

49th IUPAC COUNCIL MEETING
DETAILED AGENDA: ADDENDUM 07 June 2017

ADDENDUM TO DETAILED AGENDA (07 JUNE 2017)

Following 01 June 2017 release of the Council Agenda, a revised Council Agenda Book containing additional material, items and corrections has been prepared. The items below are to note specific sections and changes for reference. The times associated with Agenda items have been adjusted to compensate for the changes.

National Adhering Organization Delegations to Council: The Delegations and representative organizations have been updated to (1) correct Portugal's delegates, (2) add Swedish Delegation and organization and (3) add Korea, Republic of Delegation and organization (04 June 2017 receipt)

Elected Officers of the 2016-2017 Biennium: A typo has been corrected for Dr. Tollinche (ChemRAWN) and Weir, Prof. Ron (ICTNS) was added.

Item 4. Election of Officers and Members of Bureau

*Prof. Christopher M. A. Brett (Portugal) term is 2016-2019 and will continue as Elected Member of Bureau if not elected as Vice President.

*Prof. Tavarekere Chandrashekar (India) nomination for reappointment was withdrawn 24 May 2017, after the 8 April Bureau meeting, posting on the website and publication in *Chemistry International*, Vol. 39:3, pg. 48.

Item 10. Applications for National Adhering Organization (NAO) and Associate National Adhering Organization (ANAO) Status-Ratification

IUPAC received notification (05 June 2017) of a change in organization from the Czech NAO, the Czech Committee for Chemistry. They propose the Czech Chemical Society to become the successor of the current NAO-Czech Committee for Chemistry. A new body, will be formed within the Czech Chemical Society: Working Group for Terminology and Nomenclature.

Motion: Council approves the Czech Chemical Society as successor to the Czech Committee for Chemistry as National Adhering Organization.

Item 13. Reports of Division Presidents

Due to an unforeseen scheduling conflict, the report of CPCDS by Ms. Bonnie Lawlor has been added to this item and will follow the Division VIII report. The report remains in the Standing Committee section of the Agenda Book.

Item 15 and 16: The guidelines for the bid proposal presentations and voting process has been included in the Agenda book. (pg. 9, ref.)

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DETAILED AGENDA: ADDENDUM 07 June 2017

Item 21.4 National Adhering Organizations and Associate National Adhering Organizations in Arrears

Text on page 20 has been updated:

As of **08 June 2017** the amount of national subscriptions received is only **\$397,141** from **30** of 54 NAOs with accounts receivable of **\$534,661** (original budget). A summary of the national subscription payments for 2016-2017 has been updated in the Agenda Book.

Item 22.2 National Subscriptions for 2018-2019

Page 29:

The 2018 and 2019 National Subscriptions have been added in the Agenda Book.

Item 28. Approval of English as the Official Language of IUPAC

Statute 5.405 requires that Council determine every four years the one language in which the official records of the meetings of the Council, Bureau, and Executive Committee shall be kept and published. The last time that such a determination was made was at the General Assembly held in Istanbul, Turkey, in the year 2013, four years ago.

Motion: *Council is asked to approve that the one language in which the official records of the meeting of the Council, Bureau and Executive Committee shall be kept and published will be English for the period of 2018-2021.*

This item was omitted from the Detailed Agenda, but was included in the short agenda sent to NAOs in April 2017.

49th IUPAC COUNCIL MEETING
DETAILED AGENDA: ADDENDUM_2 29 June 2017

SECOND ADDENDUM TO DETAILED AGENDA (29 JUNE 2017)

*Following 01 June 2017 release of the Council Agenda and 07 June Addendum, a revised Council Agenda Book containing additional material, items and corrections has been prepared. The items below are to note specific sections and changes for reference. The times associated with Agenda items have been adjusted to compensate for the changes. Changes are noted in the Detailed Agenda by *.*

National Adhering Organization Delegations to Council: The Delegations and representative organizations have been updated to (1) include Denmark delegation, (2) include New Zealand Delegation.

In Memorium has been updated to reflect Dr. John W. Jost's passing earlier this year. The Secretariat was notified after the first Agenda Book was sent.

Item 11. Adoption of Recommendations on Nomenclature and Symbols

Dates were updated to:

Motion: *Council formally adopts the Recommendations approved by the Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS) and published, or scheduled to be published, in Pure and Applied Chemistry from **August 2015 through June 2017**.*

Item 12. Deleted First sentence of paragraph 3 after review.

Item 19. Centenary Planning was exchanged with WCLM report due to scheduling complications. WCLM becomes Item 26.

Item 21.4: Item was numbered out of sequence. Agenda corrected to Item 21.6

Item 21.5.1.2 Year End Cash Flow report renumbered to align with Agenda item

Item 21.6 NAO NS Status report renumbered to align with Agenda item. Item 21.4 was numbered out of sequence. Agenda corrected to Item 21.6.

Item 21.7 Other Income was previous Item 21.5. All subsections renumbered.

Council Motions under Item 22.1 Proposed Budgets for 2018-2019. The documents for review are now in the Agenda book.

Item 22.1: Added proposed CA document called "IUPAC and Applied Chemistry" for Council consideration.

Item 22.1 Added proposed Corporate Endowment Fund proposal for Council consideration.



INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

IUPAC Bureau Members - 2016-2017 Biennium

IUPAC Officers:

TARASOVA, Prof. Natalia (Russia), President
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ZHOU, Prof. Qi-Feng (China), Vice President and President-Elect
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HARTSHORN, Prof. Richard (New Zealand), Secretary General
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HUMPHRIS, Mr. Colin (United Kingdom), Treasurer
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Division Presidents:

WILSON, Prof. Angela (United States), President of Division I
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REEDIJK, Prof. Jan (Netherlands), President of Division II
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BRIMBLE, Prof. Margaret (New Zealand), President of Division III
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RUSSELL, Prof. Gregory (New Zealand), President of Division IV
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INTERNATIONAL UNION OF
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LABUDA, Prof. Jan (Slovakia), President of Division V
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PERUN, Dr. Thomas (United States), President of Division VII
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HELLWICH, Dr. Karl-Heinz (Germany), President of Division VIII
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Standing Committee Chairs:

TOLLINCHE, Dr. Carlos (Puerto Rico), Chair of CHEMRAWN
Federación Latinoamericana de Asociaciones Química (FLAQ)
catollm@gmail.com

WEST, Dr. Bernard (Canada), Chair of COCI
bernard.west@sympatico.ca

SÖZBİLİR, Prof. Mustafa (Turkey), Chair of CCE
Atatürk Üniversitesi
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LAWLOR, Ms. Bonnie (United States), Chair of CPCDS
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WEIR, Prof. Ron (Canada), Chair of ICTNS
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Elected Members of the Bureau: 2016-2017

BOYD, Prof. Russell (Canada), Elected Member
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INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

BRETT, Prof. Christopher (Portugal), Elected Member
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CHANDRASHEKAR, Prof. Tavarekere (India), Elected Member
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CHIU, Prof. Mei-Hung (China/Taipei)
National Taiwan Normal University
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GARELICK, Prof. Hemda (United Kingdom), Elected Member
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KEINAN, Prof. Ehud (Israel), Elected Member
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LEE, Prof. Kee-Ho (Korea), Elected Member
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OBER, Prof. Christopher (United States), Elected Member
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TUNDO, Prof. Pietro (Italy), Elected Member
Università Ca' Foscari di Venezia
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YAMANOUCHI, Prof. Kaoru (Japan), Elected Member
University of Tokyo
kaoru@chem.s.u-tokyo.ac.jp

National Adhering Organizations of IUPAC

Delegations to Council São Paulo, Brazil 2017

Australia

Prof. Mary Garson
Prof. Brynn Hibbert
Dr. Rai Kookana
Prof. Frances Separovic

Austria

Prof. Dr. Ulrich Schubert

Bangladesh

Dr. Md. Aftab Shaikh

Belgium

Dr. Rita Cornelis

Brazil

Prof. Adriano Andricopulo
Prof. Aldo Zarbin
Prof. Norberto Peporine Lopes

Bulgaria

Prof. Venko Bechkov

Canada

Prof. Neil Burford
Dr. Shan Zou
Prof. Kim Baines
Ms. Bernadette Lockyer
Mr. Roland Andersson

China/Beijing

Prof. Zhigang Shuai
Prof. Zhengping Liu
Prof. Zhibo Li
Prof. Xuefeng Jiang
Dr. Suping Zheng
Dr. Yaru Wang

China/Taipei

Prof. Chain-Shu Hsu
Prof. Ling-Kang Liu
Prof. Mei-Hung Chiu
Prof. Ito Chao
Prof. Ming-Yu Kuo

Czech Republic

Prof. Jiri Vohlidal
Prof. Miroslav Ludwig
Dr. Jan Merna

Denmark

Prof. Dr. Stefan Vogel

Egypt

Prof. Dr. Ghada Bassioni

Finland

Prof. Risto Laitinen

France

Prof. Nicole Moreau
Prof. Gerard Ferey
Prof. Jean-Pierre Vairon
Dr. Jean Pelin
Dr. Roberto Marquardt

Germany

Prof. Dr. Thisbe K. Lindhorst
Dr. Karl-Heinz Hellwich
André Augustin
Prof. Dr. Klaus Griesar
Prof. Dr. David-Samuel Di Fuccia
Prof. Dr. Willi Meier

Hungary

Prof. Attila Császár

India

Prof. Kankan Bhattacharyya
Prof. Vinod Singh
Prof. Uday Maitra
Prof. Ganesh Pandey

Ireland

Prof. Earle Waghorne

Israel

Prof. Ehud Keinan

Italy

Prof. Pietro Tundo
Dr. Mario Malinconico
Prof. Francesco Nicotra
Prof. Pierangelo Metrangolo
Dr. Silvia Borsacchi

Japan

Prof. Kaoru Yamanouchi
Prof. Ken Sakai
Prof. Laurean Ilies
Prof. Mitsuo Sawamoto
Prof. Takae Takeuchi
Prof. Masahiro Kamata

Jordan

Prof. Abeer Al Bawab

Korea, Republic of

Prof. Chang Hee Lee
Dr. Kew-Ho Lee
Prof. Myung-Han Yoon
Prof. Myoung Soo Lah

Kuwait

Mr Haef Haef

Malaysia

Assoc. Prof. Dr. Chin Han Chan
Dr. Ting Kueh Soon

Netherlands

Em. Prof. Dr. Jan Reedijk
Prof. Dr. Floris Rutjes
Dr. Jan Apotheker
Maarten van Sisseren
Dr. Jan-Willem Toering

New Zealand

Prof. Suzanne Boniface
Prof. Gregory Russell
Prof. Margaret Brimble

Nigeria

Prof. Gloria Obuzor
Prof. Sunday Okeniyi
Ms. Cynthia Ibeto

Norway

Prof. Harald Walderhaug

Portugal

Prof. Joaquim Faria
Prof. Christopher Brett
Prof. Maria Clara Magalhaes

Puerto Rico

Dra. Agnes Costa
Prof. Ethel Rios-Orlandi
Prof. Nestor Carballeira
Prof. Jorge Colon
Prof. Jose Prieto
Prof. Carlos Ruiz

Russian Federation

Prof. Petr Fedotov
Prof. Tatiana Myasoedova
Dr. Anna Makarova
Prof. Ilya Vorotyntsev

Senegal

Prof. Serigne Amadou Ndiaye
Prof. Modou Fall

Slovakia

Prof. Milan Drábik
Prof. Ján Labuda
Dr. Igor Lacík

Slovenia

Prof. Venceslav Kaucic

National Adhering Organizations of IUPAC

Delegations to Council São Paulo, Brazil 2017

South Africa

Prof. Bice Martincigh
Prof. Marietjie Potgieter
Dr. Sibulelo Vilakazi

Spain

Mr. Ernesto De Jesus-Alcañiz
Ms. Maria Concepción Gimeno

Sri Lanka

Dr. Keerthi Attanayaka

Sweden

Prof. Pher Andersson
Prof. Lars Öhrström
Dr. Irene Rodriguez Meizoso

Switzerland

Dr. Leo Merz

Thailand

Dr. Wandee Luesaiwong
Dr. Suthiweth T. Saengchantara
Prof. Dr. Supa Hannongbua
Prof. Dr. Supawan Tantayanont
Asst. Prof. Dr. Supakorn Boonyuen
Dr. Natthakarn Ketkoom

Turkey

Prof. Dr. Bahattin Yalcin
Prof. Dr. Mustafa Culha
Prof. Dr. Mustafa Sözbilir

United Kingdom

Prof. Jeremy Frey
Dr. Janet Scott
Dr. Derek Craston
Dr. Hemda Garelick
Dr. Gerry Moss

United States

Dr. Laura McConnell
Prof. Christopher Ober
Dr. Thomas Perun
Prof. Daniel Rabinovich
Dr. Michelle Rogers
Dr. Carolyn Ribes

Uruguay

Dr. Leopoldo Suescun

National Adhering Organizations

Australian Academy of Science
Austrian Academy of Sciences
Bangladesh Chemical Society
Royal Academy for Sciences and the Arts Belgium
Brazilian Society of Chemistry/Sociedade Brasileira de Química-SBQ
National Committee for Pure and Applied Chemistry
National Research Council Canada
Chinese Chemical Society
Czech Committee for Chemistry - IUPAC
National Committee of Pure and Applied Chemistry-Bulgaria
The Danish Chemical Society
Egyptian National Committee for Pure and Applied Chemistry
Finnish Chemical Society
Comite National de la Chimie
Deutscher Zentrallausschuss fuer Chemie (c/o GDCh)
Hungarian Academy of Science
Indian National Science Academy
Royal Irish Academy
Israel Chemical Society
Consiglio Nazionale delle Ricerche
Science Council of Japan
Jordanian Chemical Society
Korean Chemical Society
Kuwait chemical society
Institut Kimia Malaysia
Koninklijke Nederlandse Chemische Vereniging (KNCV)
Chemical Society of Nigeria
The Royal Society of New Zealand
Norwegian Chemical Society
Sociedade Portuguesa de Química
Colegio de Químicos de Puerto Rico
Russian Academy of Sciences
Comité Sénégalais pour la Chimie
Slovak National Committee of IUPAC, Slovak Chemical Society
Slovenian Chemical Society
South African Chemical Institute
MINECO
Institute of Chemistry Ceylon
Swedish National Committee for Chemistry
Swiss Academy of Sciences
Chemical Society Located in Taipei
Department of Science Service
Türkiye Kimya Derneği
Royal Society of Chemistry
National Academy of Sciences
PEDECIBA QUIMICA



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Prof. Richard Hartshorn (New Zealand)

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Mr. Colin J. Humphris (UK)

Executive Director

Dr. Lynn M. Soby (USA)

22 May 2017

All statutory actions necessary for convening the 49th IUPAC General Assembly and Council Meeting in São Paulo, Brazil during the period 7-14 July 2017 have been taken through the following e-mail communications:

- Nominations of Candidates for Elections (Officers and Bureau)
- Official Invitations to National Adhering Organizations and Associate National Adhering Organizations
- Official Invitations to Associated Organizations
- Official Invitations to Members of IUPAC Bodies
- Draft Agenda and Request for Additional Agenda Items for Council Meeting Sent to NAOs
- Announcement of Candidates for Elections (Officers and Bureau)

The following informational items will be completed by 1 June 2017 and distributed to the NAO Delegations and other Council Meeting Attendees:

- Final Agenda and Detailed Agenda for Council Meeting Issued
- Agenda Book for Council Meeting

Dr. Lynn M. Soby

Executive Director



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*** VOTING PROCEDURES IN IUPAC 49th COUNCIL**
(as of 30 May 2017)

There are 54 Delegations eligible to vote with a total of 170 assigned votes, not including any readmitted NAOs. NAOs applying for readmission to the Union will only be eligible to vote if their applications for NAO status are approved by Council (see Agenda Item 10). The number of assigned votes may be changed on the day of the Council meeting depending on NAO status. A Table of assigned votes as of 30 May 2017 follows this.

1. Scientific Matters (Bylaw 2.11)

Voting by individual Delegates present at time of voting - simple majority on show of hands (86 if all assigned votes are cast).

2. Non-scientific Matters (Bylaw 2.2)

Voting by Delegation Cards - simple majority of votes cast is mandatory for all election matters, but see 2.4 below (86, if all assigned votes are cast).

(each Delegation must cast all of its votes in the same sense)

2.1 Admission and Removal of Members (Bylaw 2.21)

2.1.1 Admission - simple majority of Delegation Card votes cast
(86, if all assigned votes are cast)

2.1.2 Removal - 75% of Delegation Card votes cast
(128, if all assigned votes are cast)

2.2 Election of Officers (Bylaw 2.222)

Secret ballot by Delegation Voting Slips - simple majority of votes cast
(86, if all assigned votes are cast)

(see second paragraph of Bylaw 2.222 for elimination procedure in case of lack of simple majority of votes)

2.3 Election of Bureau Members (Bylaw 2.222)

Secret ballot by Delegation Voting Slips - simple majority of votes cast per Bureau Member
(86, if all assigned votes are cast)

(see third paragraph of Bylaw 2.222 for elimination procedure in case of lack of simple majority of votes for necessary numbers of candidates)

2.4 Other Non-scientific Matters (Bylaw 2.23)

At the discretion of the Council, such matters may be adopted without a formal vote, for example, by a show of hands.

3. Change of Bylaw (Bylaw 6.2)

Voting by Delegation Cards – more than 50% of assigned votes (86)

4. Change of Statute (Statute 14.3)

Voting by Delegation Cards - 66.6% of assigned votes (113)

Note. Abstentions (Statute 5.32): In all Council voting procedures, abstentions shall not be recorded as votes.

Referenced Paragraphs from B2.2.2.2

The officers of the Union and the Elected Members of the Bureau, as defined by the Statutes, shall be elected at a regular meeting of the Council by a written and secret ballot, a simple majority of the votes recorded being required for election. The election for each officer shall be held separately. If no nominee receives a majority on the first ballot, the nominee receiving the smallest number of votes shall be eliminated from the next ballot and successive ballots shall be held until a nominee receives a simple majority of the votes recorded or there are only two nominees on which to vote. If two nominees get an equal number of votes, the Presiding Officer, after consultation with the Executive Committee, shall cast the deciding vote.

For election of Elected Members of the Bureau, the nominees receiving the highest number of votes shall be elected to the vacancies, provided that the number of votes cast for each such nominee shall be a majority of the total votes cast per vacancy. If fewer nominees than the vacancies receive a majority of such votes cast, then those receiving a majority shall be declared elected and a second ballot conducted among the remaining nominees for the remaining vacancies. If, in this second ballot, no nominee receives a majority, the nominee receiving the smallest number of votes shall be eliminated from the next ballot and successive ballots conducted until all vacancies are filled. In each ballot, the number of names on ballot papers submitted by each Delegation shall be no more and no less than the number of vacancies outstanding at the conclusion of the previous ballot.

2017 Assignment of Votes (30 May 2017)

NAO	Votes	NAO	Votes
China/Beijing	6	Denmark	2
Germany	6	Egypt	2
Japan	6	Greece	2
Korea, Republic of	6	Hungary	2
USA	6	New Zealand	2
Brazil	5	Slovakia	2
China/Taipei	5	Slovenia	2
France	5	Bangladesh	1
India	5	Bulgaria	1
Italy	5	Croatia	1
Netherlands	5	Cuba	1
Puerto Rico	5	Jamaica	1
Russia	5	Jordan	1
Spain	5	Kuwait	1
UK	5	Mozambique	1
Australia	4	Nepal	1
Belgium	4	Nigeria	1
Canada	4	Senegal	1
Israel	4	Serbia	1
Switzerland	4	Sri Lanka	1
Thailand	4	Uruguay	1
Austria	3	Pakistan*	2
Chile	3		
Czech Rep.	3		
Finland	3		
Ireland	3		
Malaysia	3		
Norway	3		
Poland	3		
Portugal	3		
South Africa	3		
Sweden	3		
Turkey	3		

Sincerely,



Dr. Lynn M. Soby



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Dr. Lynn M. Soby (USA)

12 April 2017

TO: IUPAC National Adhering Organizations

FROM: Richard Hartshorn

**Assignment of Votes to Delegations at 49th Council
12-13 July 2017, Sheraton São Paulo World Trade Center
(WTC)
São Paulo, Brazil**

ASSIGNMENT OF VOTES TO DELEGATIONS

Subject to updating eligible National Adhering organizations that may reapply for readmission, all current (54) NAOs have paid the 2016 National Subscriptions in full. The attachment lists the votes as they will be assigned at São Paulo. Assignment of votes is based on the approved National Subscription for the year 2016, as calculated in USD using first quarter 2015 exchange rate and according to the following table.

Each NAO may seat a number of Delegates equal to the number of votes to which they are entitled. In addition, each Delegation is entitled to one non-voting Secretary.

National Subscription	Votes
GTE USD 40,000	6
LT USD 40,000 and GTE USD 20,000	5
LT 20,000 and GTE USD 10,000	4
LT USD 10,000 and GTE USD ,5000	3
LT USD 5,000 and GTE USD 2,000	2
LT 2,000	1

GTE = Greater Than or Equal To
LT = Less Than

NAO	Votes		NAO	Votes
China/Beijing	6		Denmark	2
Germany	6		Egypt	2
Japan	6		Greece	2
Korea, Republic of	6		Hungary	2
USA	6		New Zealand	2
Brazil	5		Slovakia	2
China/Taipei	5		Slovenia	2
France	5		Bangladesh	1
India	5		Bulgaria	1
Italy	5		Croatia	1
Netherlands	5		Cuba	1
Puerto Rico	5		Jamaica	1
Russia	5		Jordan	1
Spain	5		Kuwait	1
UK	5		Mozambique	1
Australia	4		Nepal	1
Belgium	4		Nigeria	1
Canada	4		Senegal	1
Israel	4		Serbia	1
Switzerland	4		Sri Lanka	1
Thailand	4		Uruguay	1
Austria	3			
Chile	3			
Czech Rep.	3			
Finland	3			
Ireland	3			
Malaysia	3			
Norway	3			
Poland	3			
Portugal	3			
South Africa	3			
Sweden	3			
Turkey	3			

cc: Members of the IUPAC Bureau

In Memoriam
(as of June 1, 2017)

IUPAC was saddened to learn of the following deaths of Union colleagues reported since the 48th General Assembly in Busan, Korea 2015. We shall remember them with respect and gratitude for their service to IUPAC.

(Date of passing in parentheses, if known)

Prof. Mauro Bonardi (Italy) – Member of Division V: Titular Member, 2004-07 and Task Group Chair of project 2003-015-2-500.
(29 March 2016)

Dr. Paul De Bièvre (Belgium) – Associate Member of Division II, 1996-97; National Representative on the Commission on Isotopic Abundance Measurements, 1988-2009; National Representative on the Project Committee; Representative on the Bureau International des Poids et Mesures (BIPM), 2008-17; Task Group Chair of projects 2003-015-2-500; 2003-004-1-500 and 2001-010-3-500 and Member of many Task Groups.
(19 April 2016)

Dr. Peter Greaves Taylor Fogg (United Kingdom) – Member of Division V: Titular Member, 1996-97 and Associate Member, 2000-01.
(13 February 2016)

Dr. Heinz Gamsjäger (Austria) – Member of Division V: Associate Member, 1994-95; Titular Member, 1996-2001; Associate Member, 2002-07 and Subcommittee Chair, 2002-07.
(30 October 2016)

Prof. Derek Horton (United States) – Representative of the Joint Commission on Biochemical Nomenclature (JCBN), 1998-03 and Associate Member 2004-15.
(May 2015)

Dr. John W. Jost (United States) – Former Executive Director of IUPAC 1997-2010. Responsible for relocation of the Secretariat from Oxford, UK to the US and establishment of the office and operations in order to maintain the IUPAC official records. (06 February 2017)

Prof. Ernest Maréchal (France) – Member of Division IV: National Representative 1986-87.
(01 January 2016)

Dr. Kenneth N. Marsh (Canada) – Member of Division 1, Task Group Chair of project 2002-005-1-100 and Task Group Member on many projects.
(Notified on 3 October 2016)

Prof. Ronald Sanderson (South Africa) – Member of Division IV: National Representative (1988-99; 2002-03) and Associate Member 1996 -2001.
(Notified on 19 April 2017)

Dr. Thomas E. Sloan (United States) – Member of Division VIII: He was involved with Chemical Abstracts.
(04 September 2016)

Prof. Robert Stepto (United Kingdom) – Member of Division IV: Division Vice-President 1998-01; Associate Member 1987-89; Associate Member 1989-93; Titular Member 1987-91; Division President 2002-05; Division Past President 2006-07 and Task Group Chair 2005-005-2-400.

Dr. Camille-Georges Wermuth (France) – Member of Division VII: Titular Member 1998-2001; Division President, 1998-2000; Division Past President (2000-01) and Fellow 2008.
(September 2015)

Dr. A. Nelson Wright (Canada) – Member of COCI: Titular Member 1996-01; Standing Committee Chair, 1998 – 2003) and Fellow 2005.
(Notified on 27 May 2016)

Dr. Wentao Zhai (China) – Member of COCI: Fellow 2005 and Task Group Chair of project 2001-045-1-050.
(Notified on 27 May 2016)

49th IUPAC COUNCIL MEETING
Sao Paulo, Brazil, 12-13 July 2017
AGENDA

1. Introductory Remarks and Finalization of Agenda
2. Approval of Minutes of 48th Council Meeting and Matters Arising
3. Ratification of Decisions Taken by Bureau and Executive Committee since 48th General Assembly.
4. Announcement of Nominations for Union Officers and Bureau Members
5. Announcement of Time of Elections
6. Presentation of the Executive Committee ICSU
7. Statutory Report of President on State of the Union
8. Vice President's Critical Assessment
9. Report of Secretary General
10. Applications for National Adhering Organization (NAO) and Associate National Adhering Organization (ANAO) Status-Ratification
11. Adoption of Recommendations on Nomenclature and Symbols
12. Ratification of the Names and Symbols of New Elements 113, 115, 117, 118
13. Reports of Division Presidents (Written reports will be received and 10 minutes allowed for questions and discussion on each)
 - 13.1. Division I – Physical and Biophysical Chemistry Division
 - 13.2. Division II – Inorganic Chemistry Division
 - 13.3. Division III – Organic and Biomolecular Chemistry Division
 - 13.4. Division IV – Polymer Division
 - 13.5. Division V – Analytical Chemistry Division
 - 13.6. Division VI – Chemistry and the Environment Division
 - 13.7. Division VII – Chemistry and Human Health Division
 - 13.8. Division VIII – Chemical Nomenclature and Structure Representation Division

END OF DAY ONE – COUNCIL RECEPTION

49th IUPAC COUNCIL MEETING
AGENDA

DAY TWO:

- 14. 09.00 Election of Union Officers and Bureau Members
- 15. Bids for and Voting on Site and Dates of 51st General Assembly and 48th Congress (2021)
- 16. Bids for and Voting on Site and Dates of 52nd General Assembly and 49th Congress (2023)
- 17. Reports of Standing Committee Chairs (Written reports will be received and 10 minutes allowed for questions and discussion on each)
 - 17.1. Committee on Chemistry Education (CCE)
 - 17.2. CHEMRAWN Committee
 - 17.3. Committee on Chemistry and Industry (COCI)
 - 17.4. Committee on Publications and Cheminformatics Data Standards (CPCDS)
 - 17.5. Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS)
 - 17.6. Project Committee (PC)
 - 17.7. Evaluation Committee (EvC)
- 18. Presentation of IUPAC service awards
- 19. Plans for 50th General Assembly and 47th Congress in 2019 (Paris, France)
- 20. IUPAC100 (Centenary) Progress Report
- 21. WCLM 2017 Report
- 22. Financial Reports
 - 22.1. Biennial Report of Treasurer
 - 22.2. Report of Finance Committee
 - 22.3. Accounts for 2016-2017
 - 22.4. National Adhering Organizations in Arrears
 - 22.5. Appointment of Auditors for 2019

COUNCIL LUNCH 12:00-13:00

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- 23. Budget Proposal
 - 23.1. Proposed Budget for 2018-2019
 - 23.2. National Subscriptions for 2018-2019
- 24. Applications for Associated Organization Status
- 25. Termination of Associated Organizations
- 26. Proposals Formally Received from National Adhering Organizations
- 27. Organizational Changes in Existing IUPAC Bodies, Proposals for New and Reconstituted Bodies/Terms of Reference
 - 24.1 Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD)
 - 24.2 Approval of Terms of Reference
- 28. Proposals for Changes to the Statutes and By-Laws of the Union
- 29. Approval of Divisional Rules
- 30. Approval of Elected Officers of Divisions
- 31. Reauthorization of Commissions
- 32. Motion for English Language as the official language of IUPAC.
- 33. Important Matters Referred to Council by Bureau at 49th General Assembly, Not Covered by Items on Council Agenda
- 34. Any Other Business
- 35. Closing Remarks, Adjournment

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São Paulo, Brazil 12-13 July 2017
DETAILED AGENDA

Reference should be made to the Agenda Book for background information relating to the agenda items

Day One 12th July 2017

1. [13.00] Introductory Remarks and Finalization of Agenda

[Prof. Tarasova]
[For Information]

2. [13.10] Approval of Minutes of 48th Council Meeting and Matters Arising

[Prof. Tarasova]
[For Information and Decision; voting by show of hands]

Motion: *Minutes of 48th Council Meeting in Busan, Korea are approved.*

3. [13.20] Ratification of Decisions Taken by Bureau and Executive Committee since 48th General Assembly

[Prof. Tarasova]
[For Information and Decision; voting by show of hands]

All decisions taken by the Bureau and Executive Committee through calendar year 2016, since those approved by the Council at Busan, Korea (Minute 3, 48th Meeting), are contained in the following Minutes, which were distributed to National Adhering Organizations on the dates shown:

98 th Bureau (Montreal, Canada, April 2016)	8 April 2017
99 th Bureau (Virtual Bureau, 8 April 2017, Draft)	31 May 2017
97 th Bureau (Busan, Korea, August 11 & 14, 2015)	25 January 2016
154 th Executive Committee (Research Triangle Park, North Carolina 31 October-1 November 2016)	28 March 2017
155 th Executive Committee (Beijing, China 8-9 November 2016)	21 May 2017

Motion: *Council ratifies all decisions taken by the Bureau and Executive Committee through calendar year 2016, since those approved by the Council at Busan, Korea (Minute 3, 48th Meeting).*

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4. [13.25] Announcement of Nominations for Union Officers and Bureau Members

[Prof. Hartshorn]
[For Information]

Nominations Received: The nominees CV's, Photos and other information may be found in the Agenda Book.

Vice President

Prof. Christopher M.A. Brett (Portugal)
Dr. Javier García-Martínez (Spain)

Elected Members of Bureau

Prof. Russell J. Boyd (Canada)
Prof. Mary Garson (Australia)
Dr. Javier García-Martínez (Spain)
Prof. Chris Ober (USA)
Prof. Ken Sakai (Japan)

*Prof. Christopher M. A. Brett (Portugal) term is 2016-2019 and will continue as Elected Member of Bureau if not elected as Vice President.

5. [13.35] Announcement of Time of Elections

[Prof. Hartshorn]
[For Information]

The elections for Vice President and Elected Members of the Bureau will be held at **09:00** hours on 13 July 2017.

Motion: *Council approves the appointments of Prof. Mei-Hung Chiu (China/Taipei), Prof. Jan Reedijk (Netherlands) and Dr. Fabienne Meyers (IUPAC Secretariat) as Election Tellers.*

6. [13.40] ICSU-ISSC Merger, Executive Committee ICSU

[Prof. Nicole Moreau]
[For information and Discussion]

7. [13.50] Statutory Report on the State of the Union

[Prof. Tarasova]
[For Information]

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The President will report on the challenges and accomplishments of the Union in the current biennium. Implementing the renovated Strategic Plan, IUPAC is looking for new approaches to position chemistry as a powerful tool to achieve Sustainable Development Goals. IUPAC has strengthened its' cooperation with other unions, ICSU, UNESCO, OPCW and is seen as a leader in the chemistry enterprise in the rapidly evolving field of science. As IUPAC now approaches its centenary in 2019, a set of surveys has been carried out to outline the directions of development in its second century.

7.1 IUPAC Strategic Plan-Membership Relations

[Dr. Cesa]

[For Information]

IUPAC has surveyed its stakeholder groups, including volunteers, affiliates, NAOs and CAs, as an essential step in recruiting new members and retaining current members. The results of the surveys are being analyzed to help with the writing of value proposition statements for these stakeholders and with generating new ideas for offerings to current and new member sets.

7.2 Proposed Merger of ICSU and ISSC

[Dr. Cesa]

[For Information and Decision, voting by show of hands]

In October, 2016 an Extraordinary General Assembly of national and union members of ICSU, the International Council for Science, was held, at which the members voted in favor of a "merger in principle" between ICSU and ISSC, the International Social Science Council. IUPAC is a union member of ICSU. Such a merger would create a combined new Council that would merge the two bodies, hopefully to the benefit of its members and of the world at large. The merger-in-principle vote was not to approve the merger, but instead to entrust ICSU and ISSC to form two task groups, a Transition Task Force and a Strategy Working Group, to formulate proposals for the framework and strategic plan, respectively, for the proposed new Council. At the coming ICSU General Assembly in October 2017 in Taiwan, ICSU members will be asked to vote on whether to authorize the two organizations to merge.

Documentation on the status of work on the proposed merger can be found at: <https://icsu.org/about-us/icsu-issc-merger>. In April 2017 a draft strategic plan document, which is in the agenda book along with other background documents, was sent to ICSU and ISSC members for comment. IUPAC's response requested more information to explain how the combined Council would be more effective than the two separate organizations in bringing the natural sciences and social sciences together for mutual benefit and in enabling a stronger, more effective global voice in guiding public policy.

IUPAC leadership has not yet decided whether to vote in favor of or against the merger and is awaiting further information as mentioned above. Final documents from ICSU and

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ISSC containing the recommendations of the Transition Task Force and the Strategy Working Group are expected in July 2017, not allowing enough time for a review by delegates at Council. Therefore, IUPAC asks Council to authorize and support the IUPAC Executive Committee to review these documents and, based on their content, to formulate IUPAC's decision to vote either for or against the merger.

Motion: *Council authorizes the IUPAC Executive Committee to review documents on the proposed ICSU-ISSC merger and to vote accordingly on the merger at the 2017 ICSU General Assembly.*

8. [14.20] Vice President's Critical Assessment

[Prof. Zhou]
[For Information]

Prof. Zhou submitted the Vice President's critical assessment to Bureau 8 April 2017.

The Vice President will report on improvements and concerns regarding the Union's infrastructures and scientific priorities, giving special attention to membership relations, green chemistry and UN Sustainable Development Goals, big data, collaboration with other organizations and the 100th anniversary of IUPAC.

9. [14.40] Report of Secretary General

[Prof. Hartshorn]
[For Information and Discussion]

The Secretary General will report on the operation of the Secretariat and on initiatives taken to advance the work of the Union:

The Executive Director and the Secretary General have worked together to improve the operation of the Secretariat, notably through streamlining work-flow for various activities of the Union in order to limit the number of hand-overs involved in any particular series of tasks. It is important to recognize that there are only five people employed in the Secretariat, which is a remarkably small number given the breadth of the Union and the number of scientists to whom they supply administrative support.

There have also been significant refinements and efficiencies made in election processes, notably in standardizing the electorates used for our various bodies (following consultation with Divisions and Standing Committees), and through employment of on-line systems for both nomination and voting stages of the elections. The Secretariat is also continuously improving the new IUPAC website, developing a new members and contacts database platform to link to the website and reengineering multiple processes related to use of the database. Greater use is being made of electronic communication and web-based systems for better collaboration. It was notable that there was increased engagement of National Adhering

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Organizations in the nomination process for elections and for the IUPAC-Solvay International Award submissions, perhaps because of improvements in these systems and the new website.

Significant improvements have been made in financial systems and management, something on which the Treasurer will, no doubt, provide additional detail.

We have revised the Statutes and By Laws for the Union (see item 25.3) in order to reflect decisions taken by the Bureau, Executive Committee, and Council since they were last revised (2010).

We have also begun a process of formalizing strategic relationships with bodies such as OPCW and IYCN, through development of Memorandums of Understanding. There is also a significant and developing relationship with the Chemistry Research Data Interest Group of the Research Data Alliance, through which we are seeking to identify and address key problems for the field of Chemistry in the world of big data. This is an area where we expect to have to commit more resources in coming biennia. The MoUs are in the Agenda Book.

We also draw your attention to the proposal to introduce a new standing committee, the Interdivisional Committee on Green Chemistry for Sustainable Development (see item 25.2), and the proposed addition to the terms of reference for the Evaluation Committee (see item 25.1), which will provide a review mechanism by which we can judge the effectiveness (or otherwise) of Divisions and Committees in delivering on the mission and strategic initiatives of the Union.

These last two paragraphs reflect an intention to raise the responsiveness of IUPAC toward developments in Chemistry and the world in which we operate.

10. [15.00] Applications for National Adhering Organization (NAO) and Associate National Adhering Organization (ANAO) Status-Ratification

[Prof. Hartshorn]

[For Decision; voting by show of hands]

No organizations have applied for NAO status since the 48th Council Meeting.

IUPAC received notification (05 June 2017) of a change in organization from the Czech NAO, the Czech Committee for Chemistry. They propose the Czech Chemical Society to become the successor of the current NAO-Czech Committee for Chemistry. A new body will be formed within the Czech Chemical Society: Working Group for Terminology and Nomenclature.

Motion: Council approves the Czech Chemical Society as successor to the Czech Committee for Chemistry as National Adhering Organization.

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11. [15.10] Adoption of Recommendations on Nomenclature and Symbols

[Prof. Hartshorn]

[For Information and Decision; voting by show of hands]

Motion: *Council formally adopts the Recommendations approved by the Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS) and published, or scheduled to be published, in Pure and Applied Chemistry from August 2015 through June 2017.**

12. [15.15] Validation and Naming of New Elements 113, 115, 117, 118

[Prof. Reedijk]

[For Information]

The IUPAC/IUPAP Joint Working Party charged with the task of examining claims for the discoveries of these four elements to establish whether they fulfil the necessary criteria and assigning priorities to the successful laboratories have produced two IUPAC Technical Reports that have been sent to Pure and Applied Chemistry for expert review and subsequent publication. The first of these reports is entitled 'Discovery of the elements with atomic numbers $Z = 113, 115$ and 117 . The second is entitled 'Discovery of the element with atomic number $Z = 118$ completing the 7th row of the Periodic Table'.

The publication of both documents took place in January 2016 (*PAC* **88**, 139 (2016) and *PAC* **88**, 155 (2016) were subsequently accepted by the Executive Committees of IUPAC and IUPAP. At that time the president of the IUPAC Inorganic Chemistry Division (Division II), has started the second phase of the process to name new elements by inviting the laboratories to which priorities have been assigned to propose names and symbols for those elements deemed to have been discovered. These proposed names and symbols were received by March 31, 2017, and were considered and accepted by the Division II Committee before they were distributed for expert reviewers and for public review as provisional recommendations. The public review period took place between June 8 and November 8, 2016. All comments and suggestions were carefully checked and treated by Division II, and summarized for the Bureau and Executive Committee. The Executive Committee, at the November meeting approved the recommendations to be sent to Bureau. The Bureau and Division II finally accepted on November 28, 2016 the 4 names and symbols, and the connected paper appeared in *PAC*, **88**, 1225-1229 (2016).

The names and symbols for the four new elements and the updated IUPAC Periodic Table became final on November 28, 2016.

The following four new elements names and symbols are proposed:

- (a) nihonium and symbol Nh, for the element with $Z = 113$,
- (b) moscovium with the symbol Mc, for the element with $Z = 115$,
- (c) tennessine with the symbol Ts, for the element with $Z = 117$, and
- (d) oganesson with the symbol Og, for the element with $Z = 118$.

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After careful deliberation on these names and symbols, considering the 2016 naming rules and a public review period, the Inorganic Chemistry Division recommended these proposals for acceptance by the Bureau and for ratification by the IUPAC Council.

A descriptive summary of the complete name-giving process and the comments from the general public is available in *Chemistry International* April 2017, pages 30-32.

Motion: Council ratifies the decision of Bureau for the names and symbols of the above four elements.

[15:25-15:50 Refreshment Break]

13. [15:50] Reports of Division Presidents (Written reports will be received and 10 minutes allowed for questions and discussion on each)

[Prof. Tarasova]

[For Information and Discussion]

- 13.1 [15.50] Division I – Physical and Biophysical Chemistry [Prof. Angela Wilson]
- 13.2 [16.00] Division II – Inorganic Chemistry Division [Prof. Jan Reedijk]
- 13.3 [16.10] Division III – Organic and Biomolecular Chemistry Division [Prof. Margaret Brimble]
- 13.4 [16.20] Division IV – Polymer Division [Prof. Greg Russell]
- 13.5 [16.30] Division V – Analytical Chemistry Division [Prof. Jan Labuda]
- 13.6 [16.40] Division VI – Chemistry and the Environment Division [Dr. Petr Fedotov]
- 13.7 [16.50] Division VII – Chemistry and Human Health Division [Dr. Thomas J. Perun]
- 13.8 [17.00] Division VIII – Chemical Nomenclature and Structure Representation Division [Dr. Karl-Heinz Hellwich]
- 13.9 [17:10] [10.10] Committee on Publications and Cheminformatics Data Standards (CPCDS) [Ms. Bonnie Lawlor]*

[17.20] Closing Comments followed by the Council Reception

End of Day One



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Day Two 13th July 2017

14 [09.00] Election of Union Officers and Bureau Members and Approval of Elected Officers of Divisions

[Prof. Tarasova]

[For Decision of Union Officers and Elected members of Bureau; voting by written and secret ballot (Bylaw B 2.22)]

An introduction to the election process for the 2017 Council Meeting is included in the Agenda Book. The election slate (nominees for Vice President and for Elected Members of the Bureau) and information about each of the candidates may also be found in the Agenda Book. [see item 4.] The results of the 2018-2019 elections for Division Officers and Titular members are in the Agenda Book. The results of the Standing Committee Elections are included as well, and will be used to inform the President's decisions on membership of those committees.

Motion 1: *Council ratifies the election of the new Vice President and Elected Members of the Bureau at the 49th General Assembly in São Paulo, Brazil.*

In addition, Officers of the eight IUPAC Divisions are also listed for approval of the Council. Elections for Divisional offices have been completed prior to the Council Meeting, as is the normal procedure, and only require final ratification by the Council.

Motion 2: *Council ratifies the election of Division Officers and Titular Members that have been completed previously during individual divisional elections coordinated through the IUPAC Secretariat.*

[The following two items will run concurrently with the elections during counting of votes]

15 [09.00-10.00] Bids for and Voting on Site and Dates of 51st General Assembly and 48th Congress (2021)

[Prof. Hartshorn]

[For Decision; vote by delegations; simple majority (Bylaw B 2.23)]

The vote for 2021 will be taken first and will follow the pattern of the elections used for Officers of the Union (By-Law 2.2.2.2). If no bid receives a majority on the first ballot, the bid receiving the fewest number of votes will be eliminated and another ballot will be conducted. This will continue until a bid receives a majority of the votes cast. The decision for 2023 will be made in a similar way.

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Four proposals to host the General Assembly and World Chemistry Congress in 2021 were received. (Canada, China, Israel and Thailand) Two proposals to host only the General Assembly and World Chemistry Congress in 2023 were received. (Netherlands and New Zealand). The letters of Intent to host 2021 and 2023 were received by the deadline of 15 February. Full bid proposals were received by 30 March 2017 for Bureau review at the 8 April 2017 meeting. Bureau agreed that all bid proposals were eligible to present at Council and asked that additional information regarding each country's VISA program and any missing information or clarification be included the final proposal. The guidelines for the presentations and voting process is included in the Agenda Book.* The six bid proposals are in the Agenda Book. (Each proposal is allowed 5 minutes presentation and 5 minutes for questions from Council)

15.1 China-Chinese Chemical Society (CCS)

15.2 Canada-CNC-IUPAC & Canadian Chemical Society.

The interactive proposal from Canada may also be accessed here:
<https://indd.adobe.com/view/8a50c613-a120-40f4-8398-856c6c35fab1>.

15.3 Israel-The Israel Chemical Society

15.4 Thailand-Chemical Society of Thailand

The bid receiving the majority of votes cast will be deemed selected to host the 2021 WCC/GA.

16 [09.00-10:00] Bids for and Voting on Site and Dates of 52nd General Assembly and 49th Congress (2021)

[Prof. Hartshorn]

[For Presentation and Vote]

Six proposals to host the General Assembly and World Chemistry Congress in 2023 have been received. The Royal Netherlands Chemical Society and Royal Society of New Zealand/New Zealand Institute of Chemistry (NZIC) will present their proposals.

16.1 China-Chinese Chemical Society (CCS)

16.2 Canada-CNC-IUPAC & Canadian Chemical Society

16.3 Netherlands-Royal Netherlands Chemical Society (KNCV)

16.4 New Zealand-Royal Society of New Zealand/New Zealand Institute of Chemistry (NZIC)

16.5 Israel-The Israel Chemical Society

16.6 Thailand-Chemical Society of Thailand

The bid receiving the majority of votes cast will be deemed selected to host the 2023 WCC/GA

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17 [10:00] Presentation of IUPAC service awards

[Prof. Tarasova]

[For celebration]

18 [10.10] Reports of Standing Committee Chairs (Written reports will be received and 10 minutes allowed for questions and discussion on each)

[Prof. Hartshorn]

[For Information and Discussion]

~~18.1~~ [10.10] Committee on Publications and Cheminformatics Data Standards (CPCDS) [Ms. Bonnie Lawlor]-Presented previously.

18.2 [10.20] CHEMRAWN Committee [Dr. Carlos Tollinche]

18.3 [10.30] Committee on Chemistry and Industry (COCI) [Dr. Bernard West]

18.4 [10.40] Committee on Chemistry Education (CCE) [Prof. Mustafa Sözbilir]

18.5 [10.50] Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS) [Prof. Ron Weir]

18.6 [11:00] Project Committee (PC) [Prof. Doug Templeton]

18.7 [11.10] Evaluation Committee (EvC) [Prof. Christopher Brett]

19 [11.20] Centenary Planning

[Prof. Tarasova]

[For Information and discussion]

19.1 Status of IYPT [Prof. Tarasova]

In December 2016, the IUPAC accepted the invitation from the Russian Academy of Sciences to be the main sponsoring organization for the application to UNESCO that 2019 be designated as the International Year of the Periodic Table of Chemical Elements (IYPT), celebrating the 150th Anniversary of the great discovery of Dmitry Mendeleev.

The Periodic Table is strongly linked to IUPAC's mission. The chemical elements are crucial for humankind and our planet, and for industry. At the same time, it is important that whilst they are used to give added value and products necessary for our civilization, that this is done in a sustainable way. In particular, awareness is needed of the sustainability of the use of scarcer elements, which are often either diluted in the earth's

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crust or only available in very specific locations. An International Year of the Periodic Table of Chemical Elements would give an opportunity to draw the attention of children through to senior adults to these aspects that are important for the future of our planet, whilst also celebrating the genesis and development of the periodic table over the last 150 years. Other activities will also be organized making full use of the extensive network of IUPAC members.

International Union of Pure and Applied Physics (IUPAP), European Association of Chemical and Molecular Sciences (EUChMS), the International Astronomical Union, the International Union of History and Philosophy of Science and Technology (IUHPST) have supported the initiative of the IYPT.

In February 2017, the IUPAC President participated in the UNESCO IBSP Board meeting to promote the IYPT. The world-known laboratories (Dubna, Livermore, Oakridge, Riken), as well as national chemical societies have sent the letters to the UNESCO DG Irina Bokova expressing the support of the IYPT.

The update as for July 2017 will be given. The decision is to be made later this year.

19.2 Status of Anniversary Options

[Prof. Zhou]

[For information]

The task group of IUPAC 100 has been working closely and diligently with the Executive Director and other Union Officers to get support from our NAOs (China, United Kingdom, Italy, Switzerland and Belgium answered) and to reach related national commissions for UNESCO. In late April, with help of Chinese Chemical Society, the Chinese National Commission for UNESCO submitted a proposal to include the 100th anniversary of IUPAC in the UNESCO list of anniversaries 2018-2019. Since then, related personnel have been trying hard to get more countries or national commissions for UNESCO to sign as supportive, as well as to get support from other sectors of UNESCO. We need to accomplish the above work before 15 June, after which the proposal will be submitted to the UNESCO Executive Board at its 202nd Session.

19.3 Report from the IUPAC100 task group Chair [Prof. Mary Garson]

[Prof. Mary Garson]

[For information]

The task group considering the IUPAC Centenary in 2019 will have met on 11th Tuesday, July 2017. A status of the activities will be discussed.

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20 [11:35] Plans for 50th General Assembly and 47th Congress in 2019 (Paris, France)

[Prof. Hartshorn]

[For Information and Discussion]

The French NAO (Comité National Français de la Chimie) will present a brief report on preparations for the General Assembly and World Chemistry Congress to be held in Paris, France in 2019. [Prof. Jean-Pierre Vairon]

LUNCH: 12:00-13:00

21 [13:00] Financial Reports

21.1 Biennial Report of Treasurer

[Mr. Humphris]

[For Information and Discussion]

The current financial outlook emphasizes the need for change and innovation. The 2016 performance was better than plan and we are starting to see the benefits of tighter financial control and planning given the changes to our accounting systems. The biennium 2016/17 is still however expected to show an overall deficit and although the 2018/19 budget deficit is smaller than for the current biennium, the position is clearly not sustainable in the long run. Eventually we must either increase income or cut costs or both. Critical to this is that members, of whatever category, see value to them in what IUPAC stands for, the work it does and the priorities set.

IUPAC has long relied on subscriptions from our NAOs for the majority of its income, but most countries are seeing substantial pressure on their science budgets. NAOs were also unhappy with the methods of calculating National Subscriptions. The old model was abandoned in 2015, an interim budget approved and the work of the National Subscription task force initiated. The task force has been working on a new approach based on an index of chemistry knowledge (Chemistry publishing and patenting) and capital impact (Size of GDP and the Chemical Industry). The objective is to provide eventually a more realistic, transparent and predictable model that allows an evolutionary change. Such a change will always be controversial given there will inevitably be winners and losers. Countries will have their own concerns about the choice of a particular set of factors and/or the individual factors themselves. Based on feedback from the most recent round of consultation webinars, the task force needs to review its recommendation as a result of updating information for some countries. The timing means this will not be available for Council.

In developing the budget however I believed it was unrealistic to plan longer term on a contribution from NAOs much greater than the 2017 budget of \$917k. The proposed budget is therefore based on the \$ USD NAOs subscriptions approved for 2017. The budget

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therefore includes proposed national subscriptions for 2018 and 2019. These can be superseded once agreement is reached on a new formula and implementation method.

2018/19 sees the introduction of new activities such as the interdivisional committee on Green Chemistry for Sustainable Development, work on Big Data, IUPAC 100, commitments to ICSU projects. It is therefore essential that we develop new income streams from other membership categories and from our work products. The proposed budget for 2018/19 accommodates the additional work within the existing level of funding to Divisions, Committees and for General Assemblies. The Budget also introduces new thinking for the Affiliate Membership Scheme (AMP) and Company Associates (CA) in an effort to engage these constituencies more effectively and to generate meaningful income streams. Inevitably this involves reconsideration of the benefits to these other membership groups and their rights within the IUPAC Divisions and Committees. The proposed budget and changes to AMP and CA schemes were endorsed and recommended to Council by both the Finance Committee and Bureau.

The scope of our work and the cost of the Secretariat to support this are tightly interdependent. We have invested in new systems so that we can administer the Union more efficiently and effectively. We cannot however continue to add activities without retiring others. As the Finance Committee puts it, we need to ensure a focus on only those activities where IUPAC has unique competence. This will become a theme for the next biennium – we need to decide more rigorously what we should do, what we shouldn't do and ensure a Secretariat sized and capable to support this.

21.2 Report of Finance Committee

[Mr. Humphris]

[For Information and Discussion]

The Finance Committee met in Zurich on 8th February 2017. A number of recommendations were noted and decisions made:

- All advice and recommendations from the Finance Committee should be available to Bureau at its following April meeting
- It was noted that Pat Confalone and Georg Wießmeier finish their terms in 2017 but are available for reelection and will be nominated to the President.
- The Finance Committee recommended a change in Auditors for the financial year 2019. A recommendation to change will be required by **2017** Council.
- The Investment Policy statement was reviewed and reconfirmed without change.

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- The proposed budget 2018/19 was supported. The need for new income was recognized and the bold step with Company Associates supported. The Finance Committee noted however that the Secretariat costs were showing inflationary pressure whilst the science funding was unchanged. They felt this was a poor signal. There was a need to ensure that IUPAC focus only it can uniquely undertake and that the scope of science activities and the necessary administrative support/cost is kept under review. It was recommended that extra-budgetary expenditure be kept to a minimum by building all costs that can be anticipated into the budget.
- The proposed approach to National Subscriptions was supported and the majority of members recommend the use of USD \$ as the subscription currency.
- The proposed endowment scheme was strongly supported and IUPAC encouraged to progress this as a priority for areas in which IUPAC has unique competence. Advice should be sought from our financial advisors BB&T.

The minutes of the Finance Committee Meetings of 2015 and 2016 are in the Agenda Book.

21.3 Accounts for 2015-2016

[Mr. Humphris]

[For Information and Discussion]

The Agenda Book contains the audited financial statements for 2015 and 2016 in which no areas of concern were noted by the auditors. The 2016 Audit was completed and available for the Bureau meeting in April 2017.

21.4 Profit and Loss Statement

The complete Profit and Loss statement for 2016 is below and behind this is detail that exemplifies the power of the new accounting system and the tracking of all financial transactions now possible. The data provide a better foundation for IUPAC to prepare budgets than has existed before. The data make comparisons with 2015 and the original 2016 budget together with a commentary to aid understanding. Looking at 2015 (a higher cost General Assembly Year) and 2016 (off year) together gives a feel for a typical IUPAC biennium. A summary view is provided below:

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IUPAC Income Statement - Summary						
						Budget-Actual
	2015 Actual	2016 Actual	2016 Budget	2016 Variance		
Income						<i>Red=Positive Income</i>
Program Income	\$ 1,337,493	\$ 1,134,277	\$ 1,095,472	(38,805)		
Direct Public Support	43,342	29,000	-	(29,000)		
Investments	85,328	205,138	139,992	(65,146)		
Miscellaneous Income	32	-	-	-		
Total Income	1,466,195	1,368,415	1,235,464	(132,951)		
Cost of Good Sold	-	34,045	-	(34,045)		
Gross Profit	\$ 1,466,195	\$ 1,334,370	\$ 1,235,464	(98,906)	<i>Over on Income</i>	
Expense						<i>Red=Over budget</i>
Awards, Grants & Contribution	9,159	29,000	-	(29,000)		
Fixed Costs - Salaries & Benefits	518,054	557,443	547,649	(9,794)		
Lease, Insurance & Bank Fees	80,214	79,531	53,769	(25,762)		
General & Administrative Expenses	161,661	106,679	40,055	(66,624)		
Contracted Services	122,420	89,114	19,000	(70,114)		
Depreciation Expense	12,407	9,850	20,475	10,625		
Other Expenses	30,055	28,548	26,592	(1,956)		
Travel & Meetings	603,929	385,109	589,776	204,667		
Miscellaneous Expense	1	-	-	-		
Total Expenses	\$ 1,537,901	\$ 1,285,275	\$ 1,297,315	12,040	<i>Under on Expenses</i>	
Net Ordinary Income / (Loss)	\$ (71,706)	\$ 49,095	\$ (61,851)	(110,947)		
Other Income & Expenses						
Other Income	(2,391)	(1,013)	-	1,013		
Other Expense	63,039	17,598	25,000	7,402		
Net Other Income / Expense	\$ 60,647	\$ 16,585	\$ 25,000	8,415		
Nominal Income / (Loss) for the period	\$ (132,354)	\$ 32,510	\$ (86,851)	(119,362)		

In summary, 2016 shows a positive net income \$32K relative to budget expectation of a deficit \$(87K).

The principal income variances were the AMP membership income and Publication/Royalty \$43k (note: the CI costs now split out into General & Administrative Expense), plus the finance portfolio up \$65k. The Public support \$29k has a matching expense.

The principal expense variances were bank fees associated with reimbursements of claims, and transaction fees; increased IT support due to the office move and the inclusion of the CI costs with G&A (the budget had these netted off against income) but importantly substantially reduced travel, accommodation and subsistence costs arising from claim forms associated with IUPAC projects.

As indicated, throughout 2016 IUPAC continued a substantial restructuring of its Secretariat, its functions and the necessary IT infrastructure to underpin this. Despite this, most of these expenses were accommodated within the approved budget. The remainder were approved as extra budgetary items by the officers. This has involved a

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number of projects overseen by the IUPAC officers and approved by the Executive committee. Important amongst these were:

- The operation of the full accrual accounting system (software and consultancy done in 2015) and the appointment of Jay Lucido as financial controller (within the budgeted Secretariat headcount of five).
- Multiple moves to the new permanent office accommodation (incremental costs of \$1,500). Purchased new office furniture and fittings at a cost of \$33,290 in 2015- there is a depreciation cost of \$5,153 in 2016 with a balance remaining of \$33,380.
- Upgrading the stability, decreasing risk and improving the security of the IT infrastructure commensurate with an international organization (positive variance in budget).
- The development of the new website as a foundation for the future public face of IUPAC and communications. The initial budget was approved at \$39,154. The expenditure to Phase I completion was \$136,280, including the beta version for the General Assembly pre-launch feedback. The website has been capitalized and is recorded on the balance sheet.
- The upgrading of the databases used in the administration of the Union and the interface with the new website to greatly improve the efficiency of working in the Secretariat. The expenditure that was approved was \$50,130 (includes \$5,000 scoping study for development of the SOW) in 2016 and remainder of \$44,860 will be spent in 2017 (development, implementation & training).
- Consulting support of \$19,000 was approved by the officers for the evaluation of chemistry in the member countries as a basis for a new approach to National Subscriptions.

21.5 Balance Sheet as of 31st December 2016

In summary, 2016 shows net increases in Cash and Cash equivalents, net investment in important fixed infrastructure mentioned (website, databases), the good performance of the investment portfolio and a reduction in subscriptions receivable. The opportunity was taken to write off the aging inventory of books.

The Accounts receivable (predominately NAOs outstanding subscriptions) was significantly reduced in 2016 due to focused attention, multiple reminder emails and outreach. The Accounts Payable shows a lower liability year on year. IUPAC's first filing for North Carolina state sales tax reimbursement as a non-profit was in 2015.

The Audited Summary Balance Sheet for 2016 is below:

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IUPAC Balance Sheet As of 31 December 2016						
				2015	2016	2016 vs. 2015 YOY
ASSETS						
	Current Assets					
	Checking/Savings					
	Total Checking/Savings			154,577	180,833	26,255
	Accounts Receivable					
	Total Accounts Receivable			203,829	117,365	(86,464)
	Other Current Assets					
	Allowance for Doubtful Acct			(50,913)	(25,348)	25,565
	Inventory			34,045	-	(34,045)
	Sales Tax Receivable			4,797	1,336	(3,460)
	Total Prepaid Expenses			5,278	2,382	(2,897)
	Total Other Current Assets			(6,793)	(21,630)	(14,837)
	Total Current Assets			351,613	276,568	(75,045)
	Fixed Assets					
	Total Fixed Assets			123,906	187,992	64,086
	Security Deposits			3,565	3,565	-
	Total Marketable Securities			3,818,558	3,889,081	70,523
	Total Other Assets			3,822,123	3,892,646	70,523
	TOTAL ASSETS			\$ 4,297,642	\$ 4,357,206	\$ 59,563
LIABILITIES & EQUITY						
	Liabilities					
	Current Liabilities					
	Accounts Payable					
	Total Accounts Payable			132,689	78,232	(54,456)
	Total Credit Cards			22,648	172	(22,477)
	Other Current Liabilities					
	Total Payroll Liabilities			34,570	44,701	10,131
	Total Unearned Membership Income			34,838	21,823	(13,015)
	Deferred Rent			18,635	21,506	2,871
	Total Short-term Notes Payable			-	100,000	100,000
	Total Other Current Liabilities			88,043	188,030	99,987
	Total Current Liabilities			243,380	266,434	23,054
	Total Liabilities			243,380	266,434	23,054
	Equity					
	Net Asset w/ Donor Restriction			204,357	204,357	-
	Net Asset w/o Donor Restriction			105,422	100,110	(5,312)
	Unrestricted Net Assets			3,876,837	3,749,795	(127,042)
	Nominal income / (loss) for the period			(132,354)	32,510	164,864
	Total Equity			4,054,263	4,086,772	32,510
	TOTAL LIABILITIES & EQUITY			\$ 4,297,642	\$ 4,353,207	\$ 55,564

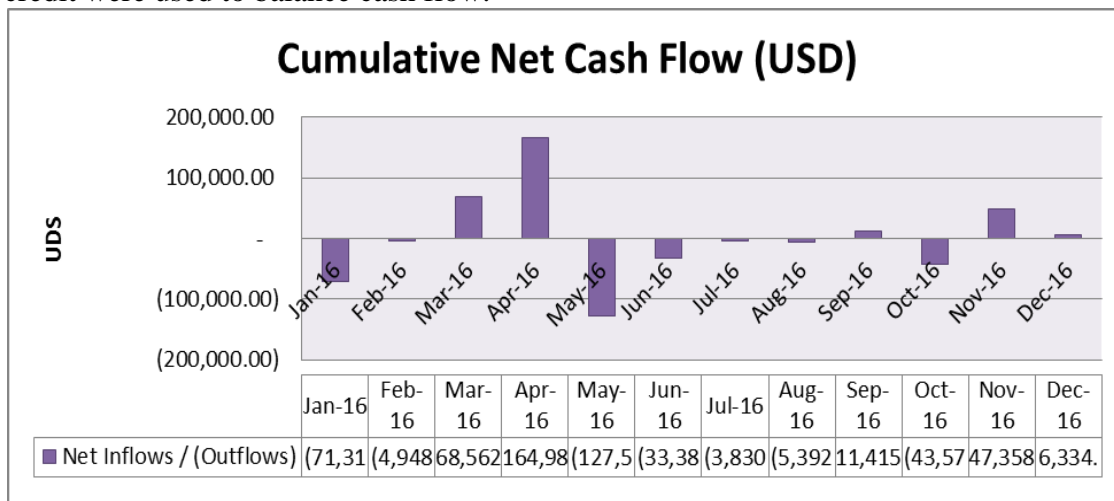
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21.5.1 Cash Flow 2016

The cash flow issues center around the difficulty of predicting when NAOs will settle their subscription invoices or when claim forms will be submitted by volunteers.

21.5.1.1 Cumulative Net Cash Flow:

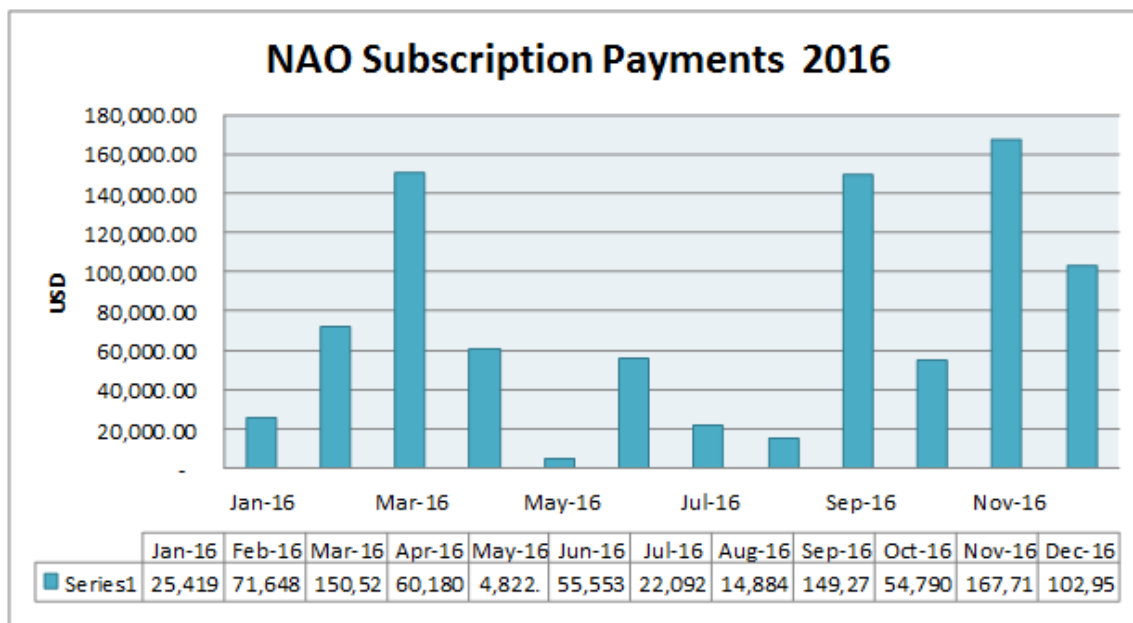
In 2016, IUPAC Divisions and Standing Committee hold annual meetings throughout the year. Planning for these expenses and timing is difficult, however, a process was implemented to determine when each meeting would occur and estimate the expenses associated. Currently the Claim form submissions are tracked to insure expenses were accounted for in the year they occurred. Given the uncertainties of NAO payment timing and the reimbursement requests, the investment dividends and interest and the line of credit were used to balance cash flow.



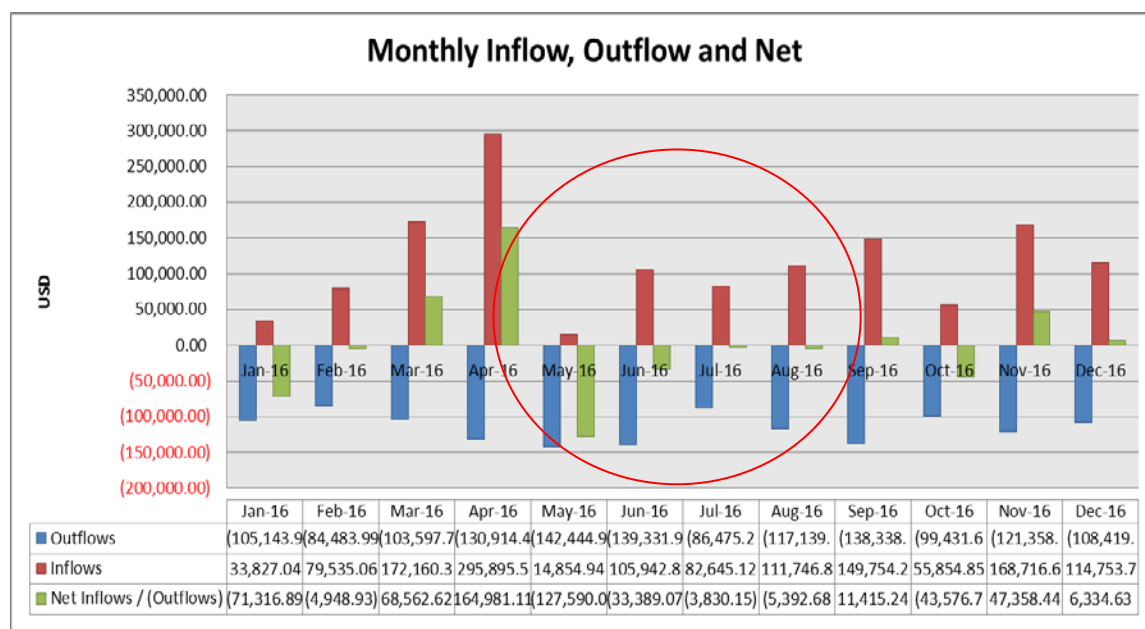
21.5.1.2 Cash Flow Issue: NAO Payments

Currently NAO payments are invoiced in September for the following year with a due date of 1 January 20xx and past due 31 December 20xx and thus can be received at any point through the year (or year after) reflecting in part the different mechanisms for funds from governments and National Academies. This creates erratic and unpredictable cash flow for IUPAC's main income stream that is particularly difficult to manage. The 2016 NAO subscription payments throughout the year are below. Many Academies tend to pay in the fall due to funds availability. The chart details are in the report in the agenda book.

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During 2016, there was a significant shortage of cash in May-August. The chart below shows the monthly cash flow situation. IUPAC was forced to utilize our maximum line of credit in July and August (\$50,000 each month). This is shown as Total Short Term Notes Payable in the balance sheet.



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21.6 National Adhering Organizations and Associate National Adhering Organizations in Arrears

[Mr. Humphris]
[For Information and Discussion]

There are no National Adhering Organizations that are in arrears for 2016.

The following National Adhering Organizations were notified of the impending loss of NAO status in September 2016 and reminded of the outstanding invoices: Argentina, Bulgaria, Kazakhstan, and Pakistan. We received payments of the 2015 and 2016 National Subscription from Bulgaria. As of the 31 December 2016 deadline, no payments were received from Argentina, Kazakhstan and Pakistan and were considered automatically removed from NAO status, due to being 24 months in arrears. All three were notified 11 January 2017 of this change and invited to reapply for NAO status and sent the readmission policy and application. The overall loss for 2015-2016 against budget for these three countries amounts to \$24,298.

2017 National Subscriptions were budgeted as \$931,802 but is reduced to \$916,577 given the member nations who ceased their NAO status in 2015 and 2016. (NAOs above plus Ethiopia, Tunisia and Luxembourg's withdrawal) As of 08 June 2017 the amount of national subscriptions received is only \$397,141 from 30 of 54 NAOs with accounts receivable of \$534,661 (original budget).* The summary of the NAO subscription payments for 2016-2017 is in the Agenda Book for reference. This was creating a major cash flow issue in January and February, including our ability to meet payroll. As noted above we have already made the full use of our line of credit.

Associate National Adhering Organizations:

IUPAC approved Ghana Institute for Pure and Applied Chemistry at Council in 2015. They have paid their 2014 and 2015 ANAO fee and have an outstanding balance due for 2016 and 2017. Under IUPAC Statutes Ghana would have to convert to full NAO status but their intention is unclear despite reminders to this fact.

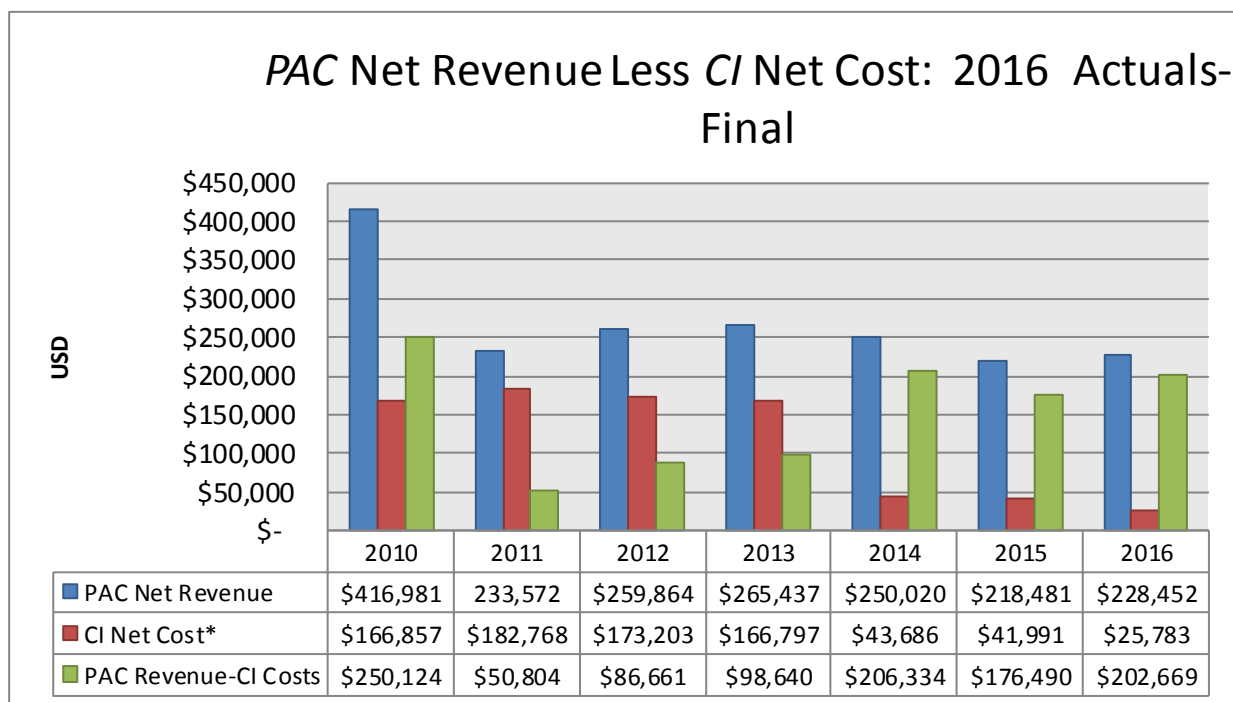
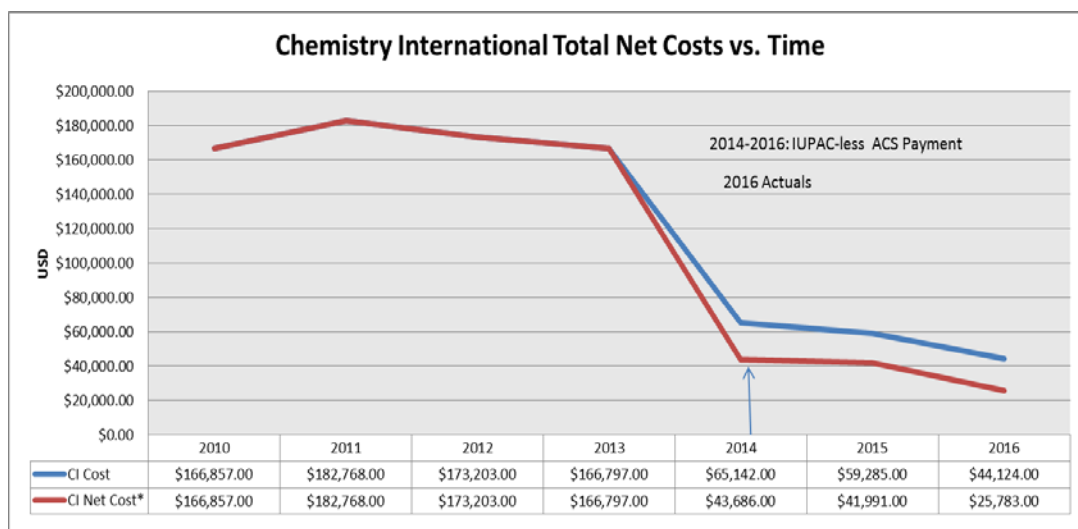
21.7 Other Income

21.7.1 Publishing income

IUPAC's share of publishing income from PAC and CI from the agreement with De Gruyter in 2016 was \$202,669. This number is shared with Council members to allow year on year monitoring of publishing performance. In the published accounts the phasing is different as a result of the agreement. Final settlement invoices and payments are made in April of following year along with a PAC advance payment of €100,000 now negotiated for future years. The year-end payment for 2016 made on 15 May 2017 will be part of the 2017 accounts and audit.

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Considering year on year publishing performance, CI net cost to IUPAC continues to fall. We intend to maintain this trend by moving to more digital access and developing a new CI Digital First platform on the IUPAC website.



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21.7.2 Company Associates Program

IUPAC had 57 Company Associates in 2016 that accounted for just \$5,950 in income in 2016; less than budgeted. In 2017 the invoicing was sent earlier to account for the CA income within the subscription year. The 2017 Company Associates are down to 48. The CA program is under active review to ensure it is more relevant to both companies and IUPAC, to significantly add to income and to remove unnecessary complexity and administrative burden. Currently the annual subscription is just \$450, unchanged for many years. In some cases CA status is granted for support of IUPAC activities. Dow Chemical Company was granted enduring CA status for the support of IYC. Only those companies participating directly with IUPAC pay \$450. Most are managed through an NAO in which case IUPAC receives just \$50, the NAO retaining the bulk of the subscription.

21.7.3 Affiliate Members Program

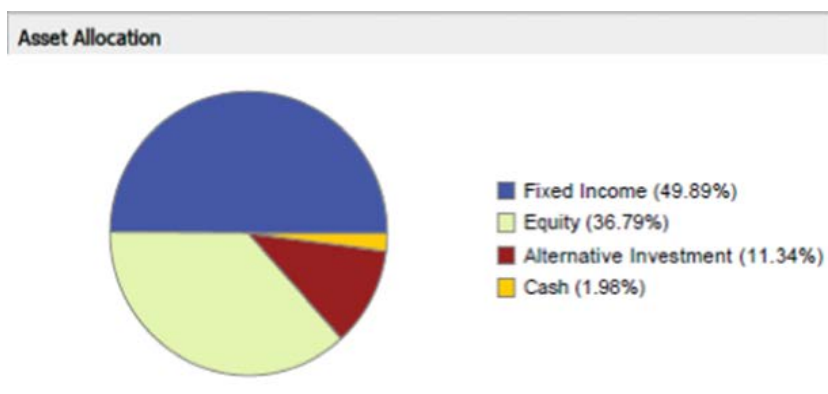
IUPAC also allows individual membership through the AMP scheme. This is both a fee-bearing program and an IUPAC sponsored program for members from developing countries. The current AMP fee is \$35.00, again unchanged for many years. It is collected both by IUPAC directly and through national chemical societies by some NAOs e.g. USA and France. Membership through a NAO/Chemical Society remits \$20.00 per member; ACS remits \$21.00 and represents ~66% of the AMP membership. In 2016 there were 1150 paid members; 54 individual sponsored members, and 6 sponsored Countries having 113 members. This provided a 2016 income of \$28,225 and a cost to IUPAC of \$3,500 for sponsored (by IUPAC income) membership. This resulted in a net income of \$24,725, before CI print costs are deducted. Benefits of membership are a paper copy of *Chemistry International* and discounts to IUPAC endorsed conferences. The AMP membership subscriptions and benefits are currently being reviewed to ensure they represent a fair balance between subscription and benefits, a meaningful income stream and as a mechanism to encourage engagement of chemists from all countries.

21.7.4 Investment Portfolio

In 2016 the IUPAC Investment performance the portfolio showed a net appreciation of \$87,550 over 2015 to a total value of \$3,967,624. Interest and Dividends of \$125,445 was earned before fees. Of this, \$77,867 was used to help management of cash flow. There were no withdraws of principal capital from the investment portfolio. Management of the portfolio is the responsibility of the Finance Committee acting on expert guidance of advisors BB&T/Scott&Stringfellow.

The overall allocation class was stable throughout 2016.

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21.8 Appointment of Auditors for 2017 and 2018

[Mr. Humphris]

[For Decision; voting by show of hands]

It is recommended to Council that we the appointment of Batchelor, Tillery and Roberts, LLP, of Raleigh, North Carolina USA as IUPAC Auditors for 2017 and 2018.

Motion: *Council approves the appointment of Batchelor, Tillery and Roberts, LLP, of Raleigh, North Carolina USA as IUPAC Auditors for 2017 and 2018.*

21.9 Appointment of Auditors for 2019

[Mr. Humphris]

[For Decision; voting by show of hands]

The Finance Committee recommended at the 2017 February meeting to change auditors beginning for the accounting year 2019. Requests for proposals are being solicited and these will be considered by the Finance Committee and Bureau so that a recommendation can be provided at Council in 2019 for approval.

Motion: *Council approves the process for a change of auditors for fiscal year 2019 onwards.*

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22 [13.30] Proposed Budget for 2018-2019 and National Subscriptions for 2018-2019

[Mr. Humphris]

[For Discussion and Decision; voting by cards, >50 % of votes cast (Bylaw B2.2)]

22.1 Proposed Budget for 2018-2019

The full budget proposal for the biennium 2018/19 is attached below. The budget for 2018/19 is for a smaller deficit of \$153k than budgeted for 2016/17 that showed a deficit of \$214k. This is despite the inclusion of additional anticipated expenditure for IUPAC 100 and the cost of our commitments to the ICSU project on Women in Science. The budget improvement is in part due to the greater understanding of the financial performance now available through the new accounting system and reporting and our understanding of the improved performance in 2016. A key issue was the control of costs at the 2015 Busan General Assembly that is anticipated to be repeated in São Paulo 2017 and Paris 2019.

The Budget is linked directly to the individual budgets of the Division and Standing Committee allocations, which are included in the Agenda Book.

Items and key Budget assumptions Council should consider are:

- The proposal to maintain the total National Subscription income from existing members at the 2017 level with individual national subscriptions set at the 2017 level already approved in USD. We are seeking to grow other income lines to offset US inflation of expenses.
- The proposed increase in income from Company Associates (CA) following a review of membership benefits and costs. The proposal is in the Agenda Book (IUPAC and Applied Chemistry).^{*} It reflects a determination to reactivate corporate engagement (subscription up to \$2500) but with two other benefits. Restoration of the financial benefits to companies that were lost in the transition to DeGruyter (discounts on publications) and the provision of rights for companies to nominate scientists for election to Associate positions in Divisions and Standing Committees irrespective of home country.
- A (long overdue) review of the individual affiliate membership program (AMP). The budget assumes subscription fees are increased to \$50 with a premium fee of \$75 for those wishing to receive a printed version of *CI*. All other members will be provided authenticated access to *CI Digital First* by default in addition to existing discounts for publications and to IUPAC conferences. The intention is to grow the worldwide membership and engage it more effectively in IUPAC activities by enabling affiliate members to be nominated for election to Associate positions in Divisions and Standing Committees irrespective of home country.

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Bureau supported these ideas to increase the engagement of individual chemists in all countries (not just the 54 adhering countries) whether they are in academia, government or industry.

- New earnings from database with De Gruyter (PAC Standards Online).
- The growth in salaries and benefits driven by allowance for salary increases (3% p.a.), full accounting for earned vacation (a non-cash item) and increasing US health insurance costs
- The forecast reduction in General and Administrative expense now that IUPAC is established in its new office and we see the benefit of the investment in new operating systems and databases.
- Reduction in the printing and distribution costs for Chemistry International with the move to digital publishing and a requirement for those members requiring paper copies to pay the cost premium for this.

The short form P&L for 2016 Actual, 2017 Budget, 2018 and 2019 budget are shown below:

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		2018-2019 Proposed Budget				
		2016		2017	2018	2019
		Actual	Budget	Budget	Budget	Budget
Ordinary Income/Expense						
Income						
Program Income						
	Membership Dues – NAO	883,284	886,900	931,200	917,033	914,375
	Membership Dues – ANAO	250	–	–	500	750
	Membership Dues – AO	1,900	–	–	2,000	2,000
Company Associates						
	CA – NAO	2,350	6,696	6,700	25,000	50,000
	CA – Rest of World	3,600	–	–	5,000	5,000
	Total Company Associates	5,950	6,696	6,700	30,000	55,000
Affiliate Membership Program						
	AMP – Chemical Society	26,790	15,000	15,000	32,703	37,375
	AMP – Individual Members	1,435	–	–	17,609	20,125
	Total Affiliate Membership Program	28,225	15,000	15,000	50,312	57,500
Publication Income						
	Database Income – DeGruyter	200,474	182,496	241,000	235,000	250,000
	Database Income – Springer	–	–	29,000	24,474	20,144
	Royalty Income	–	–	–	22,000	22,000
	Royalty Income	14,195	2,500	2,500	10,000	15,000
	Total Publication Income	214,668	184,996	272,500	291,474	307,144
	Total Program Income	1,134,277	1,093,592	1,225,400	1,291,319	1,336,769
	Total Direct Public Grants	29,000	–	–	30,000	30,000
	Total Direct Public Support	–	–	–	5,000	10,000
	Total Government Grants	–	–	–	1,000	1,000
	Total Investments	205,138	139,992	140,000	141,000	142,000
	Miscellaneous Income	–	–	–	–	–
	Total Income	1,368,415	1,233,584	1,365,400	1,468,319	1,519,769
Cost of Goods Sold						
	Cost of Goods Sold	34,045	–	–	–	–
	Gross Profit	1,334,370	1,233,584	1,365,400	1,468,319	1,519,769
Expense						
	Total Awards, Grants & Contributions	29,000	–	–	–	10,000
	Total Salaries & Earned Vacation	438,192	426,000	456,040	475,497	489,765
	Total Employee Benefits	119,251	121,649	126,423	137,809	149,859
	Total Insurance & Workers Comp	2,507	2,616	2,370	2,600	2,700
	Total Lease & Rent Expense	56,930	49,953	57,440	55,127	54,952
	Total Interest, Payroll & Bank Fees	20,094	1,200	17,580	20,750	20,800
General & Administrative Exp						
	Office Supplies	2,840	2,400	3,600	3,300	3,400
	Total IT Support & Maintenance	48,854	26,520	26,820	24,300	25,300
	Total Communication Expense	6,284	6,515	6,491	6,515	5,567
	Total Cost of CI Production (DG)	41,754	–	–	19,380	25,858
	Total Postage, Prntg & Ref Materials	6,947	4,620	6,000	7,300	8,700
	Total General & Administrative Exp	106,679	40,055	42,911	60,795	68,825
	Total Contracted Services	89,114	19,000	59,300	63,750	63,750
	Total Facilities and Equipment	9,850	20,475	36,570	46,104	46,104
	Total Other Expenses	28,548	26,592	25,850	28,100	28,100
	Total Travel & Meetings	385,109	589,776	654,399	423,560	872,340
	Miscellaneous Expenses	–	–	–	–	–
	Total Expense	1,285,275	1,297,315	1,478,883	1,314,092	1,807,195
	Net Ordinary Income	49,095	(63,731)	(113,483)	154,227	(287,426)
	Net Other Income (Expense)	(16,585)	(25,000)	(12,000)	(10,000)	(10,000)
	Net Income / (Loss)	32,510	(88,731)	(125,483)	144,227	(297,426)
	Biennium Income(Loss)			(214,215)		(153,199)

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Motion 1: *Council approves the proposal for the reassessment of the Company Associates program*

Motion 2: *Council approves the proposal for the revision of subscriptions and benefits of the Affiliate Members Program*

Motions 3: *Council approves of the Proposed Budget for 2018 – 2019*

To supplement new income from Company Associates, Affiliate Members and from publishing, we are considering ways to facilitate broader engagement with Corporations given the important and relevant new strategic priorities for IUPAC in relation to sustainable development and Big Data. With this in mind, we are considering the creation of an endowment fund to create the opportunity for corporations to become strategic partners or corporate sponsors of IUPAC and a proposal is included in the Agenda Book.* With the new accounting system in place and through our work with BB&T we feel we have the capability to administer this type of approach.

The principles would be easily adapted for grants from funding bodies and trust or for donations or bequests from individuals who wish to contribute to the work of IUPAC.

At this stage Council is asked to support this initiative to enable the Executive Committee to implement it as soon as the legal and financial details can be finalised. No account of possible benefits in the 2018/2019 biennium has been made at this stage.

Motion 4: *Council approves of the proposal for the Executive Committee to proceed with the creation of the Endowment Fund*

22.2 National Subscriptions for 2018-2019

In Busan, IUPAC committed to bring forward new proposals for 2018/19 that were more predictable, transparent and represented a better balance of the national chemistry activities, their impact and national wealth. The National Subscriptions for 2016/17 were calculated on a provisional basis given dissatisfaction with the method for calculating subscriptions.

The task force has analysed national activities in chemistry and their impact on national wealth to develop a proxy for the chemistry activity in each country that provides a measure or an index of:

- Knowledge comprising firstly analysis of publishing activity the Scopus database and secondly of patent activity in chemistry relevant categories from analysis of patent applications for the Thomson Reuters Innovation database.
- A Capital Index providing a value measure of firstly the National GDP (World Bank data) and the size of the Chemical industry based on Cefic data. Industry impact could be represented either by absolute value or the importance the chemical industry as the percentage of GDP.

All data is a historical average for the past five years. The data is normalised to provide the index in each category (based on the largest as 1.000) and the indices summed, unweighted to give an

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overall proxy for each country.

In addition the task force

- Surveyed National Adhering Organizations twice on the firstly principles of a new approach to calculating national subscriptions and secondly proposals for the proxy, possible banding of subscriptions and a recommendation to invoice in \$ USD.
- Benchmarked IUPAC with other Science Unions

The results of the first survey work were endorsed by the Executive Committee and summarized in a second survey of National Adhering Organizations included in the agenda book.

In April 2017 Bureau noted from the surveys that:

- Most science unions have a banded subscription model linked directly to voting rights. IUPAC has six voting bands linked to the actual subscription paid. National members agreed to a banded subscription model if this is useful within the calculation.
- Most agreed to an evolutionary approach, with migration from current subscriptions to the new levels no greater than 5% per annum up or down.
- The critical consideration for the assessment of the scale and impact of chemistry by country across the world is the availability of reliable, comparable data. NAOs would prefer the data to be available from public sources for transparency
- There were reservations about the use of USD \$ invoicing.
- The proposed 2018/19 budget assumes a level of income overall from individual member countries unchanged from the 2017 budget. This is subject to change depending on the Council vote on the National Subscription task force recommendations.

Based on the Bureau approval, a full provisional proposal including national subscription calculations and individual country's national data was sent to all NAOs with an invitation to join one of six regional webinars held in May 2017. The objectives were to ensure a good understanding of the approach, to enable feedback of any concerns and to highlight any national data issues.

The provisional National Subscription task force recommendations sent to NAOs were:

- The use of a proxy based on four factors combining a Knowledge Index comprising factors for Intellectual Property IP and Publishing (based on number of articles) and a Capital Index comprising the absolute GDP and the % of this GDP represented by chemicals.
- The use of these factors, unweighted, to calculate an overall proxy for each country

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- Calculation of a proxy subscription in \$ USD as a proportion of the total budgeted income for NAOs. For each country, a calculated proxy subscription (NSp)_i based on a simple proportion of an individual country's proxy score (Np)_i to the total of all proxy scores (Np)_n multiplied by the total income budgeted from NAOs (NS)_n in \$ USD:

$$(NSp)_i = (Np)_i / (Np)_n \times (NS)_n$$

- For each country a comparison is made between (NSp)_i and its 2017 subscription (NS₂₀₁₇)_i measured in \$ USD to assess if this is an increase or decrease over 2017. Depending on whether this is an increase or decrease the final subscription (NS)_i is calculated as (NS₂₀₁₇)_i migrated at +/- 3% annually until the calculated proxy subscription (NSp)_i is reached..
- Invoicing subscriptions in future in \$ USD.
- The use of this proxy approach to calculate the subscription due from any new membership applicants.
- The current voting bands are unchanged.
- Given the relative insensitivity of the IP index and domination by a small group of countries it is not proposed to review this aspect of the proxy calculation every biennium. All the remaining proxy information is readily available for updating. The IP index might be updated every 2 or three biennia as a check.

12 NAOs joined the calls or gave feedback. Most supported the approach, and the proposal for an evolutionary implementation. All supported the proposal to invoice in \$ USD. Concerns were raised over the use of composite factors (e.g. Chemicals turnover as % GDP) and we have identified a significant issue with data for one country that would have a material impact on the national subscription calculations that were shared with NAOs. **The task force therefore feels that further work is needed before making a formal final recommendation to Council.** Given the timing, this will have to follow the 2017 General Assembly in Sao Paulo.

Motion 1: *Council supports the continuation of National Subscription task force to verify all data and to recommend a new approach by July 2018 for implementation for 2019 onwards superseding those agreed in the agreed in the 2019 Budget.*

Motion 2: *In the event that this is not possible Council authorizes the Executive Committee to call a special delegate conference of NAOs to agree a way forward on national subscriptions in the autumn of 2018.*

Motion 3: *Council approves the proposal to invoice in future in USD \$*

In the event that motion 3 is not carried it is recommended that 2018 and 2019 subscriptions are invoiced in the currency previously chosen, calculated on the average best available USD \$ exchange rates in the first half of 2017. (1 January 2017- 30 June 2017) The 2018 and 2019 National Subscriptions are in the Agenda Book.*

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REFRESHMENT BREAK: 15:00-15:30

23 [15:30] Applications for Associated Organization Status

[Prof. Tarasova]

[For Decision]

The application for International Young Chemists Network to become an Associated Organization of IUPAC was endorsed by the Executive Committee of IUPAC and is submitted for formal approval by the IUPAC Council.

Motion: Council approves designation of the International Young Chemists Network as an Associated Organization of the Union.

24 [15:40] Termination of Associate Organization Status

[Prof. Tarasova]

[For Information]

There are no Associate Organizations in arrears at this time.

25 [15:45] Organizational Changes in Existing IUPAC Bodies, Proposals for New and Reconstituted Bodies/Terms of Reference

[Prof. Hartshorn]

[For Information, Discussion and Decision; voting by show of hands]

25.1 Evaluation Committee (EvC)

Please see the Agenda Book for the full Terms of Reference with the proposed additional term; these were recommended for approval at Council by Bureau.

It is thus proposed that the following new Term of Reference be inserted as ToR “(iv)”:

(iv) To evaluate the roles and contributions of Divisions and Committees with respect to the mission and strategic initiatives of the Union.

Motion: Council approves the proposed Terms of Reference for the Evaluation Committee

25.2 Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD)

At the meeting in Montreal the IUPAC Bureau voted to establish the Interdivisional Subcommittee on Green and Sustainable Chemistry. This decision

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reflected our view of the importance of green Chemistry among other IUPAC areas of influence. Green Chemistry first seen as the invention, design and application of chemical products and processes to reduce or eliminate the use and the production of harmful substance, has become now-a-days a basic instrument for sustainable development that touched many aspects of the environment and human welfare, and is relevant to 17 Sustainable Development Goals set by the UN.

Since that time, a group of volunteers, led by Professor Pietro Tundo, the IUPAC Bureau member, worked on Terms of Reference of this new IUPAC body. After several rounds of discussions among the EC and Bureau members, as well as the experts from outside IUPAC, it was suggested to name this new body “The Interdivisional Committee on Green Chemistry for Sustainable Development”. In October 2016 the draft of the Terms of Reference of The Interdivisional Committee on Green Chemistry for Sustainable Development was sent to the IUPAC Bureau members for approval and approved (24 votes have been casted: 23 for and 1 against). The Terms of Reference are in the Agenda book for review.

The composition and the proposed membership were discussed by the EC members during the EC meeting in Beijing, 12-13 November 2016. The EC approved the proposed membership as provisional until the approval of the ICGCSD by the Council at its’ meeting in San Paulo.

A report from ICGCSD is in the Agenda Book. It demonstrates that the actions undertaken allowed to gain momentum in IUPAC green chemistry for sustainable development initiatives.

Motion 1: *Council ratifies the Executive Committee’s decision to establish the Interdivisional Committee on Green Chemistry for Sustainable Development*

Motion 2: *Council approves the proposed Terms of Reference for the Interdivisional Committee on Green Chemistry for Sustainable Development*

25.3 STATUTES AND BYLAWS

The Statutes and Bylaws have been reviewed and amplified where necessary to provide detail consistent with current practice where there as none before, to incorporate changes made by Bureau and Council since the last edition (2010), and to provide more consistency in style. A draft of the changes in the Statutes and Bylaws and commentary is in the Agenda book.

Motion 1: *Council approves the proposed changes and additions to the Statutes and Bylaws*

26 [16:00] Report from the World Chemistry Leadership Meeting (WCLM)

[Prof. Ober and Prof. Garelick]
[For Information and Discussion]

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The World Chemistry Leadership Team Meeting will be held on Wednesday 12th July 2017 starting at 09.00. The theme of the meeting is IUPAC's role in developing interdisciplinary/collaborative work in the Chemistry community and beyond.

27 [16:10] Reauthorization of Commissions

[Prof. Hartshorn]

[For Decision; voting by show of hands]

Bylaw 3.302 requires that Council reapprove all existing Commissions at each General Assembly.

Motion: *Council reauthorizes the Commission on Physicochemical Symbols, Terminology and Units, the Commission on Isotopic Abundances and Atomic Weights, and the IUBMB-IUPAC Joint Commission on Biochemical Nomenclature (JCBN).*

28 [16:15] Approval of English as the Official Language of IUPAC*

[Prof. Hartshorn]

[For Decision; voting by show of hands]

Statute 5.405 requires that Council determine every four years the one language in which the official records of the meetings of the Council, Bureau, and Executive Committee shall be kept and published. The last time that such a determination was made was at the General Assembly held in Istanbul, Turkey, in the year 2013, four years ago.

Motion: *Council is asked to approve that the one language in which the official records of the meeting of the Council, Bureau and Executive Committee shall be kept and published will be English for the period of 2018-2021.*

29 [16:20] Important Matters Referred to Council by Bureau at 48th General Assembly, Not Covered by Items on Council Agenda

[Prof. Hartshorn]

[For Information and Discussion]

The 99th Bureau meeting will have taken place on Tuesday 11th July 2017 in São Paulo. This item is to ensure all items for Council can be raised by Bureau.

30 [16:25] Any Other Business

[Prof. Tarasova]

31 [16:30] Closing Remarks & Adjournment

[Prof. Tarasova]

48th IUPAC COUNCIL MEETING
Busan, Korea 12-13 August 2015
Draft Minutes

1. Introductory Remarks and Finalization of Agenda

IUPAC President Dr. Mark Cesa welcomed the delegates to the 48th IUPAC Council meeting. He thanked the Korean Chemical Society and the Busan Organizing Committee for their hospitality and the excellent arrangements for both the General Assembly and the Congress.

Dr. Cesa asked for a moment of silence for IUPAC Colleagues deceased since Council last met at Istanbul.

There were no additions or changes proposed to the Agenda. The Agenda was approved unanimously.

2. Approval of Minutes of 47th Council Meeting and Matters Arising

Dr. Cesa asked if there were any corrections or matters arising not covered elsewhere in the Agenda. No corrections or other matters were proposed. The motion below was made and seconded and was approved unanimously by a show of hands.

Motion: *Minutes of the 47th Council Meeting in Istanbul, Turkey are approved.*

3. Ratification of Decisions Taken by Bureau and Executive Committee since 45th General Assembly

All decisions taken by the Bureau and Executive Committee through calendar year 2014, since those approved by the Council at Istanbul, Turkey (Minute 3, 47th Meeting), are contained in the following Minutes, which were distributed to National Adhering Organizations on the dates shown:

94 th Bureau (Istanbul, Turkey, 15 August 2013)	23 May 2014
95 th Bureau (Coimbra, Portugal, 12-13 April 2014)	11 June 2015
96 th Bureau (Virtual Bureau, Meeting 27 May 2015)	13 July 2015
150 th Executive Committee (Istanbul, Turkey, 15 August 2013)	23 May 2014
151 st Executive Committee (Research Triangle Park, North Carolina) 7-8 December 2013)	23 May 2014
152 nd Executive Committee (Coimbra, Portugal, 13 April 2014)	20 March 2015
153 rd Executive Committee (RTP, North Carolina, 8-9 November 2014)	20 March 2015

Motion: Council ratifies all decisions taken by the Bureau and Executive Committee through calendar year 2014, since those approved by the Council at Istanbul, Turkey (Minute 3, 47th Meeting).

The motion above was made and seconded and was approved unanimously by a show of hands.

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4. Announcement of Nominations for Union Officers and Bureau Members

Mr. Colin Humphris noted that biographies of the nominees were available on the IUPAC website and in printed form in the Agenda Book for the Council meeting. He informed the delegates that the voting order would be Vice President, Treasurer, Secretary General and then Elected Members of the Bureau. He then reviewed the situation for each office. He indicated that four Bureau members would be elected to complete the full roster of ten members. The nominations received are given below.

Nominations Received

Vice President

Prof. Atta-ur-Rahman (Pakistan)

Prof. Qi-Feng Zhou (China, Beijing)

Treasurer

Mr. Colin Humphris (United Kingdom)

Secretary General

Prof. M. Iqbal Choudhary (Pakistan)

Prof. Richard Hartshorn (New Zealand)

Prof. Ron Weir (Canada)

Elected Members of the Bureau

Prof. Christo Belarew (Bulgaria)

Prof. Christopher M. A. Brett (Portugal)

Prof. Mei Hung Chiu (China Taipei)

Prof. Hemda Garelick (UK)

Prof. Ehud Keinan (Israel)

Dr. Kew-Ho Lee (Korea)

Dr. Patrick Moyna (Uruguay)

Dr. Carlos Tollinche (Puerto Rico)

Prof. Pietro Tundo (Italy)

5. Announcement of Time of Elections

Mr. Humphris announced that the elections for Vice President, Treasurer, Secretary General and Elected Members of the Bureau would be held at 09:00 hours on 13 August 2015. He then announced that the proposed Tellers for the Union election were Prof. Kaoru Yamanouchi (Japan), Prof. Jan Reedijk (Netherlands) and Dr. Fabienne Meyers (IUPAC Secretariat) as Election Tellers.

The motion below was made and seconded and was approved unanimously by a show of hands.

Motion: Council approves the appointments of Prof. Kaoru Yamanouchi (Japan), Prof. Jan Reedijk (Netherlands) and Dr. Fabienne Meyers (IUPAC Secretariat) as Election Tellers.

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6. Dr. Cesa introduced Professor Nicole Moreau, Executive Committee ICSU, who reported an overview and current programs within ICSU.

7. Statutory Report of President on State of the Union

- 7.1 Report of the President

Dr. Cesa delivered a summary of his Report on the State of the Union. The entire written report is available in the Council Agenda Book. The President reported on the challenges and accomplishments of the Union in the current biennium. IUPAC has strengthened its infrastructure, its finances, and its place as a leader in the chemistry enterprise in the rapidly evolving field of science. Amid the continued strong scientific contributions of volunteers in the Divisions and Standing Committees, IUPAC has positioned its finances for future growth, stabilized and strengthened the Secretariat, and established a new collaborative model for its publications. As IUPAC now approaches its centenary in 2019, a strategy review has been completed to move the Union forward into its second century.

- 7.2 IUPAC Strategy Review

Dr. Cesa thanked the Strategy Review Task Group members who worked on the development of a new strategic plan. Dr. Cesa summarized the progress achieved for the Strategy review and presented the results to Council.

8. Vice President's Critical Assessment

Prof. Natalia Tarasova delivered a summary of her Vice President's Critical Assessment. The entire written report is available in the Council Agenda Book.

9. Report of Secretary General

Mr. Humphris delivered a summary of his Report of the Secretary General which focused on the restructuring of the IUPAC Secretariat. The written report is available in the Council Agenda Book.

10. Applications for National Adhering Organization (NAO) and Associate National Adhering Organization (ANAO) Status

Mr. Humphris reported that the Spanish NAO, "Spanish IUPAC Committee" organization had applied for readmission under the terms of the readmission policy approved by the Executive Committee having ceased membership in 2015 under the terms of IUPAC Statute 9.2. The Spanish IUPAC Committee have fulfilled the requirements of the readmission policy. Under the terms of the readmission policy they would be able to vote at Council, once Council approves their application.

Having paid all required National Subscription fees under the terms of readmission, Council approved the following motion by show of hands:

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Motion 1: *Council approves the application of [Spanish IUPAC Committee] to be readmitted as an IUPAC National Adhering Organization.*

The Bangladesh Chemical society had applied for readmission under the terms of the readmission policy approved by the Executive Committee having ceased membership in 2015 under the terms of IUPAC Statute 9.2. A copy their the application was included in the Agenda Book. BCS has fulfilled the requirements of the readmission policy.

Having paid all required National Subscription fees under the terms of readmission, Council approved the following motion by show of hands:

Motion 2: *Council approves the application of the Bangladesh Chemical Society to be readmitted as an IUPAC National Adhering Organization.*

Four organizations have applied for NAO status since the 47th Council Meeting. All four have been granted Provisional National Adhering Organization (NAO) status by the Executive Committee.

Two Provisional National Adhering Organizations have paid their 2014 National Subscriptions. Under the terms of Provisional Membership they will be able to vote at Council, once Council approves their applications. The two organizations are:

- 10.1. Kazakh National Academy of Science Kazakhstan (NAO)
- 10.2. Comité Sénégalais pour la Chimie Senegal (NAO)

The following motion was approved by show of hands:

Motion 2: *Council approves the applications of the Kazakh National Academy of Science and of the Comité Sénégalais pour la Chimie to become IUPAC National Adhering Organizations. This approval is subject to payment of the 2014 National Subscription fees by Kazakhstan and Senegal and that have been confirmed by the Executive Director of IUPAC.*

Two Provisional National Adhering Organizations have not paid their 2014 National Subscriptions. Under the terms of Provisional membership they can only become members as from January 1st 2016 if their 2014 and 2015 subscriptions are paid. If not, their provisional status ceases.

The two organizations are:

- 10.3. National Nanotechnology Laboratory - High Technology National Center, Costa Rica (NAO)
- 10.4. Sociedad Colombiana de Ciencias Químicas, Colombia (NAO)

The following motion was approved by show of hands:

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Motion 3: *Council approves the applications of National Nanotechnology Laboratory - High Technology National Center, Costa Rica and Sociedad Colombiana de Ciencias Químicas subject to their payment of their 2014 and 2015 subscriptions prior to January 1st 2016.*

One organization has applied for ANAO status since the 47th Council Meeting. Provisional Associate National Adhering Organization (ANAO) status has been granted by the Executive Committee and the 2014 ANAO membership fee has been paid. Under the terms of Provisional Membership this organization will have full rights as an ANAO of IUPAC. The organization is:

10.3 Ghana (ANAO) - Ghana Institute For Pure And Applied Chemistry

The following motion was approved by show of hands:

Motion 4: *Council approves the application of the Ghana Institute For Pure And Applied Chemistry become an IUPAC Associate National Adhering Organization. This approval is subject to payment of the 2014 National Subscription fees by Ghana.*

11. Adoption of Recommendations on Nomenclature and Symbols

Mr. Humphris referred the Delegates to the list of published Recommendations and Technical Reports in the Agenda Book. The motion below was approved unanimously by show of hands.

Motion: *Council formally adopts the Recommendations approved by the Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS) and published, or scheduled to be published, in Pure and Applied Chemistry from August 2013 through July 2015.*

12. Validation and Naming of New Elements

Prof. John Corish summarized the most recent efforts regarding the validation and naming of new elements with atomic numbers Z=113,115,117 and 118. Discussion was provided regarding the current status of the IUPAC/IUPAP Joint working Party and the draft reports.

13. Reports of Division Presidents

The reports of the Division Presidents were accepted as read and periods were allocated for questions and comments. Full reports are available in the Council Agenda Book.

14. Election of Union Officers and Bureau Members and Approval of Elected Officers of Divisions

Dr. Cesa discussed the election process that was in the Agenda Book. The election slate (nominees for Vice President, Secretary General and Treasurer and for Elected Members of

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the Bureau) and information about each of the candidates were included in the Agenda Book.

Council approved the motion by written and secret ballot:

Motion 1: *Council ratifies the election of the new Vice President and Elected Members of the Bureau at the 48th General Assembly in Busan, Korea.*

In addition, Officers of the eight IUPAC Divisions are also listed for approval of the Council. Elections for Divisional offices have been completed prior to the Council Meeting, as is the normal procedure, and only require final ratification by the Council.

Council approved the motion by written and secret ballot:

Motion 2: *Council ratifies the election of Division Officers and Titular Members that have been completed previously during individual divisional elections coordinated through the IUPAC Secretariat.*

15. Presentation of IUPAC service awards

Dr. Cesa presented the IUPAC service awards for those IUPAC members retiring from service.

16. Reports of Standing Committee Chairs

The reports of the Standing Committee Chairs were accepted as read and periods were allocated for questions and comments. Full reports are available in the Council Agenda Book.

17. Report from the World Chemistry Leadership Meeting (WCLM)

Dr. Laura McConnell presented the results from the WCLM meeting, having the theme of UN Sustainable Development Goals and how the chemistry community could be involved.

18. IUPAC 100 Proposals

Prof. Tarasova presented the results from the Task Group working on the IUPAC 100 Centenary in 2019.

19. Financial Reports

19.1. Biennial Report of Treasurer

The Treasurer Prof. Corish noted that since the last report, major changes have been carried out in the way in which we treat two of our income streams, namely our publications and investments, and the financial management of the Secretariat and of all our accounting and data systems have been completely modernized and improved to provide real time information and control of our expenditures and income. Prof. Corish noted the change in IUPAC's publishing operations with De Gruyter and the new challenges that it presents in managing cash flow. The 2014 results indicated that

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the net revenue from PAC and CI has stabilized and is slightly rising with the De Gruyter partnership began.

19.2. Report of Finance Committee

Prof. Corish noted in his report that the 2014 Finance Committee decided that in light of the changed financial climate we should restructure the way in which we managed our investments to a more pro-active stance to maximize our income return. He noted that the Finance Committee's recommendation to Executive Committee in November of 2014 had been accepted and the IUPAC investment portfolio was now managed by a professional investment manager as part of BB&T Wealth Management. He stated that at the Finance Committee meeting in 2015 the Finance Committee comprehensively reviewed the changeover that had been made in the management of our investment portfolio and approved of its implementation and operation and results during its initial months.

19.3. Accounts for 2013-2014

Prof. Corish the Agenda Book contained the audited financial statements for 2013 and 2014 in which no areas of concern were noted by the auditors. Despite the unusual circumstances prevailing during much of this period as reported in the Biennial Reports of the Acting Secretary General and of the Treasurer the operations of the Union for the biennium were reasonably within budget.

19.4. National Adhering Organizations and Associate National Adhering Organizations in Arrears

Prof. Corish referred to the list provided in the Agenda Book regarding the status of the National Subscription payments for 2014 and 2015.

19.5. Appointment of Auditors for 2015 and 2016

Prof. Corish reported that the Bureau had recommended to Council the appointment of Batchelor, Tillery and Roberts, LLP, of Raleigh, North Carolina USA as IUPAC Auditors for 2011 and 2012. The motion below was unanimously approved by Council.

Motion: *Council approves the appointment of Batchelor, Tillery and Roberts, LLP, of Raleigh, North Carolina USA as IUPAC Auditors for 2015 and 2016.*

20. Proposed Budget for 2016-2017 and National Subscriptions for 2016-2017

20.1 Proposed Budget for 2016-2017

Prof. Corish stated that the Agenda Book contained the budget developed for 2016/2017 using the current model: this includes a line by line comparison with the budget for the current biennium. He also stated that a second budget, the 'Proposed Interim Budget' was included in the Agenda Book. He noted that Bureau had

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reviewed the two options and approved the Proposed Interim Budget. After lengthy discussion regarding the details of both income and expenses, the effect of exchange rates and the implications to the Union and our National Adhering Organizations, Prof. Corish recommended to Council to approve the Proposed Interim Budget for 2016 -2017.

20.2 National Subscriptions for 2016-2017

The Agenda Book included a table showing The amounts of the national subscriptions for 2016 and 2017 in the currencies in which they are paid and calculated using the current model . Prof. Corish noted that large variations between the subscriptions calculated for 2015 and those calculated for the 2016 and 2017 are evident in the table shown in the Agenda Book and it is clear that a significant number of members would face substantial increases in their subscriptions if this model was adopted. He then discussed the Proposed Interim Budget that the principal tenet of this model – the proposed interim model - is that all NAOs share the load as equally as is possible and this is realized by requesting the same percentage increase from all our NAOs based on the currency in which they have chosen to pay. The model therefore maintains the same proportional allocations of the total sum as are being used in the current biennium and the proposal is for a 5% increase for each of the years 2016 and 2017 on the subscriptions paid in 2015. Prof. Corish also discussed the Proposed Interim Budget effect on the overall budget which would represent overall deficits of USD 94.0k and US 67.5k in 2016 and 2017, respectively with respect to the expenditures shown in the current model budget. It is intended that this proposed interim model will operate for the 2016/2017 biennium only.

Prof. Corish discussed that the Proposed Interim Budget will provide an opportunity to reconsider the basis upon which our national subscriptions are calculated and the President proposed to set up a Task Force, which will begin work immediately to develop a new model for adoption at the General Assembly in 2017. The proposed composition of the Task Force which will complete its work by July 2016 is:

Executive Director	Dr. Lynn Soby (Chair)
Treasurer	Prof John Corish
Treasurer Elect	To be determined
Member of Finance Committee	Appointed by the Finance Committee
Two Representatives of NAOs	Bureau Members, one from larger and one from smaller NAO.

Council approved the Motion below by show of hands:

Motion 1: *Council approves of the Proposed Interim Budget for 2016-2017 and the resulting National Subscriptions.*

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Council approved the Motion below by show of hands:

Motion 2: *Council approves the establishment of a Task Force to determine a new method for calculating National subscriptions for approval at the 49th Council meeting in São Paulo, Brazil 2107.*

21. Applications for Associated Organization Status

Mr. Humphris reported that no applications for AO status have been received since the 47th Council Meeting.

22. Termination of Associate Organization Status

Mr. Humphris reported that the following AO's were several years in arrears in the payment of their annual AO fees. They have not responded to contacts to try to rectify this situation.

- 22.1 Federation of Asian Polymer Societies (FAPS)
- 22.2 International Society of Heterocyclic Chemistry (ISHC)
- 22.3 International Zeolite Association Int'l.
- 22.4 Confederation for Thermal Analysis & Calorimetry

Motion: *Council approves the termination of the Associated Organization status of the Federation of Asian Polymer Societies (FAPS), International Society of Heterocyclic Chemistry (ISHC), International Zeolite Association Int'l and Confederation for Thermal Analysis & Calorimetry International Plasma Chemistry Society and the Calorimetry for failure to pay annual subscription fees for several years. **

23. Proposals Formally Received from National Adhering Organizations

Mr. Humphris reported that no formal proposals had been received from National Adhering Organizations.

24. Organizational Changes in Existing IUPAC Bodies, Proposals for New and Reconstituted Bodies/Terms of Reference

Mr. Humphris reported the following proposed organizational changes in existing IUPAC Bodies and discussed the reasoning behind them.

- 24.1. The Terms of Reference of Committee on Publications and Cheminformatics Data Standards (CPCDS) were recommended for approval at Council by the Executive Committee.

Motion 1: *Council approves the proposed Terms of Reference for the Committee on Publications and Cheminformatics Data Standards.*

Council approved the above motion

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24.2 The Terms of Reference of Project Evaluation Committee (EvC) were recommended for approval at Council by the Executive Committee.

Motion 2: *Council approves the proposed Terms of Reference for the Project Evaluation Committee.*

Council approved the above motion.

25. Plans for 49th General Assembly and 46th Congress in 2017 (São Paulo, Brazil)

Prof. Adriano Adricopulo and Prof. Luiz Silva provided a detailed update on preparations for the next IUPAC General Assembly and World Chemistry Congress to be held in São Paulo, Brazil in July 2017.

26. Plans for 50th General Assembly and 47th Congress in 2019 (Paris, France)

Prof. Nicole Moreau presented an update report from the French NAO on preliminary preparations for the 50th General Assembly and 47th World Chemistry Congress to be held in Paris, in 2019.

27. Reauthorization of Commissions

Mr. Humphris noted that Bylaw 4.302 requires that Council reapprove all existing Commissions at each General Assembly. Council then voted on the motion below. The motion was unanimously approved by a show of hands.

Motion: *Council reauthorizes the Commission on Physicochemical Symbols, Terminology and Units, the Commission on Isotopic Abundances and Atomic Weights, and the IUBMB-IUPAC Joint Commission on Biochemical Nomenclature (JCBN).*

28. Important Matters Referred to Council by Bureau Not Covered by Items on Council Agenda

No important matters were referred to Council by the Bureau that were not already covered by items on the Council Agenda.

29. Election of Union Officers and Bureau Members and Approval of Elected Officers of Divisions

The elections for Vice President, Treasurer, Secretary General and Elected Bureau Members were held as announced earlier, at 09:00 hours on 13 August 2015. The results of the elections for Union Officers were as follows:

In the election for Vice President, Prof. Qi-Feng Zhou received 117 votes while Prof. Atta-ur Rahman received 32 votes. Voting was carried out by ballot cards and there were no abstentions. Prof. Qi-Feng Zhou will serve as Vice President during 2016 and 2017.

In the election for Treasurer, Mr. Colin Humphris ran unopposed. Voting was carried out by ballot cards and there were no abstentions. Mr. Humphris received 140 For votes; 7 Against and 2 Abstains. Mr. Humphris will serve as Treasurer for four years beginning in 2016.

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In the election for Secretary General, Prof. M. Iqbal Choudhary received 4 votes, Prof. Richard Hartshorn received 107 votes, Prof. Ron Weir received 3 votes. Voting was carried out by ballot cards and there were no abstentions. Richard Hartshorn will serve as Secretary General for four years beginning in 2016.

In the election for Bureau Members, Prof. Christopher Brett was re-elected for additional four-year terms on the first ballot by cards. Also in the first round of balloting, Prof. Mei-Hung Chiu (117), Prof. Hemda Garelick (114), Prof. Ehud Keinan (83), Dr. Kew-Ho Lee (109) and Prof. Pietro Tundo (88) were elected for first term of Bureau and will serve for four years beginning in 2016.

Mr. Humphris announced the newly elected officers of the eight Divisions and asked Council to approve their appointments. All the Division officers were approved without dissent and their names are listed below. The names of officers continuing their current terms of office are also included for completeness.

Physical and Biophysical Chemistry Division (I)

President: Prof. Angela Wilson (United States)
Vice President: Prof. Kristin Bartik (Belgium)
Secretary: Prof. Assaf Friedler (Israel)

Inorganic Chemistry Division (II)

President: Prof. Jan Reedijk (Netherlands)
Vice President: Prof. Lars R. Ohrström (Sweden)
Secretary: Prof. Markku Leskelä (Finland, continues)

Organic and Biomolecular Chemistry Division (III)

President: Prof. Margaret A. Brimble (New Zealand)
Vice President: Prof. Francesco Nicotra (Italy)
Secretary: Prof. Amelia Rauter (Portugal)

Polymer Division (IV)

President: Prof. Gregory Russell (New Zealand)
Vice President: Prof. Christine Luscombe (United States)
Secretary: Prof. Michael Walter (United States)

Analytical Chemistry Division (V)

President: Prof. Jan Labuda (Slovakia)
Vice President: Dr. Zoltan Mester (Canada)
Secretary: Prof. Attila Felinger (Hungary)

Chemistry and the Environment Division (VI)

President: Dr. Petr Fedotov (Russia)
Vice President: Dr. Rai Kookana (Australia)
Secretary: Dr. Hemda Garelick (United Kingdom)

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Chemistry and Human Health Division (VII)

President: Dr. Thomas Perun (United States)
Vice President: Dr. Rita Cornelis (Belgium)
Secretary: Dr. Michael Schwenk (Germany, continues)

Chemical Nomenclature and Structure Representation Division (VIII)

President: Dr. Karl-Heinz Hellwich (Germany)
Vice President: Prof. Alan Hutton (South Africa)
Secretary: Prof. Risto Laitnen (Finland)

30. Any Other Business

No other business of the Union was discussed.

31. Closing Remarks, Adjournment

Dr. Cesa thanked the delegates for their active participation and cooperation in making the Council meeting a success. He wished the delegates a safe return journey and urged them to communicate what they had learned to their communities when they arrived home.

Dr. Cesa adjourned the Council meeting.

International Union of Pure and Applied Chemistry

98th MEETING OF BUREAU

Montréal, Canada, 9-10 April 2016

MINUTES

Attendees: Prof. Natalia Tarasova (Chair), Prof. Russell J. Boyd, Prof. Christopher Brett, Prof. Margaret Brimble, Dr. Mark Cesa, Prof. Mei-Hung Chiu, Dr. Petr Fedotov, Prof. Hemda Garelick, Prof. Richard Hartshorn, Dr. Karl-Heinz Hellwich, Mr. Colin Humphris, Prof. Ehud Keinan, Prof. Jan Labuda, Ms. Bonnie Lawlor, Prof. Kew-Ho Lee, Prof. Christopher K. Ober, Dr. Thomas J. Perun, Prof. Jan Reedijk, Prof. Greg Russell, Prof. Mustafa Sözbilir, Prof. Carlos Tollinche, Prof. Pietro Tundo, Prof. Ron Weir, Dr. Bernard West, Prof. Kaoru Yamanouchi, Prof. Qi-Feng Zhou

Absentees: Prof. Tavarekere K. Chandrashekar, Prof. Angela Wilson

Guest: Prof. Doug Templeton, Prof. Neil Burford (in part), Dr. Roland Andersson (in part)

Secretary: Dr. Fabienne Meyers

1. INTRODUCTORY REMARKS AND WELCOME FROM HOSTING SOCIETY

Prof. Tarasova welcomed the members of the Bureau to the meeting and thanked the Canadian Chemical Society (CCS) and their Canadian National Committee for IUPAC (CNC-IUPAC) for their invitation and facilitation for hosting this Bureau meeting in the premises of the McGill University Faculty Club. She welcomed Neil Burford (Chair, CNC-IUPAC) and Roland Andersson (Director of the Chemical Institute of Canada).

Prof. Burford reviewed briefly the activities of the CNC-IUPAC and pointed out that no less than 16 members are today actively involved in the Bureau and various Divisions and Committees. Canada hosted two world Congresses, one in 1981 in Vancouver, and the Congress/GA in 2003 in Ottawa, and they are interested in hosting a Congress again in the near future. The Society is about to celebrate in 2017 the 100th anniversary of the Canadian Chemistry Conference in Toronto in May 2017 with the theme 'A Celebration of Chemistry'. The CCS has a good experience in hosting large events and the CNC-IUPAC has demonstrated good management, including investment in the involvement of young chemists through their travel awards which every year result in funding the attendance of young scientists to IUPAC-endorsed conferences.

2. FINALIZATION OF AGENDA

Prof. Tarasova asked if there were any changes or additions to the Agenda. Karl-Heinz Hellwich asked why the earlier agenda item that relates to the journal *Chemistry Teacher International* and for which additional information has been circulated more recently, had been removed. It was stated that the proposal was still under review and the Bureau shall wait for the outcome of that on-going assessment prior to reviewing the project.

3. MINUTES OF 97TH MEETING OF THE BUREAU (BUSAN, AUGUST 2015)

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The minutes of the 97th meeting of the Bureau held in Busan during the General Assembly in August 2015 are in the Agenda Book. Prof. Tarasova asked if there were any comments. There were no comments, and the minutes were approved.

3.1 MATTERS ARISING FROM MINUTES (NOT COVERED BY ITEMS ON AGENDA)

There were no matters arising from the Minutes not covered by the Agenda.

4. MINUTES OF 154TH EC MEETING (RTP, NOVEMBER 2015) AND NOTING INFORMAL DISCUSSION IN BUSAN AUGUST 2015 MEETING OF EXECUTIVE COMMITTEE

4.1 RECEIPT OF DRAFT EXECUTIVE COMMITTEE MINUTES BY THE BUREAU

Prof. Tarasova noted that the draft of the 154th Executive Committee meeting minutes was in the Agenda Book and asked if there were any comments. There were no comments and the minutes were received by the Bureau.

4.2 HIGHLIGHTS AND QUESTIONS ABOUT ITEMS NOT ON THE BUREAU AGENDA

There were no questions about items for the minutes of the Executive Committee.

5. MINUTES OF 48TH MEETING OF COUNCIL

A preliminary draft of the 48th Council meeting is in the Agenda Book. These are currently under review.

Prof. Tarasova asked if there were any questions. There were no questions about this draft.

6. ACTION ITEMS FROM PREVIOUS MEETINGS NOT COVERED ON AGENDA

Prof. Hartshorn referred to the list of outstanding, in progress, and completed action items included in the Agenda Book (p.86). A separate list of Executive Committee (EC) action items is in the Agenda Book (p.101). Relevant action items to be covered during the Bureau meeting are noted in their respective sections for reference.

Reviewing the EC's list, the actions *completed* are highlighted in yellow, those not included in this meeting agenda are in green, or otherwise labeled with a reference to the relevant Agenda items.

A quick review of the on-going items not later addressed in this meeting:

[154EC03] A notice about the availability of CI through DeGruyter has been sent to the group of former Young Observers; a follow-up/reminder can be sent again.

[154EC14] To develop and establish a process to propose, assess, and approve specific nominations *of IUPAC representatives 'ON' other organizations*.

[154EC15] Also in the context of reviewing the group of IUPAC representatives 'ON' other organizations, to review the current list and include strategic bodies.

[154EC24] To plan to develop and implement an online *claim* submission form to streamline the process.

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[154EC30] *In reference to the PhosAgro awards*, to review with Hugh Burrows (PAC scientific editor) the option of publishing papers from the Busan Symposium, especially from the 2014 winners whose projects are either completed or nearing completion, and

[154EC31] - To prepare an article for *Chemistry International* outlining the scope of the proposals awarded. *Both are in progress.*

Referring to the list on p. 86, the Secretary General informed the Bureau that the items not to be addressed in the Bureau meeting were all in progress or completed. He asked if there were any questions and there were none.

7. REPORT OF THE PRESIDENT**NT**

Traditional part of the report covers the functioning of the Secretariat, web-site, NAOs and ANAO membership. Several new initiatives include:

[For Information] Call for contributions to the UN Global Sustainable Development Report. A report is included in the Agenda Book.

As the IUPAC Strategic Plan states, “IUPAC accomplishes its mission by fostering sustainable development, providing a common language for chemistry, and advocating the free exchange of scientific information”. To increase the visibility of the Union in the global arena of sustainable development actions, the President suggests to provide (on a regular basis) the information about the IUPAC contributions to the fulfillment of Sustainable Development Goals (SDGs) to the UN Global Sustainable Development Report (GSDR). The GSDR is a United Nations publication aiming to strengthen the science-policy interface at the High Level Political Forum (HLPF) on Sustainable Development, which replaced the Commission on Sustainable Development after Rio+20 as the main United Nations platform providing political leadership and guidance on sustainable development issues at the international level.

[For Information] Women in chemistry background information is in the Agenda Book.

The recent “Global Science 2015” survey reveals that female scientists are more likely to be dissatisfied with salary/benefits, job availability, gender barriers, and how they feel valued as scientists than their male colleagues. The Global Science 2015 survey sample includes 1478 respondents, 58 % men and 42 % women, from North America, Europe, Asia, and South America. The study fielded during May 2015 and has produced interesting data on the experiences, perceptions, and differences between male and female scientists.

Women are generally underrepresented in science, technology, engineering and mathematics (STEM). More women are pursuing scientific careers, but men still largely dominate these professions. The study results showed that some women see gender as a barrier to pursuing a career in science, whereas men do not. When

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asked “Based on your experience, what do you perceive to be the biggest barrier to pursuing a career in STEM?”, 15 % of female respondents selected gender, compared with only 2 % for their male counterparts.

This research shows that women feel less valued in the workplace and more misunderstood as scientists. Forty percent of female respondents reported that the quality of the management negatively affects their job satisfaction (compared with 34 % for men). Forty one percent reported feeling misunderstood by others or isolated because of their scientific career.

Several initiatives dealing with IUPAC gender policy were discussed.

[For Discussion] Creation of the International Younger Chemists Network (IYCN) in collaboration with IUPAC. The proposal is in the Agenda Book.

IUPAC’s core values emphasize scientific excellence, communication, transparency, diversity, and ethical behavior. As it was stated in the Vice-President’s Critical Assessment at the General Assembly in Busan (2015), the potential of young chemists should be effectively used, in a combination with the life experience of the elder generations of chemists. One effective option is to gain synergy as the result of collaboration with the existing or emerging global institutions of young chemists, the International Younger Chemists Network (IYCN) being one of them. Our contacts with the leadership of the IYCN led to the project proposal “Creation of the IYCN in the collaboration with IUPAC”.

Following the meeting Bureau members will be asked to comment on the project proposal submitted by IYCN.

8. VICE PRESIDENT’S CRITICAL ASSESSMENT

Qi-Feng Zhou reported on the preliminary conceptions of his Vice President Critical Assessment and addressed the Bureau on the following issues. Framed as a follow-up to the recent revision of the Strategic Plan, the VP will seek input on three major challenges:

- (a) Membership Relations, including the development of a compelling value proposition and a new schema for the calculation of the national subscription;
- (b) Project System, reviewing how projects are generated and carried out, and considering how best to support interdivisional projects. Also, reviewing and adjusting the role and functioning of the Evaluation Committee;
- (c) Cooperation with Other Organizations, reviewing how best to establish and retain fruitful relations with other organizations, including OPCW, ICHO, ICSU, UNESCO, and also how to respond to the UN Sustainable Development Goals (SDGs) and deliberations for the COP21 Paris agreement on the reduction of climate change.

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Engagement with the chemical industry and with organizations such as ICCA, the International Council of Chemical Associations, should also be considered.

Prof. Tarasova thanked the Vice President for his work and asked the Bureau to communicate and share ideas with Professor Zhou. She mentioned that it is remarkable to notice that under the IUPAC umbrella, the USA, China, and Russia can work productively together.

9. REPORT OF THE SECRETARIES GENERAL

The outgoing Secretary General, Colin Humphris, and new Secretary General, Richard Hartshorn, briefly reported on current issues and activities.

Prof. Hartshorn mentioned that while new on the job, he learned from his predecessor and colleague officers; also, he recalled his own experience as Division President and valued the discussions he had with all the Division Presidents on the previous day. One question that he keeps asking is do the Statutes and Bylaws (S&B) fit the purpose of the new Strategic Plan.

To better appreciate where the Union stands today, Colin Humphris briefly reviewed how, during the last biennium and since his involvement in April 2014, the business of the Secretariat had been in part carried out with no Executive Director, only staff, no IT and an unreliable website, and an accounting system not up to standard. Changes started with the recruitment of the current Executive Director, and today the Secretariat is in a much better position; the office has been physically relocated to suitable premises, the accounting system has been updated and a financial controller hired full time, and a new website has been redeveloped. Most of last year's challenges are under control. Colin Humphris asked the Bureau if anyone had questions/concerns.

Professor Weir asked for a vote of thanks to recognize the works of the officers and the Executive Director for bringing IUPAC out of the past tumultuous periods.

Referring to the S&B, Prof. Tarasova encouraged the Secretary General to consider what changes might be needed to better serve the Union.

Roland Andersson recognized that the Secretariat is still very small and that a challenge in handling volunteers is that they often come with new ideas.

Colin Humphris recognized that it is best to outsource work for specific activities that require different skills, but this has to be balanced with the internal resources and knowledge of the Union.

10. IUPAC STRATEGIC PLAN IMPLEMENTATION DISCUSSION

(addressing Action 154EC01 and 154EC35 on the Strategic Plan and engaging Bureau to consider how to implement)

Mark Cesa referred to the Strategic Plan included in the Agenda Book (p. 120)

10.1 STATUS

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Dr. Cesa reviewed the Strategic plan, including immediate and long terms goals, and immediate measurable objectives; the latest being:

- Brand IUPAC in the minds of stakeholders
- Improve quality and frequency of communication with stakeholders
- Increase revenue
- Expand and retain Member base
- Enhance interdivisional interaction and collaboration
- Emphasize multidisciplinary projects addressing critical global issues
- Support chemistry education in developing countries

10.2 NEXT STEPS (COMMUNICATION/BRANDING; PROJECTS AND ACTIVITIES)

Dr. Cesa outlined a plan for the implementation which calls for various activities. In the areas of Communication and Branding, he highlighted the need to have a top-of-the-line website, timely press releases, broader reach including social media and ‘popular’ presence such as on Wikipedia, to increase links with chemical societies, increase presence at conferences for general information dissemination (via poster, brochures, and in person) and activities such as poster prizes. With the focus of increasing revenues, Dr. Cesa highlighted the need to enhance the individual affiliate program and also the corporate program to secure industry contributions. IUPAC could consider donations from education providers for IUPAC education content, for scholarship/stipends for conference attendances, and prizes. The option of obtaining grants to solicit new member countries adhesion and to secure membership of those in financial difficulties could be also explored.

With the help of the Secretary General, Dr. Cesa engaged the Bureau in an exercise where in break-out groups, he asked members to consider from their perspective as an IUPAC leader and as a representative of their NAO, what they envision as IUPAC’s unique role.

Break-out reports:

Group I, reporter Bonnie Lawlor

- Serves Science, global, consensus, international stage, service orientation, quality of the volunteers
- The organization that Serves the Science

Group II, reporter Bernard West

- Credibility, objectivity, building upon representatives from many different countries (diversity), NGO status in some areas (opportunity), distinguishes IUPAC as unique.
- Could we do more “lobbying” for policy? Challenge our volunteers to communicate outside more?
- Build upon our reputation to influence decision-makers around the world? Chemistry problems and solution to them (Major Centers of Decision Makers)

Group III, reporter Chris Brett

- The UN of Chemistry-why should they become involved?

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- We enable actions in standards, nomenclature and issues that affect the community
- We share knowledge

Group IV, reporter Ron Weir

- Communication with our NAO's! Some work well, some do not.
- Share best practices somehow...lessons gained from each other
- How does IUPAC react (proactive) to the global changes coming in Chemistry?

Dr. Cesa thanked the Bureau for all the input.

11. POSSIBILITIES FOR FUTURE STRUCTURE OF GREEN AND SUSTAINABLE CHEMISTRY

(addressing Action 154EC16)

Prof. Tarasova commented that the importance of “green chemistry” globally has rapidly increased since the Subcommittee on Green Chemistry was created in 2001. She invited Pietro Tundo (Elected Member on the Bureau, former President of the Organic and Biomolecular Chemistry Division (Div III) and current chair of the Subcommittee on Green Chemistry, to review the key activities of the Subcommittee.

The current Subcommittee (SC of Div III) is an international group with more than 20 members and 11 partnerships with other IUPAC bodies and external groups; 25 current projects; 42 completed. It produced a *PAC* special issue in July 2000

(<http://iupac.org/publications/pac/72/7/>) and a short history (CI Sep 2007; http://iupac.org/publications/ci/2007/2905/1_tundo.html).

The 1st International Conference on Green Chemistry (ICGC) was organized in 2005 (https://en.wikipedia.org/wiki/International_Conference_on_Green_Chemistry), again with coverage in *PAC* (Nov 2007; <http://iupac.org/publications/pac/79/11/>).

The next International Conference on Green Chemistry (the 6th) is set to take place in Italy in September this year 2016.

In March 2012, another volume of *PAC* (<http://iupac.org/publications/pac/84/3/>) was the outcome of a project (2008-016-1-300, <http://iupac.org/project/2008-016-1-300>).

The most recent outcome is a book titled “Chemistry Beyond Chlorine” (project 2013-057-3-300), which is to be published in 2016 by Springer.

Prof. Tundo stated that a key goal is to collaborate with groups outside IUPAC, including PhosAgro, OPCW, OECD, or LAUNCH (launch.org).

Prof. Tarasova indicated that IUPAC not only needs to think about how to better collaborate within IUPAC but also outside IUPAC. She asked that IUPAC strengthen its image and presence in that field, starting by involving not only Div III, but also Div VI (Chemistry and the Environment), CHEMRAWN (Chemistry for Applied World Needs) and COCI (Industry).

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Prof. Brimble (current President of the Organic and Biomolecular Chemistry Division) commented that “Green Chemistry” is indeed more than “organic chemistry” and it is now a field that needs to be taken up also by others.

All are in favor of organizing an *interdivisional* committee on Green Chemistry. The discussion included considerations of how can such a committee be arranged. The question was asked if such a subcommittee will be different than the Interdivisional Subcommittee on Materials (ISCM, subcommittee of Div I (Physical and Biophysical Chemistry), Div II (Inorganic), and Div IV (Polymer)); the ISCM has no funds. Will the Terms of Reference clarify that? Can such a body be financially independent? Shall the entity refer to Green Chemistry or Sustainable? Can the new committee be merged with an existing body?

The Treasurer recognized that while the principles might be clear, all the details will need to be sorted out and work prepared in advance for a proposal to be presented at the next Council.

Prof. Tundo reiterated that IUPAC engagement in the field is an opportunity to collaborate around the world.

Prof. Tarasova proposed a motion so that IUPAC organizes an Interdivisional Subcommittee on Green Chemistry.

25 for; no against; 1 abstention

With that approval, Prof. Tarasova will coordinate the preparation of the Terms of Reference which should be available for consideration at the next Executive Committee and for later presentation at Council.

ACTION: Natalia Tarasova to coordinate the preparation of the Terms of Reference for an Interdivisional Subcommittee on Green Chemistry; to be available for consideration at the next Executive Committee and for later presentation at Council.

[Note added following the Executive Committee meeting of 13 Nov 2016 - Discussions following the Bureau meeting led to the conclusion that the new committee should be a full standing committee within IUPAC, the Interdivisional Committee on Green Chemistry for Sustainable Development, rather than a sub-committee. The Bureau and the Executive Committee subsequently approved both the draft terms of reference for the new committee and recommended roster for its members for the remainder of this biennium and the next one, and have, by implication, agreed to the change in status.]

Regarding the book titled “Chemistry Beyond Chlorine” (project 2013-25 057-3-300), which is to be published in 2016 by Springer, since this book is to bear the IUPAC label, Prof. Weir noted he must read this book on behalf of ICTNS. Prof. Tundo indicated he would provide it to Prof. Weir immediately. *[Subsequent note: Prof. Weir received the book and after some modifications it was approved by ICTNS.]*

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12. REPORTS FROM DIVISIONS AND STANDING COMMITTEES

The Division Presidents and Standing Committee Chairs each spoke briefly to introduce their full reports in the Agenda Book.

12.1 DIV 1 – KRISTIN BARTIK (CALL IN FOR A REMOTE PRESENTATION)

12.2 DIV 2 – JAN REEDIJK

12.3 DIV 3 – MARGARET BRIMBLE

12.4 DIV 4 – GREG RUSSELL

12.5 DIV 5 – JAN LABUDA

12.5.1 Resolutions from Division V Meeting for Consideration

12.5.2 Resolution to Chemical Data

12.6 DIV 6 – PETR FEDOTOV

12.7 DIV 7 – TOM PERUN

12.8 DIV 8 – KARL-HEINZ HELLWICH

12.9 CHEMRAWN – CARLOS TOLLINCHE

12.10 COCI – BERNARD WEST

12.11 CCE – MUSTAFA SÖZBILIR

12.12 ICTNS – RON WEIR

12.13 CPCDS – BONNIE LAWLOR

13. ITEMS FROM MEETING OF DIVISION PRESIDENTS

Prof. Jan Reedijk chaired the meeting of the Division Presidents and Standing Committees Chairs held the day prior and presented a summary of the issues reviewed.

In reference to the General Assembly, the DPs brainstormed on suggestions and for improved cross-divisional interactions. A breakfast session could be organized where on each table one member of each group is represented and one Division/Committee lead a presentation of what is happening in his/her group. In turn, after such session, each Div/Cmt will have a member informed on each other group and who can relay a brief report to his/her Div/Cmt. Ultimately, the goal is to increase awareness and better knowledge about other activities.

The DPs also value specific one-to-one exchange and wish to preserve in the schedule an opportunity for such meeting.

It will be desirable if CCE and ICTNS were to meet for their 2nd full day after the Divisions.

DPs concurred that simultaneous coffee breaks are desirable as they foster opportunities to network (in opposition to Busan where coffee was only available in each meeting rooms).

In reference to the Election process, the DPs appreciated that the cycle completed in 2015 has been significantly shortened. They suggested that early identification of the Nominating Committee Chairs and lists of the electorate would greatly improve the process. The DPs also recognized that a pro-active role for the Nominating Committees

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in identifying qualified candidates was important and that activating NAOs to make nominations of good candidates remains a major challenge.

Lastly, the DPs considered the visibility of IUPAC through *PAC* and IUPAC-endorsed conferences. They concurred that to maintain a high appreciation of *PAC* and if possible to further improve its reputation, we need to make sure that:

1. there are enough Recommendations and Technical Reports published each year;
2. all major and relevant conferences do apply for IUPAC endorsement; especially 'regular' IUPAC series and those relevant to the fields of the Divisions.

Professor Reedijk asked if there were any questions.

Dr. Cesa stressed that in advance of the elections, it was important to engage the NAOs.

Lynn Soby asked if the Divisions will gain nominations by being more specific and identifying the expertise that their committee is seeking. She stressed that one objective of the Secretariat for the coming cycle will be to clarify the eligibility of each current member much earlier.

Richard Hartshorn stressed that to support the work of the Nomination Committees (NC), current members of Divisions and Standing Committees can be invited to share suggestions with their relevant NC.

14. REVIEW OF COMPANY ASSOCIATES PROGRAM

Bernard West, Chair of the Committee on Chemistry and Industry (COCI), briefly informed the Bureau about an on-going project (2014-018-2-022) lead by COCI and that is to review and assess the Company Associates (CA) program.

(see <http://www.iupac.org/project/2014-018-2-022>)

The project has started, but its membership had to be revamped due to volunteers' limited availability and other commitments.

A survey was completed in 2014. From the results, it appears that the actual engagement with industry is medium to strong and that the key benefits of the CA program for IUPAC are that the engagement of industrial chemists in defining needs and project opportunities, executing projects, and using the output of IUPAC projects. The benefits for industry included project outputs, nomenclature and standards, technical publications, outreach, and education.

In phase 2 of this project, the task group will develop scenarios for an updated CA scheme, and plan to solicit feedback from NAOs, IUPAC leaders.

(An update was published in *Chem. Int.* March 2016, p. 19; <http://dx.doi.org/10.1515/ci-2016-0210>)

Colin Humphris stressed that a review of the CAs is critical not only for keeping an engagement with industry, but also in considering the potential financial implication, since the CA scheme can constitute a revenue source.

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15. 2015 GA/CONGRESS, BUSAN, KOREA

15.1 LESSONS LEARNED

Lynn Soby recalled that shortly after the meeting in Busan, a survey was sent to all current and incoming officers and current and next Bureau members, to seek feedback on the GA schedule. The 2015 schedule was new and the survey focused on these new features. 19 responses have been received on the survey (out of 63 invites) and a compilation of the replies is enclosed in the Agenda Book (p.294). In short:

- Overall, the Busan schedule is a suitable blueprint.
- The joint opening reception as coordinated at the Congress was well attended.
- The interdivisional meetings should be retained, but better coordinated with more advanced planning and agenda outline.
- The options for earlier task group meetings should be preserved if possible.
- The scheduling of a split Bureau, ½ before Council and ½ after was well perceived.
- The scheduling of the Council as it was in Busan should be continued, but the time during the actual elections should be used to continue business, even if these are ‘minor’ items or the presentation of service awards.
- The model of the WCLM has been evolving every GA, but the last two, involving YOs, are well perceived.
- It has been suggested that the Distinguished Women in Chemistry awards should be highlighted at the opening Ceremony of the Congress. Also, an idea to run project posters at the congress has been proposed.

Lynn Soby noted the earlier request from the DPs preferring a simultaneous coffee break, and invited comments.

15.2 FEEDBACK ON ELECTION PROCESS AND GA SCHEDULE

Lynn Soby referred to the Agenda Book (p. 287) and concurred with the DPs assessment that a way to further improve the process will be in deciding the Nomination Committees composition much earlier and with a task more clearly outlined. The eligibility of current members will also be shared in advance to afford more transparency.

The Secretary General raised the question of the electorate and stressed that it shall be reviewed and more clearly spelled out.

Relevant By-Laws (B3.104)

The Titular Members of each Division Committee shall be chosen by an electorate comprising the Titular Members, Associate Members and National Representatives on the Division Committee, *together with the members or officers of such other bodies within the Division that the Bureau may specify*. The number of Titular Members shall not exceed ten unless otherwise determined by the Bureau.

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Upon reviewing the Bylaws, Fabienne Meyers confirmed that the practice has been to include Subcommittee Chairs and Task Group Chairs of current projects. Professor Hartshorn proposed to review the question more carefully and survey each Division's practice. The ultimate outcome is to define a process that serves the Division Committees well.

15.3 WCLM AND IDENTIFICATION OF TOPIC/LEADER FOR NEXT WCLM

(addressing Action [154EC19] and [97BU05])

Colin Humphris reviewed briefly what the World Chemistry Leadership Meeting (WCLM) has become, and recalled that earlier [and up to 2011], the WCLM was a meeting on strategy, held as part of the General Assembly (*Prior to 2001, the WCLM was integral part and organized by the Congress*). Originally, this was an opportunity for the leaders of national chemistry bodies to discuss issues or priorities of importance to world chemistry. In recent years, and starting with the GA in 2013, IUPAC has tried to use this forum to stimulate debate between younger chemists and chemistry leaders on important themes such as the role of IUPAC in facilitating sustainable development.

The Bureau is asked to decide on the topic and project leader for the WCLM in Sao Paulo, and Colin Humphris suggested that a theme be chosen in a way to engage Young Observers as it was in Busan.

Hemda Garelick recalled that while she was involved in the planning in 2015, that the process of engaging Young Observers to draft project proposals evolved smoothly during and soon after the GA, but the momentum had been lost when the process reached the point of getting each group proposal mentored by a current member. She asked that if such a plan is to be repeated, that each Division plans to be receptive to the YOs initiative and be prepared to provide constructive feedback on their proposal.

Chris Ober raised the idea of a topic surrounding interdisciplinary research. He recognized that two such groups exist within IUPAC, Materials and Green Chemistry, but more could be explored; also, every chemist should in principle fit in one or the other group. A challenge will be to seek and foster interdivisional engagement.

After some discussion, Prof. Tarasova thanked the Bureau for their input. Hemda Garelick and Chris Ober volunteered to develop a plan which will also involve the Young Chemists Network and Young Observers.

15.4 YOUNG OBSERVERS PROGRAM/ENGAGEMENT

Prof Hartshorn reviewed briefly how currently YOs are recruited. The process is mainly dependent on the NAOs that provide funding. Each NAO proceeds with its selection and funding mechanism. By coordinating an activity within the GA which

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involves YOs, IUPAC only provides an added incentive for the NAOs to develop and manage such a program.

YOs primary involvement is their attendance at the regular Division and Committee meetings.

A discussion revolved around the concern of better recruits, better prepared YOs, and better ways to retain the YOs engagement after the GA.

Prof. Brimble suggested that IUPAC explore channels to keep them engaged so that they can be involved with members in current discussions. She asked if listings of former YOs were available which can be used by the Divisions.

As a former YO himself, Prof Hartshorn is motivated to define a program that is more engaging. The emerging opportunities coming from IYCN shall at the same time be considered.

As soon as a clear program for the WCLM 2017 emerges, the NAOs will be invited to consider the opportunity to invite and facilitate the attendance of young chemists at the GA.

16. 2017 GENERAL ASSEMBLY & CONGRESS, SAO PAULO BRAZIL

(addressing Action [154EC05] and [154EC21])

Lynn Soby reported on her site visit with the Congress 2017 organizers in Sao Paulo on 24-26 February 2016. She referred to the minutes of that meeting included in the Agenda Book (p. 314).

She indicated that the Congress site is centrally located and is an hour away from the airport. All the amenities are very suited to host the Congress and GA. The congress organizers are prepared to issue invitation letters for those who will need a visa. Like in Busan, the GA registration desk will be merged with and managed by the Congress.

On the programming level and for the Congress, Roberto Torresi is now in charge of addressing requests.

Prof. Tarasova asked if following their presentation in Busan, the Congress organizers have reached out to our Divisions. Hemda Garelick confirmed that indeed they received an invitation to make suggestions, but she received little feedback.

Lynn Soby indicated that so far, the attendance of two Nobel Prizes winners was confirmed.

The Congress organizers are also planning to stage the Women awards symposium in a prominent section of the program, and are working jointly with the IUPAC team involved in this project. The organizers are working hard to ensure a good diversity.

Lynn Soby encouraged everyone to review the Congress website for an outline and update of their program. She expected that this joint GA/Congress will foster strong links between IUPAC and the Sociedade Brasileira de Química (SBQ), and she encouraged

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everyone to work together as much as possible and provide support and feedback to the SBQ.

17. 2019 GENERAL ASSEMBLY & CONGRESS, PARIS

(addressing Action [154EC22] and [97BU09])

Colin Humphris reported that he and Lynn Soby have had a visit to the Congress venues on 10-11 February 2016, on their way to the Finance Committee meeting. Colin Humphris recalled that following the Organizers' presentation in Busan, there were concerns related to the logistics of using two separate venues, the Palais des Congres for the Congress and Council, and La Maison de la Chimie for the rest of the General Assembly. The two venues are a short three stops subway ride which takes less than 30 minutes. They met with Nicole Moreau and Jean-Pierre Vairon and practiced that subway run.

The program planning is well advanced. The proposed International Advisory Board is listed in the Agenda Book (p. 337); in addition to including the President and Vice President, the Bureau is asked to nominate one more member. The motion is made to nominate Richard Hartshorn.

Two symposia will be devoted to the IUPAC anniversary and these sessions will be staged at La Maison de la Chimie; see details in the Agenda Book.

18. IUPAC 100 - CENTENARY PLANNING STEERING GROUP

(addressing Action [153EC24]; [153EC25]; [97BU01])

Prof. Tarasova referred to the Agenda Book (p. 386) which includes a copy of "The centenary white paper." She asked if there were any comments.

As a follow-up to the preparation of this whitepaper, Prof. Tarasova proposed the formation of the IUPAC100 Management Committee and informed the Bureau that she has approached Mary Garson as a potential chair and that Prof. Garson is willing to lead the group.

Prof. Tundo suggested that a meeting in Rome be one of the activities and recognizing that Italy is one of the founding members of IUPAC (*along with Belgium, France, USA, and UK*).

Colin Humphris raised the question about funding for the activities related to IUPAC100. He stated that his assumption is that these shall be at zero cost. He suggested that the Bureau develops a position as to what spending IUPAC can afford and how could IUPAC fund any aspect of the celebrations.

[For Decision] Proposed formation of the IUPAC100 Management Committee.

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The Bureau was asked to approve the formation of the IUPAC100 Management Committee and also approved Mary Garson as chair.

The motion was moved; the Bureau approved; all in favor.

Prof. Tarasova suggested that all the members of the earlier steering group remain on the committee, and asked if there were any additional volunteers. There were none. In addition, the Treasurer shall be included as *ex officio*.

19. FINANCE AND BUDGETS

(addressing Action [154EC06], [154EC07]; [154EC23])

Colin Humphris reported on the Finance and Budgets and in addition to the details provided in the Agenda (reproduced below), he referred to the documentation included in the Agenda Book for details on the 2015 investment portfolio (p. 391), 2016 Year-to-date investment portfolio (p. 401), copy of the audited reports (p. 411), approved budget 2016-2017 (p. 428), organization budget (p.432), and NAO subscription status (p. 433).

19.1 REPORT ON CURRENT FINANCIAL SITUATION

The changes implemented to our accounting system to move to a full accrual basis in 2015 have provided unparalleled insights into the financial performance of the Union and, importantly, its cash needs. It is important that the Bureau understands that the numbers in the past may not have reflected the true operating costs and expenses and cash needs of IUPAC. The 2015 Audit is not yet complete so all numbers in the following should be considered provisional; the issues they highlight are, however, very real. An unaudited 2015 Profit and Loss statement, Balance Sheet and Cash flow are in the Agenda Book.

The budget for 2015 was put together on the traditional basis and predicted a small surplus of \$30k for the year. In actuality, we have seen a loss of approximately \$130k. As this was a General Assembly year, higher costs were anticipated but, however, the Union also faced a number of exceptional expenses relating to the enforced office move, support to the failing IT systems, development of the new website, the new accounting system, and corrections to staff benefits. Additionally, there were no costs for PAC and CI distribution put into the 2014-2015 budget numbers. As you will see below the Union has lost some NAOs and it also suffered a \$45k loss on currency due to the strength of the US Dollar. Losses are planned in the budgets for 2016 and 2017 and care will be needed to ensure that these losses are not exceeded to ensure the longer-term financial sustainability of the Union. We can only absorb losses by drawing down our investment portfolio, inevitably reducing future interest income. This is important; \$125k of interest income was taken in December 2015 to help the cash flow position.

Cash Flow is the primary concern. Over 2015 cash outflows were \$1,574k and inflows \$1,258k giving net cash outflow of \$316k. The financial position at the beginning of 2016 was weak and the Union has had to use a line of credit to meet

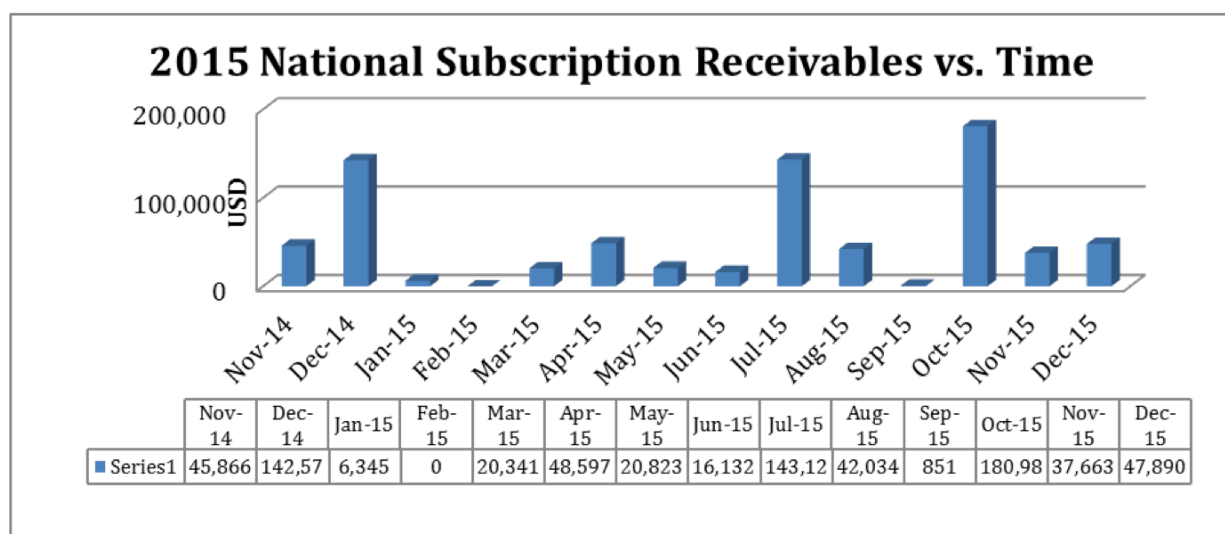
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its ongoing commitments. We are borrowing and will see interest charges as expenses in 2016. We will monitor the cash position carefully and will need to be in a strong position ahead of 2017, a General Assembly year.

The annual position, however, masks the day-to-day difficulties of having sufficient cash available to meet obligations.

Subscriptions from NAOs are three quarters of our annual income, but the timing of the payments is unpredictable. We have no control as to when these are paid through the year and, unfortunately, beyond; France and Belgium have only recently paid their 2015 subscriptions. The timing of the NAO National Subscription payments for 2015 until the end of 2015 is shown in the figure below.

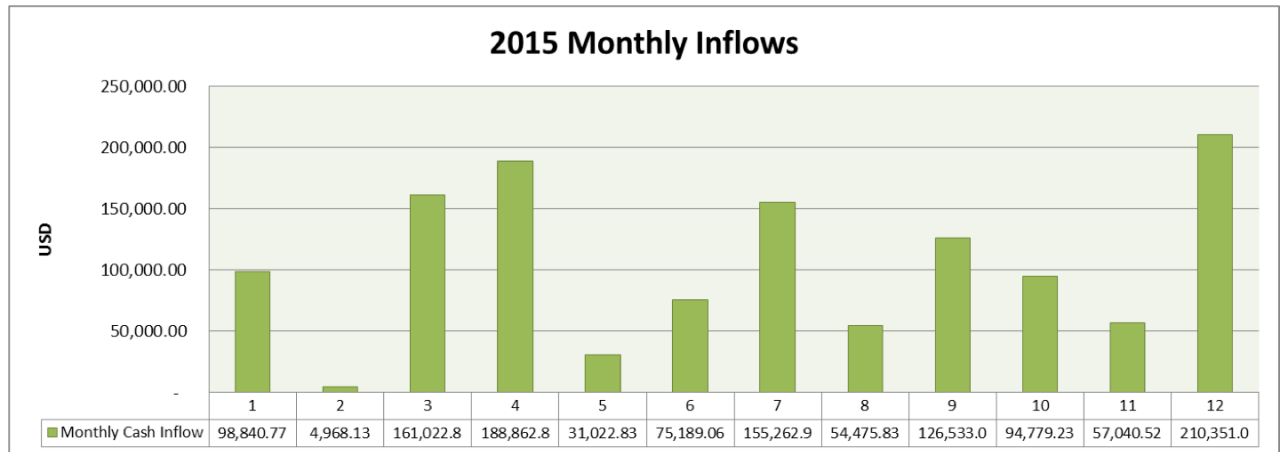


Whilst the Union has some regular and predictable cash obligations (payroll), all other calls on cash are just as unpredictable. Our investment portfolio is relatively inflexible, being designed to maximise returns. An analysis of the project system back to its inception shows a potential of up to \$800k of committed funding that could be called on at any time.

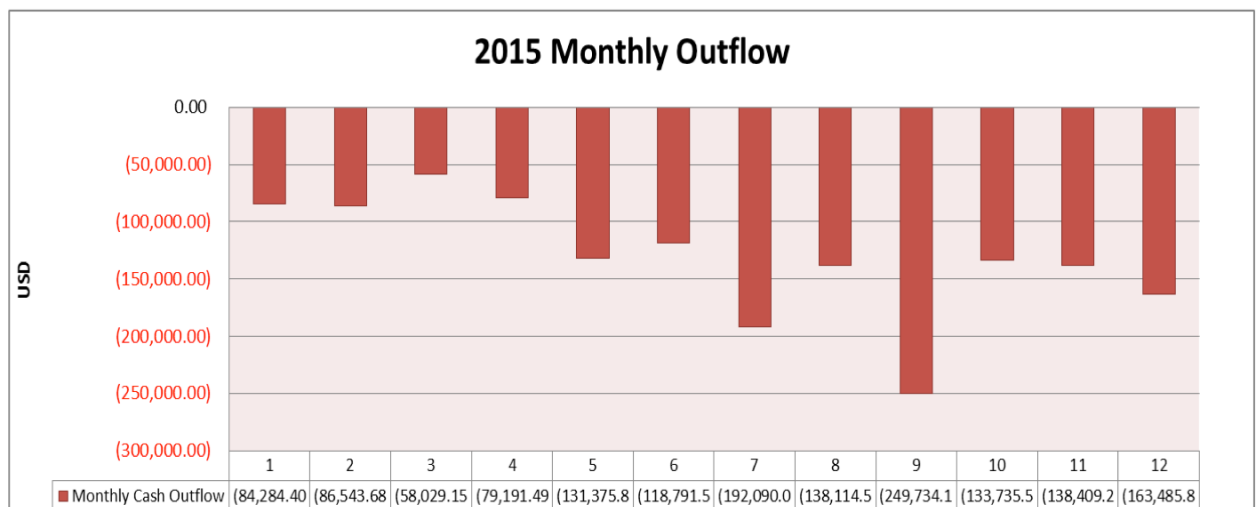
The overall Monthly Inflow of total revenue is shown below:

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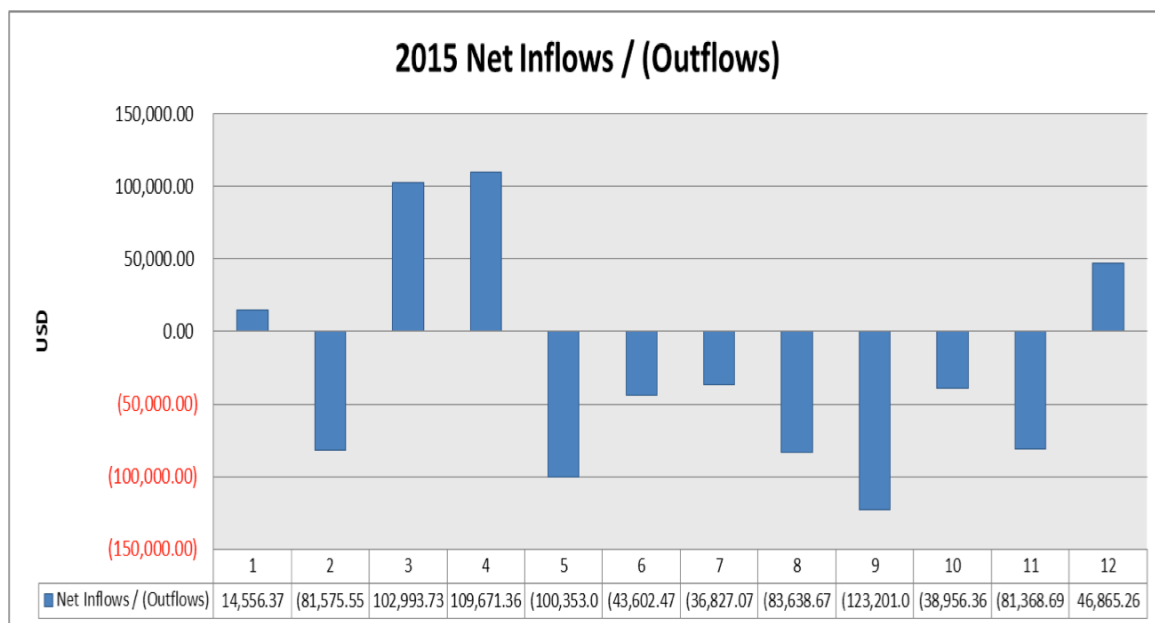
The overall Monthly Outflow (Expenses) is shown below:



The net effect in 2015 is shown below:

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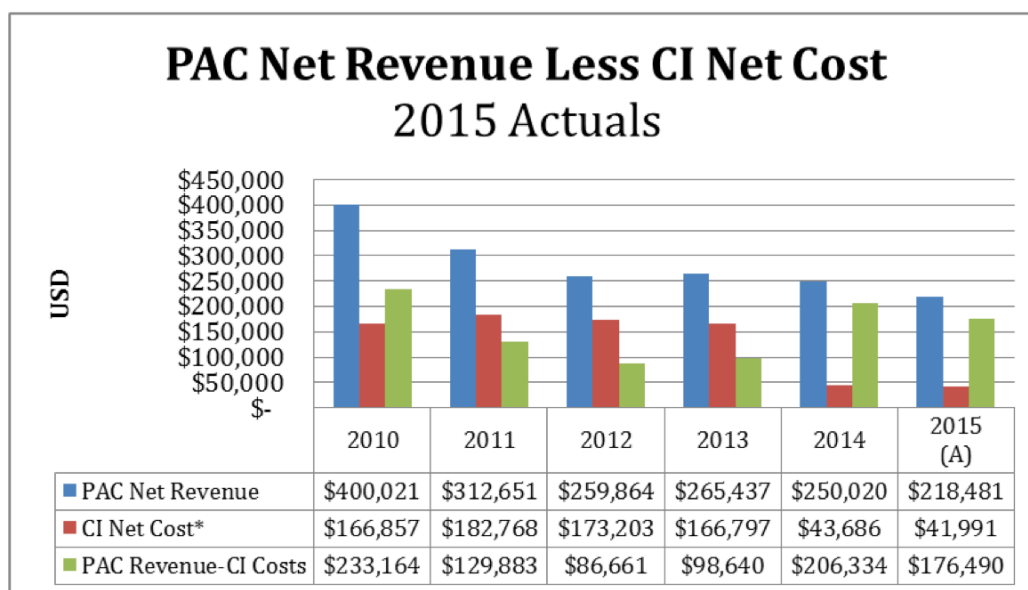
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A further complication for 2017 is that 2016 is the last year we are contracted to receive a €100k advance from De Gruyter, potentially further damaging cash flow early in 2017. Renegotiation is a priority.

Earnings from the partnership with De Gruyter are summarized below. *PAC* net earnings were below plan, but relatively stable, showing a small increase in Euro year on year.

The numbers are given in USD with 2014 exchange rate of 1.329 and 2015 of 1.100. Growth in *PAC* revenue is observed in Euro numbers for *PAC* net revenue to IUPAC from 188,126 € in 2014 to 198,619 € in 2015.



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CI Net Cost Calculation (USD)		
2014	2015	
\$ 65,142	\$ 59,285	DeGruyter
\$ 21,456	\$ 17,294	ACS Payment to IUPAC
\$ 43,686	\$ 41,991	IUPAC Net Cost

In conclusion, the Treasurer mentioned again that while the system is under much better control, the challenges remain around the management of the cash flow due to the unpredictability of both the income from National Subscriptions which can be paid any time within the year, and the outgoing expenses of having to reimburse claims associated with the various on-going activities of the Union.

In the ensuing discussion, the ideas of creating an endowment and establishing a corporate membership were mentioned.

19.2 PERFORMANCE OF INVESTMENT PORTFOLIO

The Investment Portfolio was transferred to BB&T in November 2014 following a decision of the Executive Committee on advice from the Finance Committee. A 2015 year end summary and 28 January report of the investment performance is included in the Agenda Book. During 2015, the investment portfolio outperformed the market benchmark gaining 1.28 % (benchmark 1.06 %). The Portfolio at December 31st 2015 was \$3,882,926. Annual income was \$132,737 from which \$125,000 was drawn for liquidity in December 2015. The Finance Committee remains very pleased with the performance of BB&T.

19.3 AUDITED FINANCIAL STATEMENT FOR 2014/15

The Audit report for 2014 is in the Agenda book. The 2015 Audit is in process, with the site visit and testing phase completed. All financial information reported for 2015 is pre-audited numbers.

The 2015 report will be forwarded to the Bureau when available.

19.4 REPORT OF FINANCE COMMITTEE MEETING 8TH FEBRUARY-OVERVIEW AND KEY TAKE AWAYS (CH AND LS)

19.5 BUDGET UPDATE FOR 2016-2017

The 2016-2017 Approved IUPAC Budget and Organizational Budget Allocations are in the Agenda book.

Coin Humphris confirmed that there was no change for the Divisions/Committees.

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19.6 NAOs NATIONAL SUBSCRIPTION PAYMENT STATUS (AS OF 23 MARCH 2016)

A summary of our NAO subscription payments for 2015 and 2016 is in the Agenda Book for reference.

The following National Adhering Organizations were notified of their impending loss of NAO status in September 2015 and reminded of their outstanding invoices: Argentina, Belgium, Jordan, Tunisia, Ethiopia, Colombia (provisional) and Costa Rica (provisional).

We received payments of the 2014 National Subscription from Argentina, Jordan and Belgium (payment was applied to 2014). As of 31 December 2015, Tunisia, Ethiopia, Colombia (provisional), and Costa Rica were considered automatically removed from NAO status, due to being 24 months in arrears and were notified 11 January 2016 of this change.

In addition, IUPAC received a notification that Luxembourg wished to withdraw from IUPAC as an NAO. This was compliant with our Statutes (having paid their NS for 2014-2015). IUPAC currently has 57 NAO's for 2016.

FINANCIAL IMPACT:

The 2016-2017 budget includes Tunisia and Ethiopia, but does not include the two provisional NAOs. This will represent a loss of \$3,297.

The 2014-2015 budget included Colombia and Costa Rica in the calculations (2014 = \$7,464 and 2015 = \$7,661 with Colombia being the majority).

Overall loss for 2014-2015 against budget for these four countries amounts to \$22,345. This loss will be written off in the 2015 Audit.

STATUS OF 2015 NAO SUBSCRIPTIONS:

We currently have outstanding NAO subscriptions receivable of \$26,028 for the following countries: Argentina, Cuba*, Greece, Kazakhstan, Pakistan and a partial balance for Turkey.

Lynn Soby confirmed that since the report was compiled, Greece has paid its subscription for 2015.

19.7 IMPLICATIONS OF THE STRATEGIC PLAN FOR FUTURE BUDGETS

(addressing Action [154EC35] asking the new DPs to consider the new Strategic Plan)

Richard Hartshorn asked the DPs to consider these reports especially in the light of the new strategic plan. He indicated that future budget changes might need to be examined in the plan drawn and drafted in advance of the next Finance Committee. He asked all the DPs to share ideas and concerns with the Officers and in particular the Treasurer.

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20. NATIONAL SUBSCRIPTION TASK FORCE

Colin Humphris reviewed the background of the establishment of such a task force. For the biennium 2016-2017, Council agreed that IUPAC would receive subscriptions from member countries based on the interim model (2015 subscriptions plus 5% p.a.). Significant difficulties had been encountered with the calculation model in use at the time. Council also agreed to the formation of a National Subscription Taskforce to propose a new model for calculating subscriptions for implementation in the 2018-2019 biennium. The history and issues with the subscription calculations were reviewed in a January 2016 *Chemistry International* article, included in the Agenda Book (p.434) or <http://dx.doi.org/10.1515/ci-2016-0105>.

The task force has held one web meeting to discuss its role, the task and the way forward. The goal is to establish an equitable way to calculate the National Subscription from a suitable proxy of the current chemical endeavor in that country. How to account for currency variation is also being considered.

The task force has received some feedback from a few NAOs and is now considering various proxies including academic research publications, patents and IP. One challenge is to manage expectation since *a priori* everyone will hope to pay less than with the current model. The task force is considering options of how to engage NAOs more effectively by providing incentives for early payments. It is therefore important that the perceived value of IUPAC is made clear to all. To be manageable both for the NAOs and IUPAC, the final model to calculate NS will also need to be smoothing to abrupt changes.

21. APPLICATIONS FOR NATIONAL ADHERING ORGANIZATION STATUS

Lynn Soby informed that there were no applications for National Adhering Organization Status received by the Secretariat as of 28 March 2016.

22. WEBSITE IMPLEMENTATION

(addressing Action [[153EC08]])

Lynn Soby invited everyone to visit the new site that was launched the day before. She stressed that the site deployment was a work in progress, involving the developers, but that it also needs a critical review of the content that is presented. She asked everyone to return comments and also to be on the look-out for an email inviting them to login and review their profile/contact information. She expressed her view that the website is IUPAC's public face and is an important component of the Union branding and that it is part of the value proposition that new members, be individual or national, can perceive.

23. PUBLICATIONS**23.1 STATUS REPORT *CHEMISTRY INTERNATIONAL***

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[154EC25]

In addition to the details provided in the Agenda (reproduced below), Colin Humphris referred to the Agenda Book which includes a one-page description of the mission of the magazine and the role of the new editorial board.

At its meeting on 1st November 2015, the Executive Committee approved the implementation of recommendations for *CI* by the Committee on Publications and Cheminformatics Data Standards (CPCDS). In summary, CPCDS believed that moving forward, *CI*, in conjunction with the new IUPAC website, should serve as a key promotion and two-way communication tool to increase awareness and visibility of IUPAC; both internally to members and externally to other Chemical Societies, students, researchers, and interested members of the general public. Its current editorial perspective could and should serve a broader audience to IUPAC's advantage.

CPCDS recommended that *CI* should move forward with a focus on digital, whilst continuing with a seasonal print with issues published 4 times per year starting in 2017. *CI*'s presence on the website should evolve in a transition to digital-only and leverage publishing opportunities offered by the new IUPAC website. A new business model is needed in view of the impact on member benefits for Affiliate and Company members as well as our active volunteers.

These recommendations have been discussed and agreed with De Gruyter.

CPCDS also recommended the establishment of an Editorial Advisory Board (EAB) to help with *CI* production. Based on volunteers keen to be actively involved, the EAB held a formative teleconference to discuss its role, and structure, and active involvement in the editorial process for 2016 onwards. It is recommended that board members act in both advisory and active participatory roles. For this reason, it is recommended that it is an Editorial Board, dropping the advisory focus.

Bureau members are asked to consider the current membership and make recommendations to broaden the geographic diversity. The current initial membership is:

Hugh Burrows, Editor, *Pure and Applied Chemistry*
Javier Garcia
Richard Hartshorn, IUPAC Secretary General
Colin Humphris, IUPAC Treasurer
Robert Lancashire
Bonnie Lawlor, Chair, CPCDS
Dave Martinsen
Leah McEwen

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Fabienne Meyers, Managing Editor, *Chemistry International (CI)*
Leiv Sydnès

Bureau members are also asked to consider the proposed Terms of Reference for the Editorial Board. These reflect the *modus operandi* up to formal approval at the Council Meeting IUPAC 2017.

The first edition of *CI* in 2016 was freely available, but with the ability to authenticate IUPAC members, it will be sold outside the IUPAC community for the second edition onwards.

Colin Humphris asked if anyone had any comments and also asked Bureau members to come forth with suggestions for additional volunteers, especially from the Far East.

23.2 STATUS REPORT *PURE AND APPLIED CHEMISTRY*

(addressing Action [154EC26])

The Bureau should note that the publishing process and collaboration with De Gruyter continues to run reasonably smoothly. Attention has been given to errors arising during the proofing process although these are now the exception.

Attention by CPCDS and during the *PAC* Editorial Advisory Board in Busan was on impact factors: the high impact of Standards and Recommendations contrasted with the difficulty of attracting leading chemists to publish conference papers in *PAC*. Bureau will recall that it approved the endorsement of the San Francisco “Declaration on Research Assessment” at the meeting in Busan. Looking forward a concern is a decline in content (it is down 30 %). De Gruyter plans to hold the price at the 2016 level for 2017 to forestall cancellations. This is an important issue for IUPAC to address through the *PAC* Editorial Advisory Board.

The De Gruyter plan for *PAC* in 2015 was for an aggressive growth in sales. In the event they faced a large reduction in subscriptions associated with the bankruptcy of a large subscription service (SWETS) and worked hard to recapture some lost income resulting in a better than expected 2015 income.

Bonnie Lawlor indicated that the current decline of *PAC* content was a concern also for De Gruyter and that the *PAC* editor was looking into realigning conference invitations. The timing for the preparation of technical reports and recommendations is instead less predictable, and enforcing a submission deadline for these specific type of manuscripts is not suitable.

23.3 VIRTUAL PUBLISHING AND DATABASES

Bonnie Lawlor reported that the De Gruyter Database “Standards On-Line” was launched on schedule last month. 2017 improvements will include InChI and a periodic table interface to access data.

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“Standards On-Line” is an added value, subscription bearing tool to facilitate advanced searches of the *PAC* Standards and Recommendations back catalogue. This will be royalty bearing for IUPAC (12.5%) with an expected income close to €20,000 in 2016.

Lynn Soby reported that SpringerMaterials are preparing a proposal for IUPAC consideration regarding the full Solubility Data Series to be developed into a database, either separately or as an integral part of SpringerMaterials. They are now looking at the costs associated with digitizing the full volumes of the SDS. Work will be ongoing to formalize a licensing agreement.

24. STATUS REPORT ON IUPAC SECRETARIAT

24.1 INFORMATION TECHNOLOGY AND PROCESS INNOVATION

Lynn Soby explained that since she begun in August 2014, she has reviewed all the Secretariat's functions and has implemented major changes, upgrades, and process improvements. These include the accounting system and reports, the handling and processing of claim forms, the management of the members' data, the election process, the website, etc.

24.2 STAFF AND THEIR RESPONSIBILITIES

Lynn Soby reviewed briefly the status of the Secretariat staff and key roles and responsibilities. She indicated that since Jay Lucido started to work for IUPAC in July 2015 as financial controller, Linda Tapp's role has gradually shifted; Linda now manages all the Membership programs, including National Adhering Organizations, Company Associates, Affiliate Membership Programs, and Associated Organizations. A goal is to continuously review, streamline and simplify the various processes that the office is handling.

The Secretariat also outsources specific technical skill, for example for the web development and maintenance.

24.3 CLAIM FORM PROCESSES

Lynn Soby reviewed the current claim form process and guidelines. She reported that the processing of claims was labor-intensive and that the work has actually increased since a receipted reimbursement policy was put in place. The length of time for reimbursement of claims has been a difficult issue for some of our volunteers, but an effort is made to make payment within a month. While we optimized the claim forms to enable a better tracking process, it remains a process that needs improvements if IUPAC is to manage cash flow more effectively. A goal is to develop a process that will be entirely digital with an online submission form and claim.

Lynn Soby asked for input from the Bureau members regarding future improvements.

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25. REPORT OF THE MEMBERSHIP RELATIONS COMMITTEE

(addressing Action [154EC27]; [153EC30]; [153EC31])

Mark Cesa recalled that within the scope of the new strategic plan, IUPAC is to “expand and retain member and volunteer base with an emphasis on diversity and inclusion.” The responsibility of the Membership Relations Committee (MRC) is therefore to also include retention of our current membership – National Adhering Organizations (NAOs), Associate National Adhering Organizations (ANAOs), Fellows and Affiliates – as well as recruiting new members.

Dr. Cesa indicated that the MRC met on Friday and started to explore options regarding types of membership and to develop a value proposition, i.e. a statement that describes why a stakeholder belongs to the organization.

In parallel, it will be important to collect ideas and survey members. Dr. Cesa hoped to make progress in the next few months and will report at the next Executive Committee.

Dr. Cesa stressed that it is very important that IUPAC can accurately frame what its unique role is and asked everyone to share their thoughts and in particular reflect on the most important things that IUPAC do for its members. In order to be able to plan and proceed with recruiting, and to expand IUPAC’s reach, the Committee recognized that having a coordinated approach and good and accurate contacts are key.

The MRC is composed of Mark Cesa (chair), Richard Hartshorn (*ex officio* Secretary General), Chris Brett, K.-H. Lee, Petr Fedotov, Carlos Tollinche, and Ron Weir.

Dr. Cesa will share the minutes of the recent meeting with the Bureau, when available. Prof. Tarasova will inquire to other Unions about their own practices and see what lessons can be learned from them.

26. REPORT OF THE IUPAC COMMITTEE FOR ICSU

(addressing Action [154EC13])

Mark Cesa (chair of that committee) informed the Bureau that the Committee met on Friday. In addition to the chair, the committee includes Prof. Brimble, Prof. Mei-Hung Chiu, Dr. Fedotov, Prof. Tarasova (*ex officio* as President and IUPAC representative on ICSU) and Dr. Humphris (*ex officio* as Treasurer).

The Committee is to “evaluate the value and effectiveness of IUPAC membership in ICSU and to recommend actions as needed to the Bureau; to assist the Secretariat, through the Executive Director, in response to requests from ICSU for information, nominations and other matters; and to coordinate applications from IUPAC volunteers for ICSU projects.”

Mark Cesa reported that, so far, the Committee focused primarily on evaluating IUPAC’s role in ICSU with an eye toward maximizing the value to IUPAC of this membership,

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consistent with the mission, goals and objectives of IUPAC's new strategic plan. Prof. Tarasova as President and IUPAC representative on ICSU will also gather ideas and best practices from others. ICSU is essentially focused on three major areas: universality of Science, science for policy, and research collaboration. IUPAC has currently two active projects, one with IUPAP on the participation and leadership of women in chemistry, and a second with IUCr on the concepts and terminology of crystal engineering.

Dr. Cesa mentioned that IUPAC paid about USD 24k per year and the issue is simply if IUPAC gets such value in return.

27. PROJECTS REVIEW**27.1 COMMITMENTS REPORT, PROJECTS EXPENDITURES, AND PROPOSALS UNDER REVIEW**

Fabienne Meyers referred to the report on p. 440 which compiles both the commitments and the current budget and balance of each current project.

The report is organized by Division and Committee. For each Div/Cmt the top part of the report lists the commitments made since Jan 1st and towards specific project; these commitments are made against the Division biennium budget and a recommended portion is to assign 70% towards specific projects and 30% to operational expenses such as off-year meeting. The bottom part is a status report of all current projects that have remaining funds and regardless of when these projects were initiated. The budget of each project is not restricted to the biennium and instead assigned at the time of their approval for the life time of the project.

The 'planned end date' is an indication of when the specific project might be completed and Task group members are regularly asked to review and update the status of their projects.

Also enclosed in the Agenda Book (p. 468) is the latest report of proposals under review. Such reports are generated monthly and circulated to the DPs; it provides a timely probe of the proposals that are at that time in the review process and at various stages of assessment.

28. REPORT FROM PROJECT COMMITTEE

(addressing Action [97BU03] The PC to consider alternative metrics to reach of definition of "Scientifically Emerging Region")

Prof. Templeton, Chair of the Project Committee, referred to his report included in the Agenda Book (p. 483). He stressed that by virtue of its role, the PC only sees a fraction of project proposals, which includes large projects or interdivisional ones. A guiding principle is always the assessment the scientific merit and the quality of the proposed activity, be that of a project or a conference seeking support. The PC activities are clearly relevant to the new strategic plan and do measure well against the Strategic Plan objectives.

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Among the issues under discussion, the Committee has reached no resolution regarding the ‘definition’ of “*Scientifically Emerging Region*.”

At its meeting on this past Friday, the Committee decided that from now on it will postpone to the following biennium, the assessment of proposals coming from Divisions seeking full support for a large proposal when at that time, the Division has itself already committed its entire biennium budget to other projects. A resubmission postponed the following year will require a recommendation from the new Division President. This practice is to encourage Divisions to better manage their own budgets and to recognize that the PC funds are not simply an extension of their own Division funds, but are for interdivisional/multidisciplinary projects or large projects in which the Division itself must make a commitment.

Prof. Tarasova thanked Prof. Templeton for his report and asked if the PC has looked into the UNESCO report “Global State of Science”

(http://en.unesco.org/unesco_science_report) for a definition of SER?

Mark Cesa asked if the project proposals were assessed against the new Strategic Plan. Prof. Templeton replied that the current proposal form does not explicitly make such a connection, but that the guidelines could be reviewed. Dr. Cesa suggested that doing so will provide a suitable highlight of the Strategic Plan.

29. REPORT FROM EVALUATION COMMITTEE

Prof. Chris Brett, Chair of the Evaluation Committee (EvC), informed the Bureau that the Committee was working with the EvC’s recently revised terms of reference with the goals of focusing their assessment on identifying what works well for the conduct and completion of a project and on providing insight that will result in improvement of the project outcome. The Committee will need to examine interim reports and explore ways to standardize these reports. The work of the EvC is to supplement that of the Divisions and is not an audit. A communication with the DPs/Standing Committee Chairs will be established to consider how best to proceed. Each member on the EvC has a specific responsibility in acting as a link with a specific Division/Standing Committee.

In the ensuing discussion, it was suggested the EvC look at the task groups population vs age, gender, regional diversity, and also if the task group members and chairs are simultaneously titular or associate members.

It was argued that the preparation of interim reports can help to bring a project to completion and therefore the EvC will need to consider what incentives it might provide to ensure that such reports are prepared and reviewed in a timely fashion. Ultimately the role of the EvC is to formulate and share good practices.

30. PRIZE COMMITTEE: IUPAC/SOLVAY AWARD

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Mark Cesa reported that there were 14 applications for this year's prize and the committee was currently proceeding with its review. The target date for announcing this year's award is set for the end of April.

31. COMMITTEE ON CHEMISTRY RESEARCH FUNDING

(addressing Action [154EC28] To obtain clarification from funding agencies ref their future involvement and about CS3 (Chemical Sciences and Society Summit) plan/report following their recent meeting in September 2015)

Mark Cesa informed the Bureau that CCRF was considering options for a third call for proposals and that, at the meeting in Busan, a possible collaboration with the CS3 initiative on water had been proposed, and CS3 organizers were favorable to IUPAC involvement. The CS3 initiative is a collaboration between the Chinese Chemical Society (CCS), the Gesellschaft Deutscher Chemiker (German Chemical Society, GDCh), the Chemical Society of Japan (CSJ), the Royal Society of Chemistry (RSC), and the American Chemical Society (ACS).

CS3 have issued a white paper,

<http://www.acs.org/content/acs/en/global/international/regional/eventsglobal/cs3.html>

Mark Cesa recalled that IUPAC's original involvement was to set-up and facilitate a process for calls for collaborative projects and their evaluation. If indeed such a process is now in place with its own momentum, IUPAC involvement is no longer necessary.

32. DISCOVERY AND NAMING OF NEW ELEMENTS

Prof Jan Reedijk reviewed the naming process triggered by the recent publication in *PAC* (Jan 2016) of the technical reports validating the discovery and assignation of elements 113, 115, 117, and 118.

The concerned laboratories have been invited to propose names and the provisional recommendation presenting these names will be subjected to a public review period of 5 months. The procedure is the subject of a recent feature article published in *CI* (March 2016; <http://dx.doi.org/10.1515/ci-2016-0205>)

Following the 5-month public review, it is foreseeable that the final recommendations are published towards the end of the year or early 2017.

33. EXTERNAL FUNDING SOURCES AND RELATED PROJECTS

33.1 THE PHOSAGRO PROJECT [154EC32]

33.2 NEW OPPORTUNITY – SINOPEC [153EC45]; [153EC46]

33.3 OTHER POSSIBILITIES

Colin Humphris referred to the Agenda Book (p. 490) for an updated report describing the PhosAgro/UNESCO/IUPAC grant program. Now in its 3rd round, the program has

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provided research grants for young researchers. The joint program is the result of a collaboration that was triggered during the IYC2011.

Alternative funding mechanisms needs to be explored that allow IUPAC to take part in activities of significant size and impact that also have the potential for good publicity.

The Vice President reviewed the potential opportunity emerging from a contact with Sinopec Director for Research, Dr. Xie Zaiku. It is now for IUPAC to articulate and propose practical ways that will allow such a relationship to translate into tangible funding opportunities targeted to specific initiatives. Negotiations are on-going.

For IUPAC, it is most important not to become involved in a conflict of interest with industry and to preserve its credibility and independence.

A question pointed to the Samsung prize. This is actually an endowment, restricted to educational projects and awards.

Prof. Tundo recognized that the Sinopec opportunity is a timely initiative. He suggested that it would be preferable that the format of such a joint program be unique and somewhat different than with PhosAgro.

Colin Humphris mentioned that the next Executive Committee will be in Beijing and that his hope is to have an agreement signed by the end of the year.

Bernard West mentioned that COCI was in a good position to nurture collaborative interest with industry. He recalled that at the WCLM in Busan, Dr. Hubert Mandery, director general of the European Chemical Industry Council (CEFIC), alluded to the initiative/opportunity of bringing Responsible Care through Africa. Similarly, the COCI Safety Training Program could be expanded.

Other opportunities could be explored, working with organizations such as OPCW, the Organisation for the Prohibition of Chemical Weapons, on issues related to security, or with UNEP, the United Nations Environment Programme, on issues pertaining to sustainable development, especially in Africa.

34. INCHI TRUST

Richard Hartshorn briefly informed the Bureau about the latest InChI developments and in particular about the recent projects of relevance to Health & Safety and inventory management. Such developments could prove to be important for InChI and be of great practical interest and generate visibility. He recalled that the Trust was responsible for developing the codes once the requirements and specifications were outlined as a result of a specific IUPAC project.

InChI has reached 15 years of age and the Trust plans to have a conference in 2017, to not only review what InChI has contributed to the field, but also to seek new ideas.

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The formal relationship between IUPAC (via Division VIII and CPCDS) and the Trust was reformulated last year to better reflect the role of CPCDS.

35. NPU

[153EC35]

Colin Humphris mentioned that he had been the IUPAC representative on NPU (Nomenclature for Properties and Units (in Clinical Chemistry)) for several years. The International Federation of Clinical Chemistry (IFCC) is also part of the steering group that oversees the development and promotion of NPU terminology for clinical chemistry and laboratory medicine throughout the world. (see Division VII report).

Colin Humphris explained that the NPU guidelines for clinical chemistry are currently being used in Denmark, Sweden and Norway. Within the Chemistry and Human Health Division (Div VII), the IUPAC NPU subcommittee has initiated projects to support the integration of NPU terminology with the international health standard, SNOMED CT. The integration of NPU with the SNOMED CT still requires acceptance by the owner of SNOMED CT, and adoption by additional countries.

36. OPCW ETHICAL GUIDELINES WORKSHOP/FUTURE INTERACTION

(addressing Action [154EC33] To follow-up the discussion at the Bureau and consider if the OPCW ethical guidelines deserve or not endorsement)

Prof. Tarasova referred the Bureau to the Agenda Book (p. 493) which contains an OPCW request to IUPAC for possible endorsement and promulgation of the text of The Hague Ethical Guidelines.

Professor Tarasova recalled the long-standing cooperation that IUPAC has developed with OPCW and Mark Cesa stressed that OPCW does see IUPAC as a reliable partner that provides unbiased science input. Dr. Cesa pointed out that the Guidelines are suggestions for the type of consideration that shall be included in the code of conduct. He proposed that if the Bureau is in support, that he will inform IUPAC NAOs of the existence of the guidelines and draft a message of endorsement, merely to encourage and suggest that they adhere to guidelines.

A motion was made to endorse the OPCW Guidelines.

The Bureau voted all in favor.

Mark Cesa informed the Bureau that he will also be an observer at a meeting at the end of April on educational activities. Professor Tarasova will attend OPCW Day on May 2.

37. CONFERENCE ENDORSEMENT PROGRAM

98th MEETING OF BUREAU

MINUTES

Lynn Soby referred to the summary list of conferences endorsed since 2015 July and included in the Agenda Book (p. 498). The Secretariat has recently updated the database of our conferences in order to provide detailed reports and better tracking of the conferences. The program management has also been recently defined for specific roles and responsibilities. Dr. Meyers is responsible for the conference's approval process with assistance from Linda Tapp (database and file management) and Enid Weatherwax (Approval Letters). This workflow should allow for more growth in the program, communication and management of content for *CI* and *PAC*, and a streamlined system to reduce "churn" and improve record keeping and file management.

Fabienne Meyers urged the Division Presidents to be more proactive in providing information on conferences that need to be properly endorsed (some run with the IUPAC label before applying for endorsement) and also proactive in engaging with organizers of events which could potentially be endorsed. Recognizing that an endorsed conference is a benefit for IUPAC affiliates, there is value in properly-assessed applications. Conference input also impacts on *PAC* content.

Recognizing that well-managed conferences can generate revenue, Prof. Tundo asked if/how could conferences be a revenue stream for IUPAC, similar to what it is for ACS or EuCheMS.

38. DATES AND PLACE OF NEXT BUREAU MEETING

Richard Hartshorn confirmed that the next meeting will be a virtual meeting next April or May and in advance of and preparation for the Council. The following meeting will be at the General Assembly in Sao Paulo.

39. ANY OTHER BUSINESS

Prof. Tarasova asked if there was any other business. There was none. She thanked the participants for their useful input and comments and for their help in keeping to the schedule. The meeting was adjourned at 11:50 am.

International Union of Pure and Applied Chemistry

99th MEETING OF BUREAU

Web-based GoTo Meeting 8 April 2017

ACTION ITEMS

[MC] Minor Change in budget for 2018-2019 reflecting increased funding from Solvay for the International Young Chemists Award although this does not affect the bottom line. This will be discussed at the Solvay Awards committee meeting in São Paulo.

[RH] Develop changes to Statutes and Bylaws for approval by Council consistent with Bureau's support for the proposed revisions of the Affiliate Membership Program and the Company Associates program. Circulate changes to officers followed formal approval electronically by Bureau. [RH-Completed]

[CH/LS] Develop formal documentation regarding Endowment. Status Update: First meeting with advisors was held on May 17 2017 to discuss future Audita and possible Endowment options. Outline proposal to go to Council for implementation by the Executive Committee [*in progress*]

[LMS/CH] Write to all NAO's providing the summary of National Subscription task force recommendations and subscription calculations. Invite all NAO's to take part in a regional "GoTo" Meeting as a third stage of consultation. [Status: Completed 21 April 2017] Meetings to be held throughout May 2017 [Status: Completed]

[Bureau Members] Bureau members agreed to meet with their National Adhering Organizations take them through the National Subscription recommendations and the appropriate individual country files. [Status Request and country files sent to Bureau members]

[Mary Garson/Chris Brett] UNESCO memorial date needs a national delegation proposal to the UNESCO Executive Committee. All NAO's should be contacted to determine their support. Status: Qi -Feng Zhou worked with contacts in China after the Bureau meeting. Correspondence with other NAOs continued. Application was sent to the Chinese UNESCO Delegation on 21 April 2017.

[RH/ChemRAWN] Carlos Tollinche will provide the Secretary General a detailed report of future actions, strategies for the committee. [Status: Will be discussed during GA in São Paulo]

[Chris Brett] Revise the Terms of Reference and objectives of the Evaluation Committee to broaden its role to include performance evaluation of the IUPAC bodies. [Status: Completed. In Council agenda book for Council approval]

[LMS/FM] Review General Assembly schedule so that ICTNS will not have conflicts with other division and committee meetings (Ron Weir proposed an evening meeting would be acceptable) [Status: Completed]

[FM] Consult divisions regarding the interdivisional meetings and finalize the schedule and logistics. [Status: Completed]

[LMS] Communication to NAO's regarding the nominations for Officer and Bureau members. Status: Completed.

International Union of Pure and Applied Chemistry

99th MEETING OF BUREAU

Web-based GoTo Meeting 8 April 2017

ACTION ITEMS

[LMS] Include WCLM flyer within the Council Agenda Book for Council for information (Council agenda item 19): [Status: Completed.]

[RH] Complete the IYCN/IUPAC Memorandum of Understanding and circulate it to Bureau for approval prior to 1 June 2017 deadline for the Council Agenda Book. Status: Completed. Will be signed at Young Researchers Symposium by Natalia Tarasova

[RH/FM] Develop a one-page description of the Young Observers program and activities for communication to NAOs, Young Observers' and others. [Status: Pending]

[RH] Request to Divisions to provide all Divisional rules currently being followed to be sent to LMS for inclusion in the Agenda Book to enable Council approval. [Status: no relevant Division operating rules were identified]

[LMS] Prepare detailed responses to all Congress and General Assembly bid proposers requesting any additional information identified as missing at the time of the Bureau Meeting in April. Request inclusion of a section on VISA status for international travel. Due date of one month from Bureau meeting. [Status: All completed in time for the Council agenda with additional information. Final bids received on time]

[RH] Prepare a formal letter to the NAOs outlining the voting process for selection of the Congress and General Assembly bids and inform NAOs and Proposers. [Status: Completed. Sent to NAOs and Proposers] [LMS]

[RH] Prepare a guideline for Congress and General Assembly proposal presentations at Council. [Status: Completed and sent to NAOs and Bureau.]

[RH/LMS/CH] Review Council Agenda items and associated timing (parallel) and revise detailed Council Agenda accordingly. Status: Completed In process.

[RH] Write to Bureau reminding them of their choice of next year's Bureau meeting: Bratislava or Philadelphia. Status: Completed. Bratislava will be the location of the 2018 Bureau meeting.

International Union of Pure and Applied Chemistry

99th MEETING OF BUREAU
Web-based GoToMeeting 8 April 2017

Decisions and Actions

Bureau Members taking part in the Virtual Bureau meeting:

Prof. Christopher Brett, Portugal
Prof. Margaret Brimble, New Zealand
Prof. Russell Boyd, Canada
Dr. Mark Cesa, *RTP Office*, USA
Prof. Mei-Hung Chiu, China-Taipei
Prof. Hemda Garelick, UK
Prof. Richard Hartshorn, New Zealand *RTP Office*
Dr. Karl-Heinz Hellwich, Germany
Mr. Colin Humphris, UK *RTP Office*
Ms. Bonnie Lawlor, USA
Dr. Jan Labuda, Slovakia

Dr. Laura McConnell, USA ,VII, *RTP Office*
Prof. Christopher Ober, USA
Dr. Thomas Perun, USA
Prof. Jan Reedijk, Netherlands
Prof. Gregory Russell, New Zealand
Prof. Mustafa Sozbilir, Turkey
Prof. Natalia Tarasova, Russia *RTP Office*
Dr. Carlos Tollinche, Puerto Rico
Prof. Pietro Tundo, Italy
Prof. Ron Weir, Canada
Dr. Bernard West, Canada
Prof. Angela Wilson, USA
Prof. Kaoru Yamanouchi, Japan
Prof. Qi-Feng Zhou, China-Beijing *RTP Office*

Secretary: Dr. Lynn M. Soby, RTP Office, USA

Present: Dr. Fabienne Meyers, USA, *BU Office*

Absent: Prof. Tavarekere Chandrashekar, India; Dr. Petr Fedotov, Russia; Prof. Ehud Keinan; Prof. Kew-Ho Lee

1. A request for additional agenda items was made. The Agenda was approved without additions.
2. The Minutes of 98th Meeting of Bureau in Montreal, Canada were approved. It was agreed that actions arising should be addressed at the 99th meeting of Bureau in São Paulo on 11th August 2017.
3. The Minutes of the 155th meeting of Executive Committee were noted by Bureau in relation to the following Executive Committee Decisions:
 - The endorsement for the approach taken by the NS Task Force to develop a model that encompasses a multi-index model.
 - The authorization of the Task Force to further communicate with each NAO on the progress and development of the new model.
 - The approval of the recommendation of a single electorate for all Divisions and Standing Committees and the proposed composition.

- The endorsement of the proposed new definition of the unit mole.
- The approval that the recommendations regarding the names and symbols be put to vote by the Bureau as authorized by Council at its meeting of 13 August 2015.
- In principle, supported a new proposal for Company Associate program.
- The endorsement of the Seville Declaration condemning the use of chlorine in warfare.
- The ratification of the 26 conference endorsements approved since last meeting.
- In principle, supported a new proposal for Company Associate program.

4. Decisions of 99th Bureau 8 April 2017

- Bureau approved the National Subscription task force recommendations to be presented at Council.
- Bureau approved that the proposed 2018-2019 budget be presented to Council for approval.
- Bureau supported proposed changes in membership programs for Company Associates and Affiliate members as part of the Budget and to be presented at Council.
- Bureau approved the Terms of Reference of the Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD)
 - Bureau approved the initial membership of ICGCSD
- Bureau supported the proposal for investigating alternative income from external funding and establishment of an IUPAC Endowment Fund.
- Bureau reviewed the bid proposals to host the 2021 and 2023 WCC/GA and approved all to have an opportunity to present bids at Council, if complete and submitted by target date.
- Bureau approved that the proposed changes in the Statutes and Bylaws be presented for Council approval.

5. Financial Matters

- A financial update by Treasurer was noted by Bureau and key items from the 2107 Finance Committee meeting.
- The payment status of NAOs and ANAOs was reviewed by the Executive Director with particular attention paid to the consequences of IUPAC Statute 9.2.
- The minutes of the Finance Committee Meeting of February 2016 were noted.
- The 2016-2107 financial statements were reviewed, with particular attention to the P&L statement and Balance sheet. It was noted that the 2016 financials were confirmed through a completed 2016 Audit.
- Review of the cash flow position throughout 2016 as well as the NAO subscription payments was discussed.

- Publishing income for Pure and Applied Chemistry and Chemistry International was discussed.
 - Key points were that the CI costs showed significant reduction and income from PAC at \$200,000, slightly lower than plan but exceeded expectations from December forecast.
 - Bureau approved that the proposed 2018-2019 budget be presented to Council for approval.
 - Bureau supported the proposed changes in the Company Associate program, given proposed increase in the budget.
 - Bureau supported the proposal to increase external income and funding and to explore options for creating an IUPAC endowment fund or similar instrument. Agreed that Council should be consulted.
 - On the advice of the Finance Committee, Bureau supported the change of Audit firm for fiscal year 2019.
 - The progress on the National Subscription task force was reviewed in detail and a motion to proceed to Council was approved.
6. The Vice President's Critical Assessment was received by Bureau prior to Council. Following Professor Zhou's presentation and discussion, the Bureau was asked for comments and feedback.
7. 48th General Assembly (2017)
- The General Assembly schedule and arrangements were reviewed and confirmed.
 - The Executive Director gave a status update on the 2018-2019 nomination and election processes.
8. Action Items and status from meeting are attached for reference.

Respectfully Submitted,

Dr. Lynn M. Soby

Executive Director

International Union of Pure and Applied Chemistry

97th MEETING OF BUREAU
Busan, Korea, 11 &-14 August 2015

MINUTES

Attendees: Dr. Mark Cesa (Chair), Prof. Russell J. Boyd, Prof. Christopher Brett, Prof. Greg Russell (in for Prof. Michael Buback), Prof. Tavarekere K. Chandrashekar, Prof. Mei-Hung Chiu, Prof. John Corish, Prof. Javier Garcia-Martinez, Prof. Mary Garson, Prof. Richard Hartshorn, Dr. Karl-Heinz Hellwich, Prof. D. Brynn Hibbert, Mr. Colin Humphris, Ms. Bonnie Lawlor, Prof. Roberto Marquardt, Dr. Laura McConnell, Prof. Christopher K. Ober, Dr. Thomas J. Perun, Prof. Jan Reedijk, Prof. Natalia Tarasova, Prof. Kazuyuki Tatsumi, Prof. Ron Weir, Dr. Bernard West, Prof. Kaoru Yamanouchi, Prof. Qi-Feng Zhou, Prof. Leiv Sydnes, Prof. Doug Templeton, Dr. Lynn Soby

Absentee: Prof. Michael Buback, Prof. Ram Lamba

Secretary: Dr. Fabienne Meyers

Tuesday, 11 August (starting at 14:00)

1. INTRODUCTORY REMARKS AND WELCOME

IUPAC President Dr. Cesa welcomed all participants and thanked our Korean hosts.

Dr. Cesa noted that the scheduling of a Bureau meeting within the General Assembly has been reinstated (last instance was in Glasgow in 2009). This was to address issues that are specifically relevant to Council. The Bureau last met virtually (i.e. conference call via GoToMeeting) on 27 May 2015.

Dr. Cesa informed the Bureau that at its meeting on Friday August 14, on the day following the Council, the Bureau would hold an election to select three of the Elected Members as members of the Executive Committee. Dr. Cesa invited members to consider who will be good candidates for such position, acknowledging that prior experience with the Union would be beneficial.

In addition to the current Officers, the EC currently includes Colin Humphris (also acting Secretary General), Prof. Qi-Feng Zhou, and Prof. Ram Lamba.

Dr. Cesa noted that in the registration hall of the Congress, the Korean Chemical Society has put up a booth in support of Nepal.

2. FINALIZATION OF AGENDA

Dr. Cesa indicated that most items to be discussed by the Bureau were in the Council Agenda and therefore background materials could be found in the Council Agenda Book.

No additional items were requested and the agenda was approved as proposed.

97th MEETING OF BUREAU MINUTES

3. MINUTES OF 95TH AND 96TH MEETING OF BUREAU

The minutes of the 95th Bureau meeting held in Coimbra, in April 2014 were circulated by email and via the bulletin board on 3 Sep 2014, and last corrections requested in May 2015.

The Bureau also met by GoToMeeting on 27 May for a brief meeting; the draft of the minutes was circulated by email on 13 July 2015, and included in the Council Agenda Book.

Decision: The Bureau is asked to approve the Minutes of the 95th (Coimbra) and 96th (GoToMeeting) meetings.

Dr. Cesa asked if there were any comments. As there were no comments, the minutes of the 95th and 96th meetings of the Bureau were approved by show of hands (unanimous).

For reference the Bureau minutes since 1958 are available online from the Bureau page <http://www.iupac.org/body/010>

3.1 MATTERS ARISING FROM MINUTES (NOT COVERED BY ITEMS ON AGENDA)

There were no matters arising.

4. MINUTES OF 153RD MEETING OF EXECUTIVE COMMITTEE

4.1 RECEIPT OF MINUTES BY BUREAU

The Executive Committee met briefly in Coimbra, Portugal, in April 2014 directly following the Bureau; minutes for that 152nd meeting were issued. The EC met next in RTP, NC, USA, on 8-9 November 2014; the minutes of this 153rd meeting are included in the Council Agenda Book.

The minutes of the 153rd EC meeting were received by Bureau on 27 May 2015.

There were no comments or matters arising.

For reference the EC minutes since 1999 are available online from the EC page <http://www.iupac.org/body/020>

5. MINUTES OF 47TH MEETING OF THE COUNCIL

The final minutes of the 47th Council Meeting are included in the Council Agenda Book.

There were no comments or observations.

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MINUTES

6. ACTION ITEMS FROM PREVIOUS MEETINGS

The Bureau was asked to review the Action Items in the Bureau backing papers and inform the Secretariat of any changes in status. The format of the listing has been revised and relevant items are recalled in this Detailed Agenda under the corresponding item.

Action Items not specifically covered in the agenda for noting:

*[93BU03] Establish alternative NAOs contacts list: **Secretariat** (same as [92BU02]) in progress; info collected by Moreau shared with Cesa. Transferred to Secretariat (as of 153 EC)*

[93BU16] Review speaker pack – all/Secretariat, (in progress)

[93BU17] Review Past President ppt IUPAC hint-inspired presentation – all (in progress)

*[153EC04] IUPAC as a Corporate entity in USA to be finalised as necessary **LS***

*[153EC21] Brazil GA July 3rd to July 11th dates need to be approved by Council. Write to Brazil to confirm that these are the dates, indicating the need for approval of Bureau, and requesting confirmation of their acceptance of conditions in the original invitation letter **LS**. Circulate confirmed dates to Bureau for approval **LS** (in progress – item Council Agenda)*

*[153EC32] Information gathering on ON and OFF representatives with regards related to organizations (on-going **FM** with **LS/SC**)*

*[153EC36] Set up a Bureau Committee to evaluate value that we get from ICSU, how to get best value from membership and the justification of remaining members. **MC/Secretariat***

*[153EC45] IUPAC Africa fund for new members - Sinopec need invitation from IUPAC to comply with Chinese state laws. Also consider the possibility for other countries/donors to join fund. **Action CH/MC to craft response** (Outstanding)*

*[153EC46] Sinopec proposal on collaborative research into clean energy/green chemistry building on the PhosAgro model **MC/CH to respond**. (Outstanding)*

Leiv Sydnes asked what progress has been made ref 153EC36. In principle, ICSU and IUPAC share the same values. Mark Cesa confirmed that a Bureau committee has yet to be set up but the issue will be looked at promptly now that the Strategic Review was completed.

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7. REPORT OF THE PRESIDENT

The State of the Union report and a report on the IUPAC Strategy Review were included in the Council Agenda Book. This item was to enable clarification of any matters prior to the Council meeting.

[96BU04] To provide comments and suggestions on the mission statement, vision, core values, goals and objectives by 15th June 2015; **Bureau members*

Mark Cesa referred to item 7.1 and 7.2 of the Council Agenda Book and asked if there were any comments. He noted that the report IUPAC Strategy Review had been shared with all NAOs and that only 5 responses had been received.

Leiv Sydnnes asked how we could improve contact and engagement of the NAOs. He felt that this was an important question for Council and that the community of NAOs should be more effectively re-engaged.

Colin Humphris agreed with the need to improve the relationships with NAOs and that the Union should brief Council on the steps it was taking.

8. REPORT OF THE SECRETARY GENERAL

The Secretary General report is included in the Council Agenda Book as item 9. Item to enable clarification of any matters prior to the Council meeting

** [151EC02] Establish a task group to provide recommendations on how the office shall work in collaboration with the Officers and EC, and how to exercise control and oversight of the budgets. Humphris, Corish, and Cesa will undertake the task. In addition, a member of the FC will be asked to participate.*

**[153EC01] Restructure QuickBooks from 1 January 2015 with data integrity.*
LS

[153EC02] Recommendation to have a financial controller approved. Proceed with recruitment of financial controller **LS*

[153EC03] Complete lease and office move **LS*

Colin Humphris emphasized the need to have good accounting as a priority, especially when money was short. He noted that the upgrade of the accounting system has been completed. Under Lynn Soby's leadership, the Office was in new accommodation more appropriate to our needs for an international center. Costs were comparable to the old office.

Mark Cesa noted that with the pressing office restructuring complete the Executive Director will have time to focus on longer term priorities.

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Richard Harshorn asked for a vote of thanks for the 'Acting' Secretary General. The Bureau concurred.

Leiv Sydnnes asked about the length of the new lease for the Office, and why USA had been the only option considered. He felt that the NAOs should be informed of the reasoning.

Colin Humphris confirmed that the lease was for seven years. The Secretariat remained in the USA to ensure continuity following a difficult period of change.

Mark Cesa asked that if others considered alternative venues as more appropriate that they should inform the Executive Director.

Lynn Soby welcomed feedback and Colin Humphris confirmed that if NAOs are interested in hosting the Secretariat in the future, they should make interest known in good time.

9. VICE PRESIDENT'S CRITICAL ASSESSMENT

PROF. TARASOVA

The Vice President's report is included in the Council Agenda Book as item 8. Item to enable clarification of any matters prior to the Council meeting.

**[96BU05] To provide comments and feedback to Natalia Tarasova on her Vice President's Critical Assessment prior to the General Assembly.*

Natalia Tarasova thanked Jan Reedijk for his feedback received after the previous Bureau; she had hoped for more comments.

Her VPCA was further developed following the draft already outlined in 2014. The VPCA focuses on the project system and how it can serve the Union to address major goals and key issues that are relevant to global challenges (including large and interdisciplinary projects); on sharing good practices among NAOs; on cultivating a rich diversity among members (by gender, age, regions); on recognizing the value of education and ethic issues (ref to OPCW and management of chemicals, connection with UNESCO, the Chemistry Olympiads, and understanding the new paradigms derived from the Sustainable Developments Goals); and on anticipating problems to avoid catastrophe.

Natalia Tarasova argued that IUPAC should draw on its intrinsic strengths to make meaningful contributions to international projects that address the needs of the chemistry community and the world at large and with a focus on sustainable development.

The opportunity of the Centenary (iupac100) was reviewed separately (see item 12).

Leiv Sydnnes asked how the UNESCO network could be better used.

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Natalia Tarasova cited as an example a possible repeat of a global experiment during the centenary for which the UNESCO network would be invaluable, as during IYC.

John Corish also mentioned that the PhosAgro project and the UNESCO contribution provide a good model to explore relations/joint activities with other organizations or companies.

Karl-Heinz Hellwich indicated that he has had the opportunity to talk about IUPAC in high schools and that these presentations are welcome with equal enthusiasm both from the teacher and the students. He supports IUPAC involvement in the Chemistry Olympiad.

Natalia Tarasova indicated that a small budget has been reintroduced in the proposed 2016-17 budget to support the Chemistry Olympiads. The 2016 event will be held in Pakistan (at the International Centre for Chemical and Biological Sciences (ICCBS), Karachi University, 20-29 July 2016) and the 2019 will be held in Paris and in sync with IUPAC 100!

Mei-Hung Chiu noted that the IUPAC representation at the Olympiads is very valuable. She felt that IChO would welcome practical input from IUPAC.

10. FINANCIAL MATTERS

10.1 REPORT OF TREASURER

John Corish referred to his report and the information included in the Council agenda book. He focused his review on challenges of National Subscriptions. The current formula for allocating National Subscriptions is based on CEFIC data of the relative size of each country's chemical industry averaged over 5 years. NAOs have had the option to elect to pay in either USD or their national currency. To calculate the exchange rates an average over the 4 quarters of the year prior to the General Assembly was used. The approach was an attempt to smooth variations. The model failed however when used to calculate the national subscriptions for the upcoming biennium (2016-17). A significant number of countries were assigned very large and unacceptable percentage increases in their subscriptions. A proposal to share the current financial burdens equally was therefore to be presented to Council that set a 5% per year increase for all countries in their chosen currency for payment. If approved, this would apply to all members for a 2 year interim period only. During the next biennium the Treasurer indicated that a new model would be developed with inputs from the NAOs.

Leiv Sydnæs indicated his support and thought that it is a good and equitable proposal.

Mark Cesa mentioned that other organizations are looking at similar subscription problems. Judging the relative size of a national chemistry enterprise is complex.

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Colin Humphris recognized that an important value of the data set that IUPAC has been using is that it is both objective and available from an independent source. Identifying a new model will be challenging.

Kaz Tatsumi recognized that the current formula has failed to buffer the currency fluctuations properly.

10.2 REPORT OF FINANCE COMMITTEE

The Finance Committee met on 16 February 2015; the meeting minutes are included in the Council Agenda Book and were noted by Bureau.

**[153EC10] Treasurer and Executive Director to implement the Finance Committee portfolio management recommendation immediately. Next steps; inform BB&T, develop policy statement for FC, implement SC/LS*

**[153EC11] Revisit Terms of Reference for Finance Committee given changes to investment portfolio management and policy statement in 2015 SC/LS*

The Treasurer confirmed that the actions above have been implemented.

10.3 STATEMENT OF ACCOUNTS FOR 2013 AND 2014

The Audited Financial Statements for 2013 and 2014 were included in the Council Agenda Book and noted by Bureau.

10.4 REVIEW OF BUDGETS FOR 2016-17

The Proposal for National Subscriptions and their calculation was included in the Council Agenda Book and accepted by Bureau as per the agreed action:

** [96BU02] To develop an alternative, more equitable, interim proposal for review by Bureau prior to submission to Council; **Treasurer with the Officers***

Support to IChO will be considered during the next Biennium.

[153EC41] Reconsider financial support to IChO as part of the next biennium budget preparation **LS/SC*

10.5 NAO AND ANAO PAYMENT STATUS

Bureau noted that five National Adhering Organizations were in arrears for their 2014 National Subscription payments (Argentina, Belgium, Cuba, Ethiopia, and Tunisia) as documented in the Council Agenda book (item 19.4) of 16 July 2015.

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Lynn Soby confirmed that Jordan has now paid and is up to date.

Dr Soby also noted that two Associated National Adhering Organizations were in arrears for greater than 24 months. The 2013 and 2014 ANAO payments have not been received from Indonesia and Venezuela.

Options were still under consideration for Cuba and its outstanding subscriptions.

**[153EC09] Evaluate payment route/alternatives for Cuba. Checking with US Treasury and North Carolina Department of Commerce (in progress/State Department and Treasury contacted)*

11. APPLICATIONS FOR NATIONAL ADHERING ORGANIZATION STATUS

The applications previously approved by Bureau for Council were noted:

11.1 COSTA RICA (NAO) – NATIONAL NANOTECHNOLOGY LABORATORY-HIGH TECHNOLOGY NATIONAL CENTER

11.2 COLOMBIA (NAO) - SOCIEDAD COLOMBIANA DE CIENCIAS QUÍMICAS

11.3 GHANA (ANAO) - GHANA INSTITUTE FOR PURE AND APPLIED CHEMISTRY

11.4 KAZAKHSTAN (NAO) – KAZAKH NATIONAL ACADEMY OF SCIENCE

11.5 SENEGAL (NAO) - COMITÉ SÉNÉGALAIS POUR LA CHIMIE

Lynn Soby confirmed that Costa Rica and Colombia have not paid yet and that their applications would lapse if no payments were made by 31st December 2015.

11.6 READMISSION OF NATIONAL ADHERING ORGANIZATIONS

The proposed process for readmission of NAOs who have ceased membership was approved and the positions of Spain and Bangladesh were considered.

** [96BU01] To develop appropriate policy guidelines and review the relevant Statutes in relation to NAO cessation and (re)admission; EC*

Dr Soby confirmed that the organizations that form the Spanish IUPAC Committee and will represent Spain as the National Adhering Organization in IUPAC are Real Sociedad Española de Química (RSEQ) Federación Empresarial de la Industria Química Española (FEIQUE) Instituto de Tecnología Química (ITQ) Institut Català d'Investigació Química (ICIQ) and coordinated by Fundación Española para la Ciencia y la Tecnología (FECYT).

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This newly organized Spanish IUPAC committee had filed all the necessary documents required: the readmission application, the formal notification and support letter from the ministry of economics and competitiveness which outlines a new process for ensuring and coordinating efforts for support. The Spanish IUPAC committee had also paid the outstanding national subscriptions for 2013, 2014 and 2015 as of 24 July 2015 and confirmed by the executive director.

Dr Soby also confirmed that the Bangladesh Chemical Society BCS had paid their national subscriptions in arrears for 2013, 2014 and 2015 and had submitted a readmission application and the required supporting documents.

In the absence of any questions Bureau recommended readmission of Spain and Bangladesh to Council.

Greg Russell asked if Mexico was currently in the process of applying as the Polymer Division (Div IV) was considering a proposal for the major Macro conference to be held there. Kaz Tatsumi confirmed that Mexico has yet to apply to become an NAO and that an IUPAC conference should not therefore be held there. He recalled the case for the recent ICCG in July 2014 that was held in Singapore and in that instance, the endorsement has not been granted because Singapore was not an NAO.

Leiv Sydnæs concurred and felt that the prospect for such an IUPAC conference would be the driving force for the country to become member.

It was noted that Crystallographers do the reverse: they encourage events where the country is not member (i.e. their NAO equivalent) and work from the initial conference to ensure a sustainable participation.

12. 2019 IUPAC CENTENARY

** [153EC24] Invite Regional chemistry bodies (e.g. EuCheMS etc.) to consider centenary activities*

** [153EC25] to contact ICCA to open dialogue about Centenary (in progress – Cefic Secretary General attending the General Assembly)*

**[153EC22] Find out about various prizes, the application process, rationale for IUPAC eligibility and next steps for 2019*

**[153EC23] Approach UNESCO to clarify the process by which the IUPAC Centenary would be included in the UNESCO 2019 calendar of memorial dates*

**[153EC26] Register IUPAC url's for Centenary and 2019: www.IUPAC100.xxx and www.IUPAC2019.XXX*

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The IUPAC100 workgroup met on Saturday afternoon, 8 August 2015, and Natalia Tarasova chaired this 1st meeting of the Centenary Planning Steering Group (CPSG). Participants included Bonnie Lawlor, Chris Ober, Chris Brett, Russell Boyd, Javier Garcia-Martinez, Richard Hartshorn and Fabienne Meyers; Ram Lamba was absent in Busan and Laura McConnell had a conflict with another meeting.

The group considered the legacy of IYC and discussed the timeline for IUPAC100. A whitepaper clarifying the objectives and goals of the celebration will be drafted and shared various stakeholders, including NAOs. [ACTION 01]

One theme that is unique to IUPAC is the development of a common language for chemistry; this will be echoed in the whitepaper. This was very important for effective Intellectual Property registration a possible aspect to be celebrated.

An option to add IUPAC in the UNESCO Calendar of memorial dates will be pursued.

The whitepaper will also serve as a reference to initiate advertising and funds raising activities. An approach that will require involvement of the NAOs will be formulated.

Colin Humphris felt that the work of the steering group was timely. He pointed out that one of the lessons learnt from the IYC was the need for a dedicated project manager.

Javier Garcia Martinez stressed that CPSG sees the celebrations as an opportunity to engage with NAOs and the whitepaper will focus on clarifying one message and steering one momentum.

Mary Garson recalled the Women in Chemistry Networking breakfast activity that was initiated during IYC and mentioned that in some places, it has continued as a yearly activity.

The whitepaper shall be available by March 2016, in time for discussion at the next Bureau.

13. IUPAC WEB SITE

Progress on the website was described. The prototype demonstrated displayed a limited number of features to share the feel of what is being developed.

**[153EC07] Website demonstration to be ready for Busan GA*

**[153EC08] Develop portal for new members for website*

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** [153EC39] Upgrade AIS process and implement move to "endorsement" (in progress/documents upgrades outstanding. To be completed as part of website upgrade)*

Bonnie Lawlor explained that the task force proceeded with a survey last year and that a report had been shared with the EC.

The features viewed as most important for a new website were (i) ease of navigation, (ii) a clear image of what IUPAC is and does (relates to promote the image of chemistry), (iii) a space for more content and group workspace.

Lynn Soby displayed the prototype and highlighted the key features. She pointed out to the ability for members to upload/update/edit content.

The link to the prototype was shared (email Aug 11); it included a comment feature that everyone was welcome to use; these comments are automatically shared with the developers.

14. PAC & CI TRANSITION TO DE GRUYTER

Colin Humphris reported that the transition in general has been manageable and positive, and that DeGruyter (DG) has been responsive to the specific needs of the journal. Issues continued to be worked out, and work relation is positive.

Karl-Heinz Hellwich indicated however that from his experience there have been difficulties, such as the multiple rounds of proofreading needed for the *Brief Guide to the Nomenclature of Inorganic Chemistry*.

14.1 TRANSITION REPORT ON *PURE AND APPLIED CHEMISTRY* AND THE PAC DATABASE

Colin Humphris confirmed that reports and recommendations published in PAC continue to be free as soon as released, and so are all the archives after a year.

He explained that DG have started the development of a database of IUPAC Standards and Recommendations at their own risk. The database is built by extracting standard and recommendations from *PAC*, and therefore includes definitions of terms, standard values, procedures, rules for naming compounds, etc.

Karl-Heinz Hellwich indicated that such database could be problematic because IUPAC will have no control of the quality and hence cannot authorize the content.

Colin Humphris noted that the *PAC* Editorial Advisory Board met on Monday 10 August. At the EAB it was agreed to bring a recommendation to Bureau for

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IUPAC to sign the San Francisco declaration on Research Assessment (DORA; <http://www.ascb.org/dora/>).

Leiv Sydnnes confirmed that ICSU endorsed the declaration last year.

The Bureau supported the idea in principle and that this recommendation be passed on to the Council for approval.

14.2 TRANSITION REPORT ON *CHEMISTRY INTERNATIONAL* AND FUTURE OPTIONS

For *CI*, Bonnie Lawlor confirmed that the transition has been more challenging. *CI* is not a scholarly journal and editorial practices differ from DeGruyter's core competences. DeGruyter started in 2014 by replacing IUPAC copy editor with a contractor of their own. In 2015, they reorganized their internal workload and replaced that contractor by assigning *CI* copy editing to *PAC* managing editor.

While the relation is today stable, it is not providing the complementary fit necessary to develop *CI* print as we know it. *CI* online on DG website is also not that of a newsmagazine but simply similar to *PAC*.

Bonnie Lawlor indicated that DG had asked about IUPAC intentions for *CI*. She confirmed that a survey was underway to help identify what *CI* could and should be. Based on this, CPCDS will make recommendations in time for the next EC bearing in mind that any changes to the 2017 plan will need to be confirmed by Q1/2016. [ACTION 02]

14.3 BUSINESS PLAN 2016 AND 2017

Lynn Soby indicated DG confirmed strong sales for *PAC* for 2016. For *CI*, while it took a few months to sort out the subscriptions records, the numbers of paid versus free subscription are now stable, and that allows for better planning and forecast. The largest decrease is now that of the number of affiliates subscribing via ACS.

Javier Garcia asked how the new website could help with *CI*?

Bonnie Lawlor confirmed that CPCDS/*CI* task force will explore options of going digital first and the use the new website to flash features and provide an entry to *CI* online. She confirmed that based on the existing contract, 2016 will not be different than this year, but the year ahead can provide opportunities to test features and see how contents can be pushed to members/NAOs/fellows.

Colin Humphris also confirmed that the Affiliate Membership Program (AMP) should be reviewed; the AMP fee of USD 35 has not been reconsidered since at least 15 years. Access to *CI* is an important benefit.

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15. CONFERENCES AND SYMPOSIA

15.1 FINANCIAL SUPPORT FOR CONFERENCES IN SCIENTIFICALLY

EMERGING REGIONS (SER) AND ON NEW DIRECTIONS IN CHEMISTRY

Doug Templeton indicated that the Project Committee is often challenged by the definition or lack definition for SER. The OECD list does not apply to the criteria of 'emerging region' when specifically applied to development on chemistry, and many developed countries are not OECD members by choice.

The PC will be looking into alternative metrics. [ACTION 03]

The list of financially supported conferences was enclosed in the PC chair report.

15.2 RATIFICATION OF ENDORSEMENT OF SYMPOSIA

Mark Cesa referred to the list shared in advance of the meeting; there was no questions/comments and the Bureau approved the sponsorship/endorsement of the events listed in the report included in the Agenda Book.

Mark Cesa closed the meeting and confirmed that Friday follow-up meeting will start at 8:30 with the election of three members to make up the Executive Committee.

Friday 14th August (starting at 08.30)

The Bureau reconvened the day after the Council meeting.

Additional attendees: Hemda Garelick (newly elected bureau member EM, UK), Mustafa Sozbilir (incoming CCE chair, Turkey), Petr Fedotov (incoming DP6, Russia), Kew-Ho Lee (newly elected bureau member EM, Korea). No absentees beyond those listed on p. 1.

16. ELECTION OF BUREAU REPRESENTATIVES TO THE EXECUTIVE COMMITTEE

Colin Humphris explained that in addition to the 5 officers (President, Vice President, Past President, Treasurer, and Secretary General), the Executive Committee (EC) includes 3 elected members (EM) of Bureau. He asked for nominations and the following were announced:

- Chris Brett (Portugal) – just reelected for a second 4-year term on the Bureau; previously member/President of Division I
- Mei Hung Chiu (China/Taipei) – just elected for a 1st term; previously CCE chair
- Russell Boyd (Canada) – currently in his 1st term as EM; member of the PC
- Chris Ober (USA) - currently in his 1st term as an elected Bureau member; previously member/President of Division IV
- Kaoru Yamanouchi (Japan) - currently in his 1st term as EM; previously member/President of Division I

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The Bureau was asked to vote for 3.

The ballots were counted and Brett, Chiu, and Yamanouchi were elected.

17. MATTERS ARISING FROM COUNCIL AND THEIR RESOLUTION

**[96BU06] On completion of the 2015 election process, to audit the process so that the Union can build on the experience for 2017; Executive Director (pending)*

Colin Humphris confirmed the Division elections have been completed in advance of the Council following a timeline agreed upon last year. Being new, the process will need to be reviewed as further improvements should be implemented.

Roberto Marquardt indicated that Div I also has membership for Commission I.1. Details will be shared with the secretariat.

Similarly, Commission II.1 and JCBN would be finalized.

** [96BU03] To lead a review of the basis of subscription calculations for future biennia*

Mark Cesa confirmed that a task force will be established to carry out the task. The task force should include the Executive Director (chair), the Treasurer, the incoming Treasurer, a member of the Finance Committee (suggested by FC chair), plus two or three members from NAOs, preferably one from small NAO, one from medium, one from large NAO. NAO representatives should be familiar with the current process and allocation. The task force will be in place by the end of the year. [ACTION 04]

John Corish mentioned that it will be important for the study to consider creatively new objective measures of the relative importance of chemistry in the different countries and a satisfactory method to handle currency fluctuations.

Jan Reedijk asked that the Bureau approve the release from Commission II.1 that was not presented at Council. (see item 35 below)

Jan Reedijk also asked that endorsement of the San Francisco Declaration be reviewed since it has not been presented at Council (see earlier 14.1 and item 35 below)

18. ITEMS FROM MEETING OF DIVISION PRESIDENTS

The Division Presidents and Standing Committee Chairs met on Tuesday morning, 11 August 2015.

Laura McConnell chaired the meeting of the DPs. Jan Reedijk will be the next chair.

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The group considered the suitability of the GA schedule and in particular the cross divisional meetings. The cross divisional meetings were viewed as fruitful, yet the attendance was mixed.

Richard Hartshorn suggested that may be a preset agenda or theme could help to focus the discussions.

Lynn Soby suggested that in the future there might be more options to consider that take advantages of online tools.

Participation of National Representatives during the GA was also an issue. Several Divisions had difficulty communicating with NAOs; especially obtaining nominations. NAOs need to better understand the opportunity provided by NR participation and also better appreciate that a NR is often a stepping-stone to become Associate Member.

The DPs reviewed the issues of book projects and spoke of the need to eventually have an additional section in the project proposal form to account for a review of contract and the scientific peer review. The DPs are inclined to reject proposals that already have book contract in place.

John Corish confirmed that only the Officers, not the Divisions, could sign a contract that has any financial decision/commitment with a commercial publisher.

After the scientific assessment and recommendation by the Division(s), a negotiation with the publisher should take place between the Executive Director and the publisher, and that before the project is finally approved and the financial commitments made from the budget.

The approval letter will also be therefore a confirmation for the DPs that the Secretariat has finalized a suitable contract.

The DPs also addressed issues related web projects that in the future, will need to 'fit in' the main site development. The Task Group Chair will need to recognize that the ultimate deliverable is to be integrated within the main server.

19. REPORT FROM THE MEMBERSHIP RELATIONS COMMITTEE

The MRC met on Tuesday morning, 11 August 2015.

** [153EC30] Develop a value proposition for IUPAC as tool to retain existing NAOs. What is IUPAC worth to different countries – general and country specific elements; supporting existing NAOs action for MRC, Secretariat to provide ideas for development of the value proposition and a template. EC members to seek out past presentations/relevant information. Initiate a project on NAO relationships.*

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Kaz Tatsumi indicated that the group has considered various activities that would result in better engagement of the NAOs.

First, the need to provide better feedback to the NAOs was highlighted. The MRC recommended that the NAOs be informed about new projects, and in particular the projects that are lead by a TGC from that NAO, and similarly that the relevant NAO be informed of any conferences endorsed to take place in its country.

MRC will need to broaden its remit for the next biennium to consider not only the recruitment of new NAOs but also the retention of existing members.

20. REPORT FROM PROJECT COMMITTEE

The PC met on Tuesday morning, 11 August 2015 and Doug Templeton outlined the discussions briefly focusing on the issues related to the one-year deadline associated with financially support for conferences (FSC) and funding of meetings as part of ongoing series.

The PC will consider FSC submissions as long as the applications were clearly being worked on within IUPAC during the one year period. The endorsing body (DP) may be asked to justify late submission.

The committee questioned its role in funding of meetings in an ongoing series as the PC sees the Division as 'owner'. The PC should focus on interdivisional initiatives.

21. REPORT FROM EVALUATION COMMITTEE

The EvC met on Tuesday morning, 11 August 2015.

The Evaluation Committee has the overall task of reviewing the project portfolio and setting mechanisms to enable review of the vibrancy of the project system. The terms of reference for the Committee were reviewed as they were impractical in use.

Revised terms of reference were prepared, endorsed by Bureau and approved by Council, (see Item 4 from the May 2015 Go-to-meeting, and Item 24.2 from the Council Agenda papers).

22. COMMITTEE ON CHEMISTRY RESEARCH FUNDING

PROF. TATSUMI

**[153EC34] Establish process to replace the current secretary of CCRF. KT to review with Markus Behnke as lead into 2016*

> Laura McConnell took the lead to organize a meeting in Busan

Kaz Tatsumi confirmed that CCRF met during the Assembly. Markus Behnke (German Research Foundation) had stepped down as secretary but fortunately Laura McConnell had stepped in and organized the meeting.

In addition to Chris Brett and Chris Ober (both members of the Bureau), the following participants were present:

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Suk-Wah Tam-Chang – National Science Foundation, USA
G. Yang – Univ. of Chinese Academy of Sciences, Chinese Chemical Society
Zhigang Shuai – Tsinghua University, Chinese Chemical Society
George Horvai – Hungarian Academy of Science
May Copsey – Royal Society of Chemistry, UK
M. Van Sisseren – Royal Netherlands Chemical Society/Young Observer
Sidney Riberio – Sao Paulo State Funding Agency (FAPESP)
Alexandre Roccoatto - Sao Paulo State Funding Agency (FAPESP)
Bradley Miller & Steven Hill – American Chemical Society

The committee agreed to coordinate an initiative with CS3, the Chemical Sciences and Society program hosted by USA, Germany, China, Japan and UK, and have the subject of the CCRF call inline with CS3 priorities which include water, health and the environment; detection; treatment; and recovery of materials from wastewater.

CS3 will meet in September 2015 in Leipzig, Germany, and a draft report of this meeting will be available by the end of 2015. The following timeline for the next call was then anticipated:

Fall 2015 to Summer 2016 – Solicit funding agency participation
June/July 2016 – Finalize agreement of participating agencies
Winter 2016 – Call for Letters of Intent
Early 2017 – Full Proposals Received
August 2017 – Review panel convenes at IUPAC GA in Brazil for final selection of funded proposals
August 2019 – Symposium of funded groups at IUPAC GA in Paris

The committee actions list from their meeting includes the following:

- Develop a formal letter to CS3 leaders to initiate this collaboration
- Work with IUPAC Secretariat to prepare for hiring of Call Manager via short term contract with NSF
- NSF has funded this position in the past, but would appreciate contributions from other funding agencies
- This would mean setting up an account within IUPAC where funds could be transferred from agencies
- Update contact information for funding agencies
- Begin to make contacts with agencies to solicit more participants
- Hold GoToMeeting event after CS3 as follow up

Chris Brett questioned why IUPAC was involved given that during the second CCRF call, the pool of countries was so small. In reply, Chris Ober argued that the program provided good experience and opportunities to share best practices among funding agencies. Leiv Sydnnes indicated that if Water was to be a topic, CHEMRAWN might have an interest.

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23. REPORTS FROM DIVISIONS AND STANDING COMMITTEES

This item was to cover any matters arising from the reports to Council.

Karl-Heinz Hellwich (DP8) mentioned that he received several requests for the translation of the *Brief Guide to the Nomenclature of Inorganic Chemistry* that he presented at Council and encouraged Bureau members to initiate further translations.

Leiv Sydnnes mentioned that CHEMRAWN needs to work more closely with the Divisions and will look at how to establish a better “interface” to establish collaborative projects.

24. WORLD CHEMISTRY LEADERSHIP MEETING (WCLM)

Laura McConnell briefly summarized what she presented at Council.

The WCLM in Busan was coordinated under project 2015-004-1-020 <http://www.iupac.org/project/2015-004-1-020>. The theme was to review IUPAC's role in achieving the environmental/socio-economic issues related to the UN Sustainable Development Goals, and the process was to engage the Young Observers (YOs) in a way similar to what had been done in Istanbul. It was designed to address the new IUPAC Strategic Plan and to develop a framework for young scientists who want to get engaged and who can take on leadership roles.

During the GA, 1-hour briefing and working sessions were organized for the YOs in advance of the plenary session. The YOs were divided into 5 groups and asked to develop an idea and draft a proposal and slides for a presentation at the plenary. On the day prior to the plenary, the YOs worked for 3 hours to complete their project proposals.

The WCLM itself included a welcome message by Mark Cesa, IUPAC President, followed by a plenary session with perspectives provided by Prof. Yuan-Tseh Lee, Dr. Hubert Mandery (CEFIC), and Prof. Javier Garcia-Martinez. The YOs provided their reports and project proposals, and the meeting was concluded with a discussion facilitated by Prof. Natalia Tarasova, IUPAC Vice President.

As follow-up to the meeting, the WCLM project task group will form a Sustainable Development Goals working group and will invite all YOs to participate and to continue working on their proposal. The SDG working group will provide feedback and support to the YO teams. The ultimate goal might be to package the emerging project proposals into a larger proposal to be submitted to ICSU. [ACTION 05]

25. INTERNATIONAL YEAR OF CHEMISTRY

25.1IYC2011 REPORT AND DISSEMINATION

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Mark Cesa noted that the final report from IYC2011 has been released and was available from www.iupac.org/project/2012-009-1-020 and announced in the July 2015 *CI* issue.

25.2 INTERNATIONAL YEAR OF CRYSTALLOGRAPHY 2014

John Corish indicated that a final resolution of IYCr, i.e. the *IYCr2014 Legacy Resolution* has been prepared by IUCr. IUPAC was invited to sign and the President has done so on behalf of IUPAC.

“The resolution embraces the needs to enhance the stature of crystallography, to build capacity in developing regions of the world, and to extend further the public understanding of science in general and crystallography in particular.” It is available for individuals to review and sign at <http://iycr2014.org/declarations/legacy-endorsement>

Roberto Marquardt reminded the Bureau that IUPAC and IUCr shared a project on the Basic Terminology of Crystal Engineering, sponsored by ICSU, and chaired by Professor Metrangolo.

25.3 INTERNATIONAL YEAR OF LIGHT AND INTERNATIONAL YEAR OF SOILS 2015

Bureau noted the completion of International Years of relevance to IUPAC

[95BU02] Bureau members were asked to respond with their ideas to the President by mid July (2014). The President will then write to John Dudley (president@eps.org) to seek ways to collaborate in the 2015 **International Year of Light*

[95BU03] Contact IUSS President elect Rainer Horn: rhorn@soils.uni-kiel.de to see how to engage with the 2015 **Year of the Soil*

25.4 PHOSAGRO PROJECT

John Corish confirmed that the program will continue and that a call for 2016 will be released by UNESCO in September with the objective of awarding six grants to be presented at the IUPAC International Conference on Green Chemistry to be held in Venice in September 2016 (<http://www.greeniupac2016.eu/>).

26. FUTURE GENERAL ASSEMBLIES AND CONGRESSES

26.1 49TH GENERAL ASSEMBLY AND 46TH CONGRESS (2017)

**[95BU19] To review General Assembly/Congress schedules for iupac2017 and later (Workgroup General Assembly)*

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Lynn Soby reported that she met with the Brazilian delegation and that her plan was to work with them following the model of this Assembly.

Bureau agreed that the Division Presidents should be involved well in advance so that their input can influence the scientific program of the Congress. It was recalled that in Glasgow (2009), one local organizer was paired with a Division under each theme. It was noted that the pool of IUPAC women awardees could constitute a good pool of lecturers and that the Women Award session would be better featured and integrated with the Congress program.

Follow-up is needed to ensure that the regular form for conference endorsement is prepared and details of the International Advisory Board agreed. [ACTION 06]
It was recommended that a representative from Brazil should be invited to the next Bureau meeting in Montreal. [ACTION 07]

The Bureau reviewed the question of the timeline to call for Congress in the future. This year there was no call as IUPAC 2019 is already assigned to Paris. Russell Boyd expressed the view that to secure a suitable site 4 years is nowadays too short and that going forward 6 years is more appropriate. Others concurred.

Bureau agreed that NAOs should be invited to present proposals for IUPAC 2021 and IUPAC 2023 in Brazil. Then, in Paris in 2019, the Council will be asked to vote for IUPAC 2025. [ACTION 08]

26.2 50TH GENERAL ASSEMBLY AND 47TH CONGRESS (2019)

There were no actions arising from Council. Bureau felt that further consideration was needed of the proposal to use venues separated by a short journey given the positive experience of integration of the GA and Congress in Busan. [ACTION 09 – ED to visit Paris to review proposals on site]

27. FELLOWS AND AFFILIATE MEMBERSHIP PROGRAMS

**[153EC31] Review the status of AMP and sponsored AMP programmes with a view to upgrading the programmes*

Colin Humphris confirmed that the review of these programs still needs to be done. Chris Brett suggested that similarly the AO program be examined.

28. COMPANY ASSOCIATES PROGRAM

Status and future review

**[151EC06] Notify the CAs about the PhosAgro project; the office is to work with COCI to ensure that a notice is sent out.*

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**[153EC18] CAs to receive notice drawing their attention to webpage for next PhosAgro award*

Bernard West confirmed that the review of the CAs program was progressing well and the project was led by Bryan Hanley with support from Carolyn Ribes (see <http://www.iupac.org/project/2014-018-2-022>).

The task group used surveys to discover what the various stake holders know about the CA process and IUPAC engagement with industry. That feedback is been analyzed. Input from NAOs will be gathered in a second phase. Ultimately, the goal is to develop options for changing the process to better serve the needs of the Companies and IUPAC. Any new CA programme will be in line with the new Strategic Plan.

29. CURRENT PROJECTS

Lynn Soby confirmed that a new project accounting report with a revised design was being developed and that the plan was to release a monthly update.

30. DISCOVERY AND NAMING OF NEW ELEMENTS

**[153EC29] Reports on new elements 113,115,117, 118 will go first to Division II and then Council/Bureau for review following the established procedure (pending)*

John Corish referred to his report to the Council (item 12) and confirmed that Professor Paul Karol was working on the finalization of the manuscripts for submission to PAC as IUPAC Technical Report. The 1st report is entitled 'Discovery of the elements with atomic numbers $Z = 113, 115$, and 117 ; and the 2nd is entitled 'Discovery of the element with atomic number $Z = 118$ completing the 7th row of the periodic table'.

Bureau noted that the Inorganic Chemistry Division was considering a review of an older recommendation that stipulates that name of new elements should end with 'ium'. (see <http://www.iupac.org/project/2015-031-1-200>)

31. IUPAC-SOLVAY INTERNATIONAL AWARD FOR YOUNG CHEMISTS

Lynn Soby confirmed that Solvay will continue its support of the awards for the coming two years.

32. BOOKS

**[153EC05] Notify Bureau that Officers/ED only should sign contracts for IUPAC, which should be stored centrally.*

**[153EC06] Obtain information on any Division/ Committee enacted contracts/MOUs to ensure originals are stored at RTP.*

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32.1 ADHERENCE TO IUPAC STANDARDS IN IUPAC SPONSORED BOOKS

Colin Humphris confirmed that this topic had been discussed earlier – see item 18.

The question of reprinting books was raised; in case of reprint this in principle should not require a new contract, but be based on the original contract.

33. NPU

** [153EC35] CH to continue to manage the relationships in NPU on behalf of IUPAC. (Ongoing activity)*

Colin Humphris reported on the NPU Terminology Steering Committee, NPU SC, which was established by an agreement between the IUPAC NPU subcommittee, IFCC, and the Danish National eHealth Authority. There is no budget for this Steering Committee, but activities depend on the SC members. The NPU (Nomenclature for Properties and Units) guidelines for clinical chemistry are currently being used in Denmark, Sweden and Norway.

The need for harmonization and integration of NPU terminology with the international health standard, SNOMED CT is underway but will be costly. The IUPAC NPU subcommittee has initiated projects to accomplish this, but future progress will require acceptance by the owner of SNOMED CT, and adoption by additional countries.

Colin Humphris offered to continue as an IUPAC representative on the NPU SC, to monitor progress and keep the EC informed

34. DATES AND PLACE OF NEXT BUREAU MEETING

**[153EC44] Consider venues and timing for Bureau in 2016 CH. Consider September for separate Bureau meetings in non-GA years. (Completed with acceptance of Montreal in April 2016)*

Colin Humphris confirmed that the next meeting of the Bureau will be at McGill University in Montreal, Canada, 8-10 April 2016. An outline of the schedule will be confirmed shortly.

35. ANY OTHER BUSINESS

Jan Reedijk asked for the Bureau to review and approve the release prepared by Commission II.1 on the revision of the atomic weight of ytterbium. In previous years, similar releases were presented to the Council and processed shortly after.

Motion: Bureau approves the Press Release on proposed changes to the atomic weights resulting from recent deliberations by the Commission on Isotopic Abundances and Atomic Weights after its meeting in Vienna, prior to the 48th IUPAC General Assembly in

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Busan, Korea.

Bureau approved the press release prepared by Commission II.1 on the revision of the Standard Atomic Weight of Ytterbium.

The Secretariat to complete the web post, reprint in CI and dispatch the release
[ACTION 10]

Jan Reedijk recalled that the Bureau had also previously agreed to present the San Francisco Declaration to the Council for its endorsement. Since that action has not been presented at Council, he asked that the Bureau to proceed.

Bureau approved the motion for IUPAC to endorse the San Francisco “Declaration on Research Assessment” (DORA; <http://www.ascb.org/dora/>) and recognizing that the document is critical towards the use of metrics as the sole means to evaluate scientific output and to reward scientists accordingly. [ACTION 11]

It was recalled that an action of this Bureau was to invite the NAOs to put proposal forward for the Congresses of 2021 and 2023 promptly. Bureau invited NAOs to formulate proposals for future Congresses six years in advance. (see item 26 and ACTION 08 above)

Jan Reedijk indicated that Netherlands might come forth with a proposal for hosting the Congress in 2023. Russell Boyd indicated that Canada is considering a proposal for 2021.

Lynn Soby confirmed that all 2016-17 membership updates will be confirmed by email and that membership of all Standing Committees should be completed in advance of the next EC and for ratification by the President.

Before the meeting end, John Corish asked for a round of applause for the President.

Mark Cesa thanked everyone for their hard work and continued support.

The meeting adjourned at 11:45

[end]

International Union of Pure and Applied Chemistry

154th MEETING OF EXECUTIVE COMMITTEE

Research Triangle Park, North Carolina, 31 October - 1 November 2015

MINUTES

Attendees: Dr. Mark Cesa (MC, Chair), Prof. John Corish (JC), Mr. Colin Humphris (CH), Prof. Kazuyuki Tatsumi (KT), Prof. Qi-Feng Zhou (QFZ), Prof. Natalia Tarasova (NT), Prof. Richard Hartshorn (RH) Prof. Mei-Hung Chiu (MHC), Prof. Chris Brett (CB), and Prof. Kaoru Yamanouchi (KY)

Absentees: Prof. Ram Lamba (RL)

Guest: Dr. Lynn Soby (LMS), Dr. Fabienne Meyers (FM, secretary)

1. INTRODUCTORY REMARKS AND FINALIZATION OF AGENDA

Mark Cesa welcomed all participants including all current and incoming members of the Executive Committee; incoming members are Mei-Hung Chiu (China/Taipei), Chris Brett (Portugal), and Kaoru Yamanouchi (Japan). Retiring member Ram Lamba was unable to attend.

For all matters requiring voting, only the current members will be asked to vote.

Mark Cesa thanked Lynn Soby and the staff for the arrangements and indicated that a visit of the new office will be arranged for the following day.

Additional agenda items include:

- Item regarding removal of one or more NAOs (see item 7.5 of the Agenda)
- Item regarding Associate National Adhering Organizations (ANAOs) standing (item 7.6)
- Item regarding Associated Organizations (AOs) (item 7.7)
- Update of the terms of reference for the Finance Committee (item 7)
- Review of the TOR for the ICSU committee (item 9)
- Review of the terms related to InChI Trust (item 26)

2. MINUTES OF 153RD (RTP, NOV 2014) AND NOTING INFORMAL DISCUSSION IN BUSAN AUGUST 2015 MEETING OF EXECUTIVE COMMITTEE

The minutes of the 153rd Executive Committee meeting were included in the Agenda Book for reference.

The minutes had been approved by email in March 2015 and posted online in October 2015.

2.1 MATTERS ARISING FROM MINUTES (NOT COVERED BY ITEMS ON AGENDA)

There were no questions or comments.

3. MINUTES OF 97TH MEETING OF THE BUREAU (BUSAN, AUGUST 2015)

3.1 RECEIPT OF MINUTES BY EC

The minutes of the 97th Bureau meeting held in Busan, Korea, in August 2015 were circulated by email on 19 October 2015 with comments and corrections requested by 30 November 2015. The minutes will be submitted for approval at the next Bureau meeting.

154th MEETING OF EXECUTIVE COMMITTEE

MINUTES

3.2 MATTERS ARISING (NOT COVERED BY ITEMS ON AGENDA)

There were no question or comment.

4. ACTION ITEMS FROM PREVIOUS MEETINGS

The EC reviewed the Action Items in the Agenda Book (p. 62) and the following updated were noted:

[93BU03] Establish alternative NAOs contacts list (on going)

[93BU16] Review speaker pack – all/Secretariat, (in progress)

[93BU17] Review Past President ppt IUPAC hint-inspired presentation – all (in progress)

> All 3 Actions to be reviewed under item 20, Membership Relations Committee

[151EC06] Notify the CAs about the PhosAgro project; the office is to work with COCI to ensure that a notice is sent out > closed

[95BU19] To review General Assembly/Congress schedules for iupac2017 and later (Workgroup General Assembly) > Completed – see update under item 12

* *[153EC04] IUPAC as a Corporate entity in USA to be finalised as necessary (LMS, in progress)*

[153EC08] Develop portal for new members for website > in progress – see update under item 17.4

[153EC09] Evaluate payment route/alternatives for Cuba. Checking with US Treasury and North Carolina Department of Commerce (LMS, in progress/State Department and Treasury contacted)

[153EC18] CAs to receive notice drawing their attention to webpage for next PhosAgro award (CH to contact Bernard West, in progress) > closed

[153EC24] Invite Regional chemistry bodies (e.g. EuCheMS etc.) to consider centenary activities NT and Centenary team > in progress – see update under item 15

* *[153EC25] CH to contact ICCA to open dialogue about Centenary (in progress – Cefic Secretary General attending the General Assembly)*

[153EC29] Reports on new elements 113, 115, 117, 118 will go first to Division II and then Council/Bureau for review following the established procedure > Completed – see update under item 19

[153EC30] Develop a value proposition for IUPAC as tool to retain existing NAOs. What is IUPAC worth to different countries - general and country specific elements; supporting existing NAOs action for MRC, Secretariat to provide ideas for development of the value proposition and a template. EC members to seek out past presentations/relevant information. Initiate a project on NAO relationships > in progress – see update under item 20

154th MEETING OF EXECUTIVE COMMITTEE

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[153EC31] Review the status of AMP and sponsored AMP programmes with a view to upgrading the programmes CH/FM/LMS > in progress – see update under item 20

[153EC32] Information gathering on ON and OF representatives with regards related to organizations (on-going FM with LMS/SC) > Completed – see update under item 10

[153EC33] EC members to identify other possible stakeholder organizations with which relationships should be nurtured. – see update under item 10

[153EC35] CH to continue to manage the relationships in NPU on behalf of IUPAC. (Ongoing activity) see update under item 27

[153EC36] Set up a Bureau Committee to evaluate value that we get from ICSU, how to get best value from membership and the justification of remaining member > Completed – see update under item 9

[153EC39] Upgrade AIS process and implement move to "endorsement" – Completed

[153EC45] IUPAC Africa fund for new members - Sinopec need invitation from IUPAC to comply with Chinese state laws. Also consider the possibility for other countries/donors to join fund. Action CH/MC to craft response (Outstanding) – to be revised under item 8

* [153EC46] Sinopec proposal on collaborative research into clean energy/ green chemistry building on the PhosAgro model MC/CH to respond. (Outstanding)

[96BU03] To lead a review of the basis of subscription calculations for future biennia; Treasurer elect after Busan (Revised proposal pending) > in progress – see update under item 8

[96BU06] On completion of the 2015 election process, to audit the process so that the Union can build on the experience for 2017; Executive Director (pending) > in progress – see update under item 12

[97BU01] To prepare a whitepaper clarifying the objectives and goals of the IUPAC Centenary celebration and to share various stakeholders, including NAOs; Centenary Planning Steering Group (CPSG), chaired by Natalia Tarasova > in progress – see update under item 15

[97BU02] CPCDS to make recommendations on the future of CI, bearing in mind that any changes to the 2017 plan will need to be confirmed by Q1/2016. Bonnie Lawlor > completed – see update under item 18

* [97BU03] The Project Committee to consider alternative metrics to reach of definition of “Scientifically Emerging Region”. (The OECD list does not apply to the criteria of ‘emerging region’ when specifically applied to development on chemistry, and many developed countries are not OECD members by choice.) Doug Templeton > in progress

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[97BU04] To establish a task force that will lead a review of the basis of subscription calculations; the task force should include the Executive Director (chair), the Treasurer, the incoming Treasurer, a member of the Finance Committee (suggested by FC chair), plus two or three members from NAOs, preferably one from small NAO, one from medium, one from large NAO. Mark Cesa > completed – see update under item 8

* [97BU05] The WCLM project task group to form a Sustainable Development Goals working group and invite all 2015 YOs; to review YOs proposal and prepare emerging projects into a larger proposal to be submitted to ICSU (deadline Dec 1). WCLM 2015 task group

[97BU06] To invite the 2017 IUPAC Congress organizers to complete the regular Application for Endorsement and finalized details of the International Advisory Board agreed. Executive Director > in progress – see update under item 14

[97BU07] To invite a representative of the 2017 IUPAC Congress to attend the 2016 Bureau meeting in Montreal. Executive Director > in progress – see update under item 14

* [97BU08] To invite NAOs to formulate proposals for future Congresses six years in advance. Proposals shall be considered in Brazil (July 2017) for IUPAC 2021 and 2023 and then in Paris (in July 2019) for IUPAC 2025. Executive Director/Secretary General

[97BU09] To consider the implications of Paris proposal using venues separate venues for the GA and Congress, given the positive experience of integration of the GA and Congress in Busan. Executive Director > in progress – see update under item 16

* [97BU11] For IUPAC to endorse the San Francisco “Declaration on Research Assessment” (DORA; <http://www.ascb.org/dora/>). Secretary General (with PAC EAB)

All actions except those marked * were discussed as part of the current meeting and updated in the resulting list of Actions.

5. IUPAC STRATEGIC PLAN

Mark Cesa (MC) reviewed the status of the plans to implement the new IUPAC Strategic Plan following the plan approval by Council at Busan in August.

He explained that members of the strategic review task group have been asked to make suggestions and recommendations on implementation within the Divisions and Standing Committees, on publishing the Strategic Plan on the Web site and in volunteer presentations about IUPAC, and in recruitment and retention of new National Adhering Organizations. A more specific plan will be derived from that input.

The Divisions and Standing Committees will be asked to review their own activities in light of the new Plan. The project proposal application form shall be reviewed to afford a specific reference pointing to a specific goal. The plan shall be disseminate more broadly to NAOs, via CI and the web,

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and integrated in the speaker pack. The Members Relations Committee (MRC) will be tasked to develop a value proposition and statement for IUPAC various stakeholders.

EC members echo the need to involve the MRC. It was also noted that the Evaluation Committee should consider the goals listed in the Strategic Plan as a criteria of evaluation; i.e. did this specific project address one of the IUPAC goals?

The Vice President indicated that the recent release of the UN Sustainable Development Goals was timely and that IUPAC and its Divisions should review their activities in light of both strategic documents.

The Secretary General indicated that it will be important to highlight benefits for both our organizational members and individual members; not only the former should have a voice. Individuals from non NAO countries can also take part in IUPAC activities, but few are likely to be aware of that. MC would like to see developed a simple process for the easy adhesion of individual members worldwide, allowing for a broad diversity and including chemists from both developed and developing countries, young chemists, women scientists and minority.

ACTION 01 To review Strategic Plan task group input and follow-up with a conference call focused on Strategic Plan implementation (Mark Cesa).

6. VICE PRESIDENT'S CRITICAL ASSESSMENT

Natalia Tarasova (NT) updated the Executive Committee on the status and progress of the Critical Assessment and focused her update on the need to better engage with young chemists and support women participation.

NT indicated that after Busan a group of young chemists essentially emerging from EuCheMS has expressed the wish to extend their reach and were looking for IUPAC support. She wants to encourage their initiative and will continue that contact. RH supported the idea of involving young chemists as this is coherent with the strategic plan. LMS pointed to the fact that there is no formal program to engage Young Observers during the GA and the EC concurred that there is an opportunity to better definite these activities. (this topic is discussed under item 12.4)

JC pointed out that the group of young chemists from the PhosAgro Green Chemistry for Life Programme constitutes another pool of young scientists that IUPAC should reach out to. It was noticed that IUPAC has Poster prize program available for IUPAC-endorsed conferences and for NAOs; under that program NAOs can identify one national event per year where such a poster prize can be presented. NT would like that this program to be better advertized since it does provide a mechanism for the NAOs or the Divisions to reach out to young chemists. The cost can be kept minimal and the awardees simply receive a certificate.

MC suggested that one EC member should work with the Secretariat to gather ideas and work to develop a coherent program that clarifies the engagements with young chemists. RH and KY volunteered.

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LMS also pointed out that the future website will integrate social media capabilities to help to reach this audience. She noted that there is a current project on social media and she offered to establish a contact with that task group.

Mei-Hung Chiu (MHC) indicated that the WCLM involved the participation of Young Observers and asked what contact is maintained with that group. (see later item specific to WCLM) A suggestion was made to circulate electronic copy of CI to all YOs.

Kaz Tatsumi (KT) recognized that there is prestige to be involved with IUPAC, and that for the young people as well. It is important that IUPAC retain that recognition of being prestigious.

NT pointed out that gender representation was also an issue and that involvement of women in IUPAC-endorsed events shall be encouraged, be as lecturer or member of the International Advisory Board. It was suggested that the Application for IUPAC Endorsement (AIE) be revised to suggest such participation (one criteria for the granting of endorsement already makes reference to the need for gender diversity but the form does not call for a specific entry listing such participation).

MHC pointed out that during the WCLM, Professor Yuan-Tseh Lee highlighted the importance of fully engaging women in the scientific enterprise.

The EC recalled that while the Women awards as presented in Busan were successful, the initiative deserved far more visibility. The suggestions were made to engage as a priority with the iupac2017 to make that event more visible at the Congress in Brazil.

ACTION 02 To remind the NAOs about the IUPAC poster award that can be offered to one national conference per year. (Secretariat-LMS)

ACTION 03 To circulate eCI (electronic copy of the content) to all young chemists in IUPAC network (including former YO). (Secretariat-FM)

ACTION 04 To review the Application for IUPAC Endorsement (AIE) and include a criteria that addresses gender equity in the composition of the various committees and presenters. (Secretariat-LMS)

ACTION 05 To ensure that in Brazil (IUPAC2017) the Women Award and symposium have a suitable placement. (LMS with organizers and Carolyn Ribes and Angela Wilson)

7. FINANCE AND BUDGETS

7.1 AUDITED FINANCIAL STATEMENT FOR 2014

Lynn Soby (LMS) referred to the 2014 audited Financial Statement included in the Agenda book (p. 74). She suggested that questions be “taken offline”.

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7.2 REPORT ON CURRENT FINANCIAL SITUATION

LMS described the current financial situation through three major indicators: Cash Flow management; the balance sheet; and the Profit and Loss statement.

The most challenging component is management of inflows versus outflows given our current invoicing policies for National Adhering Organizations (i.e. invoice in October of 2015 for 2016 with a 31 December 2016 deadline). Thus, IUPAC may receive payments from the NAO's throughout the year, many in the last quarter of the year. LMS mentioned for example to Australia, France, or Germany who have traditionally paid later in the year.

Since the General Assembly, cash outflows have been managed from the current bank accounts without a need to "sweep" investment cash. However, given the processing of Claim Forms until the end of the year, and in order to balance our cash flow, the Secretariat was actively pursuing NAO's for unpaid 2015 subscriptions. A chart of Inflows/Outflows was included in the Agenda Book.

The balance sheet with notes and profit and loss statements were included in the Agenda Book. A line item for sales tax recovery for state taxes was noted in the Balance Sheet. IUPAC was currently recording all sales tax payments so that a refund could be requested. This was the first year for IUPAC recovering the North Carolina sales tax.

On the P&L statement, LMS pointed to the increase in net assets relative to 2014 and 2013. The publication revenue is also noteworthy relative to 2014, but does reflect 2014 payments made in 2015 from DeGruyter for PAC less CI costs.

During the discussion, it was noted that National Subscription Task Force will need to consider incentives for the NAOs to encourage early payment.

LMS also pointed to the new system to track budget vs. actual that prevents overspend. She also indicated that IUPAC has agreed a line of credit to help manage cash flow.

7.3 PERFORMANCE OF INVESTMENT PORTFOLIO

The following summary was presented with the Agenda. The investment performance of IUPAC's portfolio since inception with BB&T/Scott&Stringfellow as of 20 October 2015 has yielded 3.63% with an estimated annual income of \$146,600. Overall market value of the portfolio was currently \$4,034,288. The quarterly investment review with the Finance Committee (20 Oct 2015) information was included in the Agenda Book. As of 29 September 2015, the asset allocations were as follows and have slightly changed in the past month. The asset allocation is relatively stable for the 2015 time period.

ALLOCATION	AMOUNT	PERCENTAGE
Bonds	\$1,094,776.14	27.84%
Mutual Funds	\$1,309,296.59	33.29%
Equities	\$1,372,017.12	34.89%
Cash Sweeps	\$156,822.63	3.99%
	3,932,912.48	100.00%

The asset allocation is relatively stable for the 2015 time period, and reported below:

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	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15
Equities	\$1,329,467	\$1,397,022	\$1,347,885	\$1,365,498	\$1,378,443	\$1,360,300	\$1,396,409	\$1,384,900	\$1,372,017
Bonds	\$1,105,876	\$1,111,938	\$1,118,662	\$1,146,379	\$1,092,784	\$1,094,123	\$1,092,981	\$1,089,211	\$1,094,776
Mutual Funds	\$1,333,949	\$1,349,071	\$1,347,872	\$1,350,496	\$1,344,302	\$1,327,893	\$1,339,565	\$1,315,030	\$1,309,297
Cash Sweeps	\$190,265	\$164,371	\$205,358	\$165,964	\$222,113	\$205,512	\$214,875	\$150,207	\$156,823
Total	\$3,959,558	\$4,022,401	\$4,019,778	\$4,028,337	\$4,037,642	\$3,987,827	\$4,043,830	\$3,939,348	\$3,932,912
		Delta	(\$2,624)	\$8,559	\$9,305	(\$49,815)	\$56,003	(\$104,482)	(\$6,436)

During the ensuing discussion, LMS indicated that in 2015, the Secretariat processed approximately 1000 claims and that each costs \$45 of bank processing fee.

In 2015, the GA budget was set to \$325k. The actual cost in Istanbul was \$428k vs. \$250k in Busan.

Because of the recent move to actively manage the accounts with BB&T, LMS pointed that the investment policy needed review.

The Finance Committee holds a conference call every quarter and reviews BB&T recommendations. The task of FC is now therefore different, and changes of the FC Terms of Reference were discussed. A draft was shared in print during the meeting. The proposed changes, including suggestions made in the meeting, are underlined below:

Composition and Terms of Office

(i) There shall be a standing Finance Committee, composed of a Chair and ~~three other~~ up to four other Titular Members. In addition, the Treasurer and Executive Director (to act as Secretary) shall be *ex officio* Members, but without voting power.

(ii) The President, in consultation with the Executive Committee, shall appoint the Chair. The Finance Committee may propose candidates.

(iii) The period of service of the Chair shall not exceed eight years. The sum of the years of service as a Titular Member and as the Chair shall not exceed ten years.

(iv) The President, in consultation with the Executive Committee, shall appoint the Titular Members. The Finance Committee may propose names of persons suitably qualified for appointment.

(v) The period of service of the Titular Members shall be normally be four years, renewable for a further term of four years.

(vi) The Membership shall be reviewed every two years by the incoming President,

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in consultation with the Executive Committee.

Terms of Reference

- (i) To advise the President and the Executive Committee on financial matters.
- (ii) To make financial recommendations for decision by the President and/or the Executive Committee.
- (iii) To review the IUPAC securities at least annually and to make such changes as appear appropriate.
- (iv) The Finance Committee shall not have executive functions, except with respect to dealings in securities. The Finance Committee shall have executive authority with respect to selection, purchases, and sales of securities held by IUPAC, provided that the Treasurer concurs with the decisions of the Finance Committee. The Finance Committee may delegate certain responsibilities to professional experts.

The EC voted all in favor of the proposed changes.

ACTION 06 To review and update the investment policy document (*FC 8 February*)

ACTION 07 To record the revised Terms of Reference for the FC: (adding one last sentence under ToR (iv) that reads "The Finance Committee may delegate certain responsibility to professional experts"; and under Composition: (i) ... composed of a Chair and *up to 4* other Titular Members; and (v) The period of service of the TM shall *normally* be 4 years,...")

7.4 BUDGET UPDATE FOR 2016-2017

The Budget approved by Council for the 2016-17 biennium was shown in the Agenda Book (p. 106) as were the resulting National Subscriptions for each of the two years. Also shown were the budgets allocated to the Divisions and Standing Committees. (The allocations to Division and Standing Committees are identical to the 2014-15)

John Corish (JC) explained that the method used to produce this biennium budget was an interim measure adopted to deal with a difficult situation that arose from the failure of the usual method to produce a reasonable set of allocations of the National subscriptions. This in turn was caused by extensive changes in the data drawn from Cefic on which the allocations had traditionally been based. The use of outdated exchange rates for the calculation of subscriptions paid in National currencies had also given rise to a material shortfall in the USD value of this income stream in the current biennium and the interim budget shows anticipated manageable deficits for each of its two years to allow a gradual return to a stable balanced situation. Whereas it is not possible to know what the future will bring in terms of currency exchange rates it was perhaps worth noting that the situation has thankfully stabilized over the past months.

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Council has also set-up a Task Force under the chairmanship of the Executive Director to determine a new method for calculating National Subscriptions. Consultation with the NAOs on this work has already begun with its recommendation due for the next Council meeting in 2017. (see below item 8)

The EC had no questions.

7.5 NATIONAL ADHERING ORGANIZATIONS (NAOs) NATIONAL SUBSCRIPTIONS: STATUS AND ISSUES

Lynn Soby pointed to the summary of the status of the NAO National Subscriptions for 2014-2015-2016 included in the Agenda Book (p. 111, Status as of 16 Oct 2015). IUPAC has received \$644,681 of the 2015-budgeted amount of \$940,500. We anticipate the total 2015 receivables estimate of \$895,892 with the difference due to exchange rates (\$44,789 to date). As exchange rates have stabilized in the recent months, the loss on currency may taper down, but will be most affected by the EURO/USD rate, given France and Germany (and Belgium) represent the largest outstanding 2015 invoices to be paid.

LMS pointed that the amounts in arrears (listed in red) and for the 2014 dues, the NAOs in arrears are Belgium, Colombia, Costa Rica, Jordan, and Tunisia. It should also include Ethiopia.

Colombia and Costa Rica were 'provisional' members and the 2015 invoices were their first. See more under item 7.5.4 below.

Natalia Tarasova suggested that if email contact failed, a follow-up telephone call might be preferable to help IUPAC understand the reasons for non payment.

7.5.1 Cuba

LMS indicated that the Cuban NAO has not paid IUPAC's National Subscription since becoming an NAO, due to the difficulties in transferring funds to the US. Their current balance for National Subscriptions is \$7,235.00 including 2015. Communication from Cuba regarding their subscription was received in late April 2015 stating that they were pursuing the Cuban government to facilitate the payment.

She has been in direct contact with the Cuban NAO to assist in the resolution to the Cuba NAO status and payments but she added that because the NAO is not a government entity it makes the matter complicated.

7.5.2 Nepal

LMS explained the communications are in process with IUPAC current NAO, Nepal Polymer Institute (NPI, Prof. Ram Adhikari) and also with Nepal Chemical Society in order to clarify the interaction of the two and their relationship with IUPAC.

The EC concurred that the two entities should resolve this problem internally and that it is for them to articulate how they would like to be represented in IUPAC. LMS was awaiting their responses.

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Meanwhile, it was indicated that IUPAC has received an informal (email) request to waive NPI's National Subscriptions for 2016-2017.

7.5.3 Pakistan

Invoices for 2015 and 2016 were sent to Pakistan with a reminder regarding their 2015 payment. Pakistan has requested that IUPAC reduce their 2015 and future NS amounts as they state they have been experiencing significant changes in leadership and find themselves unable to find funds to pay their NS.

Communication was sent 29 September 2015 informing them that IUPAC could not alter their national subscription since it was approved by Council in 2013. LMS was awaiting for their response/payment.

7.5.4 NAO's approaching 24 months in arrears

NAO's approaching 24 months in arrears, subject to Statue 9.2 were notified by the Executive Director along with their 2014 Invoices and 2015 Invoices. The letter to Belgium was included in the Agenda Book as reference.

The following NAO countries were notified 8 September 2015 of their situation regarding maintaining NAO status; they have until 31 December 2015 to remit their 2014 payments: Argentina, Belgium, Ethiopia, Jordan, and Tunisia.

On 21 September 2015, payment from Argentina was received for their 2014 NS. LMS informed the EC that no communication has been received so far from Belgium, Ethiopia, Jordan, or Tunisia.

[On 12 January 2016, the Bureau was informed that payments have been received for the 2014 National Subscription from Argentina, Belgium, and Jordan. Therefore Tunisia, Ethiopia were automatically removed from NAO status, due to being 24 months]

7.6 ASSOCIATE NAOs (ANAOs)

ANAOs status is limited to four years.

There are currently 3 ANAOs: Ghana, Indonesia, and Venezuela

Ghana was approved by Council in August 2015.

ANAO status for Indonesia and Venezuela will expire at the end of 2015.

The EC approved the termination of the ANAOs status of Indonesia and Venezuela.

7.7 ASSOCIATED ORGANIZATIONS

In August 2015, Council approved the termination of AO status for the following:

- Federation of Asian Polymer Societies (FAPS),
- International Society of Heterocyclic Chemistry (ISHC),
- International Zeolite Association, and
- International Confederation for Thermal Analysis & Calorimetry (ICTAC).

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Since last August the Federation of Asian Polymer Societies (FAPS) and the International Zeolite Association have paid their dues. The EC was asked to approve the restitution of their AO status.

EC approved.

8. NATIONAL SUBSCRIPTION TASK FORCE

Council approved the formation of the National Subscription task force in Busan. A letter informing the National Adhering Organizations of the status and seeking their inputs and suggestions was sent in September; copy of the letter is included in the Agenda Book (p. 113).

LMS indicated that to date, we have received input from Austria regarding some benchmarks from their perspective.

After consideration, the EC concurred that more background information might be needed to trigger reactions and input from members at large. Colin Humphris offered to draft an overview for publication in *Chem Int*.

The EC also considered the membership of the task force and proposed Chris Brett as a representative of smaller NAOs country and Kew-Ho Lee (Korea) as a representative of the larger NAOs.

ACTION 08 Colin Humphris to draft a background piece for CI explaining the current model and rationale for change.

9. ROSTERS FOR BUREAU COMMITTEES FOR 2016/17

Rosters for those Division Committees (Division I to VIII) and the (operational) Standing Committees, including CCE, COCI, CHEMRAWN, CPCDS, and ICTNS, were included in the Agenda book for approval by the Executive Committee.

The EC had no questions and the rosters were approved. The NAOs will be informed of the memberships. The listings should be reviewed for consistency of format and title (Prof./Dr).

Mark Cesa outlined the proposed membership of the (advisory) committees and other task forces of the Bureau, including the Project Committee (PC) and Evaluation Committee (EvC), the Membership Relations Committee (MRC), Committee on Chemistry Research Funding, the IUPAC-Solvay Award, and the new committee for ICSU. The final rosters were presented for review and prior approval by the President.

There was no questions relating to the PC and EvC, and Mark Cesa agreed to contact each member and inform them of their task.

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Mei-Hung Chiu pointed out that having two members with similar background in the Award committee might not be desirable. MC concurred and proposed that revisions be shared offline and that a later iteration will be shared with the EC for input.

The EC considered a draft of the Composition and Terms of Office and Terms of Reference for the new proposed Committee for ICSU with the objective of adding value to our membership.

The discussion led to the following:

Composition and Terms of Office

- (i) There shall be an IUPAC Committee for the International Council for Science, composed of five Members of the Bureau.
- (ii) The Past-President or his/her designee shall chair of this Committee and appoint the members in consultation with the Executive Committee.
- (iii) The membership shall be reviewed every 2 years. The period of service of the members shall be 2 years and can be renewed.
- (iv) The Executive Director shall act as *ex officio* voting Member and Secretary for the Committee. The Executive Director may delegate Secretary responsibility if desired.
- (v) The President shall be an *ex officio* Member of the Committee. He/she is also the formal IUPAC representative on ICSU.

Terms of Reference

- (i) To evaluate the value and effectiveness of IUPAC membership in ICSU and recommend actions as needed to the Bureau.
- (ii) To assist the Secretariat, through the Executive Director, in responses to requests from ICSU for information, nominations, and other matters.
- (iii) To promote and coordinate applications from IUPAC volunteers for ICSU projects.
- (iv) To report to the Bureau, in writing, annually on activities for the Committee and on assessment of the value and effectiveness of IUPAC's interactions with ICSU.

The EC supported the proposal to include the President as *ex officio* of that committee and also supported the idea that a task of the committee will be to also make ICSU better known within IUPAC; the task of “promoting” was added under ToR(iii).

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Mark Cesa agreed to revise the document and recirculate for approval.

ACTION 09 To inform NAOs of EC action having approved all Division committees and Standing committees membership (Secretariat-LMS)

ACTION 10 To share an electronic copy of the Bureau Committee Membership (draft 29 Oct 2015) or later revised version (LMS)

ACTION 11 To review the proposed composition of the Award Committee to avoid that two members with similar background and coming from CCE be represented. (Mark Cesa)

ACTION 12 To inform Bureau Members of their role in 2016 (including PC, EvC, MRC, CCRF, Solvay Awards, and new ICSU) (Mark Cesa)

ACTION 13 To revise proposed ToR for the IUPAC committee for ICSU updating to include (iii) To promote and coordinate ... and to add a statement to reflect that while being the official representative on ICSU, the IUPAC President should also be an *ex officio* on the new committee. [MC]

10. REPRESENTATIVES “ON” ORGANIZATIONS

Following the Bureau meeting in Busan, the Divisions Presidents and EC were surveyed in September and asked to recommend individuals as well as other organizations that they believe IUPAC should play an active role. As LMS discussed in Busan, the biennium 2016-17 has a budget of \$20,000 and the EC was asked to review the recommendation and consider a way forward. John Corish explained that much more clarity and transparency is needed to better manage and operate this program.

The result of that survey, a listing of volunteers and staff members to serve as IUPAC representatives ON other organizations whose work complements IUPAC's activities was presented to the Executive Committee and included in the Agenda book (p. 129).

The EC discussed the level of involvement and recognized that some Divisions also contribute to supporting their members representation on other organizations. The first question was to identify which organizations should IUPAC be involved with and at what cost.

As a proposal, the Divisions and Standing Committees could be asked to submit the equivalent of a project proposal to send a representative, requesting a justification and explanation of the value and return for IUPAC. Such proposal could then be assessed by the officers.

Mark Cesa asked about the current responsibilities of the representative besides returning a written report. Are these representatives representing the Division, and/or representing IUPAC? There were no simple answers and some of these representations are more strategic than others.

The EC agreed that going forward there is a need to develop a process. The list of representatives should clearly identify who is representative on what organization and on what level (e.g. there are

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several proposed rep on EuCheMS, but these are clearly on specific sections/divisions). Ultimately a list should be shared and made public so that anyone in and out IUPAC knows who to turn to.

For the remaining time in 2015, limited allocations to the already filed request will be managed.

Colin Humphris agreed to outline a draft process. Lynn Soby, John Corish, Colin Humphris will sort out the list offline and involve Richard Hartshorn in the review.

ACTION 14 To develop and establish a process to propose, assess, and approve specific nominations as requests are put forth by Divisions [MC/NT/CH/LMS]

ACTION 15 To review the current list and include strategic bodies [LMS/CH/JC/NT & RH]

11. THE FUTURE OF GREEN CHEMISTRY AND SUSTAINABLE DEVELOPMENT IN IUPAC

John Corish reviewed the information he provided for the agenda.

One of the themes of the Congress at Busan was that of Green Chemistry and the PhosAgro/UNESCO/IUPAC project organized two of the sessions of this symposium. A follow-up meeting to which all interested were invited was scheduled for Tuesday August 11th. Those who attended were: John Corish (who in the unavoidable absence of the appointed chairman chaired the meeting), Christopher Brett, Bernard West, Laura McConnell, Nicole Moreau, Michael Droescher, Pietro Tundo and Kenneth Seddon.

In the main and in the light of the success of and direction indicated by discussion at the two sessions of the symposium the meeting discussed ways of finding a focus for sustainable development/green chemistry within the Union that might lead to a better way forward for IUPAC in these areas. Very briefly the idea that emerged was that the sustainable development/green chemistry efforts in the Union should be coordinated and developed in line with our new strategy which, in turn, is aligned with the Sustainable Development Goals adopted by the UN General Assembly on the 25th of September last.

Currently the relevant activities that are supported include the Sub-Committee on Green Chemistry (with Division III), the PhosAgro/UNESCO/IUPAC project, the CHEMRAWN VII Prize for Green Chemistry, and the activities of CHEMRAWN. An Interdivisional Committee for Sustainable Development through Green Chemistry was seen as possibly a first step, but it was felt that this should go further and could in time subsume the functions of the CHEMRAWN Committee thereby obtaining an operational budget. In the current financial conditions there does not appear to any other way of developing the new organizational unit. It is necessary for the Union to show willing to initiate and move forward and to highlight the policies that it wishes to promote.

The view was expressed at the meeting that CHEMRAWN had become less relevant and active than when it was originally set up. The CHEMRAWN budget is currently spent exclusively on meetings of the Committee to plan conferences in the CHEMRAWN series but it could be more effectively used if these meeting were given a broader and more varied and more strategic program of activities

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on which to operate. The new grouping was seen also as an opportunity for outreach and would seek representatives from the UN, UNESCO, the International Council for Science (ICSU), the Strategic Approach to International Chemicals Management (SAICM), the European Chemical Industry Council (Cefic), the International Council of Chemical Associations (ICCA), etc. as well as representation from each interested Division and Standing Committee.

John Corish invited discussion. He added that unfortunately the CEO of PhosAgro had been unable to attend the meeting in Busan and that the senior representative from UNESCO did not stay for the entire meeting. He also indicated that the current President of the Organic and Biomolecular Chemistry Division (Division III), Mary Garson, was supportive of the idea that the Subcommittee on Green Chemistry could eventually shift out of the Div III, but that so far CHEMRAWN involvement in the consideration has been limited.

Qi-Feng Zhou asked if the idea was to simply result in a change the name?

The EC recognized that CHEMRAWN name was not well-known. Also CHEMRAWN currently has a single mode of operation, the EC questioned if CHEMRAWN mission could be broadened.

Richard Hartshorn pointed out that CHEMRAWN Terms of reference are set by Council and therefore, the EC should encourage them now to review their mission. Kaz Tatsumi indicated the CHEMRAWN appears to be OK but that the Committee might just need to be reenergized. John Corish supported the idea that they could do more. The view was expressed that Green Chemistry and Sustainable Development were more recognisable keywords than CHEMRAWN. Mark Cesa emphasized that IUPAC has an international perspective broader than that of national societies.

The EC agreed that the incoming President should reach out to CHEMRAWN and the Sub-Committee on Green Chemistry to encourage them to develop a new IUPAC strategy for Green Chemistry. This could be reviewed at the next Bureau meeting.

ACTION 16 To encourage CHEMRAWN and the Sub-Committee on Green Chemistry to develop an integrated strategy for Green chemistry. (Natalia Tarasova)

12. 2015 GA/CONGRESS, BUSAN, KOREA

12.1 LESSONS LEARNED FROM THE ELECTION PROCESS

The 2015 election process resulted in all Divisional Officers and detailed draft Titular Members being in place at the time of Council meeting. Many Standing Committee Officers were also determined for final approval by the President during the Executive Committee meeting. An electronic ballot in the election was used that worked well and had positive feedback. This Election Timetable was based upon the template approved by the Bureau (April 2014). The elimination of a Secretariat staff member in August 2014, who was responsible for the election process in past years, led to the use of a team approach to accomplish the elections:

LMS/FM: NAO Communications: Letters and emails/Website

EW/LMS/Temp: Receipt of Nominations/Collections/Files/Summary/PDF/CVs

FM: Elections via SurveyMonkey

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FM/LT: Rosters/database entry for 2016-2017/membership

In general, the timetable and estimates of time should be reviewed in the light of the initial experience. There are some steps that could be improved and/or are redundant or could be combined. The key lessons were:

- Start earlier in the process with a clear communication schedule and supporting document(s) for the NAOs (perhaps on-line);
- determine eligibility and communicate eligibility and DPs and STCs;
- work on clarity of the Statutes and Bylaws (develop an election process guideline document);
- clarify the rules regarding what constitutes the “electorate”;
- develop a flexible ballot template (not done this time);
- communicate the results to NAO’s after approval of full rosters of Divisions and Standing Committees (after the EC).

The EC acknowledged that the Secretariat team now has a clearer understanding and knowledge regarding the election process and is well positioned for more improvement in the 2016-2017 process.

Lynn Soby reviewed her summary included in the agenda (above) and pointed out that for the election process, her future goal will be to simplify the process and reduce paper as much as possible. Clarity of the tasks of the nomination committees is needed.

Natalia Tarasova indicated that we need to be cautious and aware of cultural expectations. For example, the implication of being a nominee should be clarified and the candidates should understand the election process steps and when/how a decision will be conveyed.

LMS confirmed that the document detailing the process will be reviewed and updated. Such a document exists for the Divisions and Nominating Committee, but additional guidelines should be outlined for other audiences, including NAOs and nominees. LMS also indicated that for the Standing Committees, the processes are different and specific to each committee. There would be a gain from bringing these into a single process.

LMS also reported that overall, the feedback from the Divisions was positive regarding the election and process. There were some key items, noted above, that need clarity. A better communication plan and timeline will assist them in managing their work as well as the nominating committee’s work. One key problem was that the nominating committee can place people on the ballot without notifying the secretariat prior to the ballot. Three instances of TM/AM/NR candidates being on the roster from countries that did not have NAO status could have been avoided. This was unique in this election cycle. (Spain, Bangladesh). It is worth noting that the NAO nominations and subsequent elections differed among the Divisions.

ACTION 17 To update the existing information document related to the election process for review at the next Bureau. (LMS)

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12.2 FEEDBACK ON GA SCHEDULE

Lynn Soby pointed to the document in the Agenda book p. 130, and provided the following review:

In mid September 2015, just a month after the end of the GA, a survey was sent to all current and incoming officers and current and next Bureau members, to seek feedback on the GA schedule. For 2015 the schedule was new and the survey focused on these new features. 19 responses have been received on the survey (out of 63 invites) and the detailed replies are enclosed in the Agenda Book:

- Overall, the Busan schedule is a suitable blueprint:
- The joint opening reception as coordinated at the Congress was well attended.
- The interdivisional meetings should be retained but better coordinated with more advanced planning and agenda outline.
- The options for earlier task group meetings should be preserved if possible.
- The scheduling of a split Bureau, ½ before Council and ½ after was well perceived.
- The scheduling of the Council as it was in Busan should be continued, but the time during the actual elections should be used to continue business, even if these are 'minor' items or can be the presentation of service awards.
- The model of the WCLM has been evolving every GAs, but the last 2, involving YOs are well perceived.
- It has been suggested that The Distinguished Women in Chemistry awards should be highlighted at the opening Ceremony of the Congress. Also, an idea to run project poster at the congress has been proposed.

LMS asked if there were any additional questions.

Kaz Tatsumi pointed that the efficiency of the host in Busan has contributed to the success of the General Assembly. Fabienne Meyers indicated that a major help was in their seamless handling of the GA registration which for the very first time, was set along with the Congress registration.

LMS will share the outcomes of the survey and continue to plan for IUPAC2017 with the organizers in Brazil.

ACTION 18 To share findings and plan with IUPAC2017 organizers (LMS)

12.3 WCLM

The following summary was included with the Agenda.

The WCLM in Busan was coordinated under project 2015-004-1-020, <http://www.iupac.org/project/2015-004-1-020>. The theme was to review IUPAC's role in achieving the environmental/socio-economic issues related to the UN Sustainable Development Goals, and the process was to engage the Young Observers (YOs) in a way

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similar to what had been done in Istanbul. It was designed to address the new IUPAC Strategic Plan and to develop a framework for young scientists who want to get engaged and who can take on leadership roles.

During the GA, 1-hour briefing and working sessions were organized for the YOs in advance of the plenary session. The YOs were divided into 5 groups and asked to develop an idea and draft a proposal and slides for a presentation at the plenary. On the day prior the plenary, the YOs worked for 3 hours to complete their project proposals.

The WCLM itself included a welcome message by Mark Cesa, IUPAC President, followed by a plenary session with important perspectives provided by Prof. Yuan-Tseh Lee, Dr. Hubert Mandery (CEFIC), and Prof. Javier Garcia Martinez. The YOs provided their reports and project proposals and the meeting was concluded with a discussion facilitated by Prof Natalia Tarasova, IUPAC Vice President.

As follow-up to the meeting, the WCLM project task group will form a Sustainable Development Goals working group and will invite all YOs to participate and to continue working on their proposal. The SDG working group will provide feedback and support to the YO teams. The ultimate goal might be to package the emerging project proposals into a larger proposal to be submitted to ICSU.

The EC had nothing to add. An outline and plan shall be drawn as early as possible for discussion at the next Bureau. Better visibility of the event during the GA/Congress would be beneficial. The idea that holding a strategic meeting for the leaders of Chemical Societies was a separate option and different than the WCLM model as held in Busan; a separate forum might be considered.

ACTION 19 To make early plan in advance of Brazil 2017 to bring better visibility to the event; the format of the event must be clearly defined; plan for discussion at Bureau April 2016 [RH/Others]. *Identify Chair at Bureau 2016 April.*

12.4 YOS ENGAGEMENT

Referring to the summary included in the Agenda and to the earlier discussion held along with the VPCA (item 6 above), Lynn Soby reminded EC that IUPAC does not currently have an active, formal program for Young Observers and handling the Young Observers from our NAO's became a little confusing.

The Young Observers were engaged via the WCLM program in Busan. From Istanbul, there has been little follow-up with the Young Observers, except the engagement from Mark Cesa regarding the Strategy Review.

The Congress, independent of the GA, had a Young Scientist Travel Assistance program to support early-career scientists to attend the Congress. It was mentioned that this Young Scientist travel program is not unique to Busan: it is a matching grant that IUPAC provides to the Congress Organizers. In Brazil, a support up to USD 15k will be similarly granted on the

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basis that the local organizers raise at least that amount from other sponsors. The program is to provide funding for young and early-career chemists and chemists from under-represented countries to travel to and participate in the Congress.

EC agreed that IUPAC would benefit through a consolidated program to enable young chemists to become more familiar with IUPAC and encourage early-career scientists to engage with IUPAC. Richard Hartshorn proposed to work with the Secretariat to review the current programs and to better define these activities that relate to the engagement of young chemists, especially during the GA.

ACTION 20 To outline a program that consolidates all the YOs activities into a coherent program proposal for IUPAC 2017 and beyond (RH & LMS)

13. POSSIBLE OUTSOURCING OF THE ORGANISATION OF FUTURE GAS/CONFERENCES

John Corish referred to the Agenda which contains a copy of a proposal that was sent in September by Mr. Cem Tuncel on behalf of the BROS Group. JC explained that the BROS Group was retained by the Turkish Chemical Society to organize the Congress at Istanbul in 2013. At that time, IUPAC also used the company for certain aspects of the organization and provision of services at the 2013 General Assembly. After the meeting in Istanbul, Mr. Tuncel broached the possibility with the officers of making a proposal to provide services to IUPAC in the future. He attended the 2015 Congress and General Assembly at Busan where he again raised the matter and subsequently sent the proposal to us.

The EC concurred that IUPAC has no input into the planning and management of IUPAC-endorsed conferences and therefore it was therefore not suitable for the Union to pursue such proposed agreement.

14. 2017 GENERAL ASSEMBLY & CONGRESS, SAO PAULO BRAZIL

Lynn Soby explained that she met with the IUPAC-2017 Brazilian delegation during the General Assembly in Busan. The brief minutes are in the Agenda Book (p. 146).

Following their presentation at Council, the 2017 organizers have reached out to IUPAC members to seek suggestions and ideas for the scientific program. As pointed in their letter (copy in Agenda book p. 148) *Sustainability & Diversity through Chemistry* will be the central theme of the Congress.

A one-page advertisement for *Chemistry International* has been provided and published on the outside back cover of the Sep 2015 issue. Their website has been launched just before the 2015 Congress: <http://www.iupac2017.org/>.

LMS indicated that discussions were on-going and she planned for an early on-site visit early December. Already, the lessons learned from Busan have been invaluable for planning 2017 General Assembly. The financial and logistics components are clearly understood and will assist both our organizations to plan well and execute exceptionally. LMS confirmed that a discussion

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regarding the financial commitment of the Brazilian Organizing Committee is planned for the December site visit.

(Ultimately LMS visit of December has been postponed to February 2016)

ACTION 21 To obtain clarification on the composition of the IUPAC2017 International Advisory Board and Application for IUPAC Endorsement (including plans for coverage in *PAC*) (*LMS*)

15. IUPAC 100 - CENTENARY PLANNING STEERING GROUP

Natalia Tarasova reported that the Centenary Planning Steering Group (CPSG) had made limited progress since the Busan meeting. A draft timeline of proposed activities has been developed resulting and was included in the Agenda book with the minutes of the meeting. (Agenda book page 150).

NT stated that the next task of the CPSG was to prepare a short 2 to 4-page white paper that will layout out the Goals of the celebration and provide initial ideas for engaging with NAOs and the community. An outline of the white paper is being worked on; meanwhile, via Danielle Fauque (a French historian involved with the French delegation in the planning of the IUPAC 2019 congress) an intro of the historical background has been shared with CPSG. FM will circulate that draft to the EC; it is reproduced below for reference.

NT expressed concerns about relying on volunteers only and recognized that they have their own professional priorities. She has reservation about her own involvement with CPSG while her primary role in the coming biennium will be as President. She will discuss this separately with Mark Cesa.

Colin Humphris asked how big will the celebrations be? NT replied that after the soon-to-be-disclosed new elements, there will be likely no foreseeable occasion in our own lifetime to celebrate IUPAC. Qi-Feng Zhou supported the idea to engage the NAOs in a way that they can too valorize their association with the Union. Chris Brett indicated that he too had met the history group and their plan for the history section at the Congress 2019 is well advanced. John Corish reminded that similarly as to what has been done during IYC, endorsed conferences can carry a iupac100 label. Colin Humphris suggest that ideas be focused on small activities with high impact.

NT will report next at the Bureau.

DRAFT intro referred to above and provided by Danielle Fauque:

Less than a century ago, IUPAC was born, aiming especially at enabling communication between chemists worldwide. Emphasis was thus put on calibration, normalization and nomenclature to facilitate comparison and discussions inside the community, as different regions of the world were sometimes using different standards or terminologies, which made collective progress cumbersome and difficult. Furthermore, as chemical instrumentation continuously evolved towards more precision and more tools to assess the chemical and physical properties of any given substance, the need for negotiating and

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building consensus on these new techniques and the related processes of calibration kept growing. Last but not least, conceived as an international organization, IUPAC was born in the aftermath of the First World War that deeply shook the belief in the universalism of science in general and chemistry in particular, and the peaceful use thereof for the benefit of the whole of mankind. By holding regular meetings all over the world, IUPAC contributed to create and sustain an international community that dealt with all aspects of chemistry, pure as well as applied.

A hundred years later, IUPAC and chemistry jointly are facing world challenges such as globalization, energy crisis, climate change and environmental issues. The IUPAC Centennial is thus a suitable time to commemorate the centennial organization, but also evaluate the impact of IUPAC on the shaping of the chemical sciences, broadly construed. It is timely to have a critical and thorough look back with the purpose of equipping the community for the future.

The legacy is a very rich one indeed; over a century of activity and growth, IUPAC has influenced a very reactive field of knowledge, since chemistry has reinvented itself several times since 1919, reorganizing its structure through the creation of new sub-disciplines, fostering new topics at the crossroads of well rooted specialties, and forging multidisciplinary communities tackling contemporary problems, like the creation of new materials, or the environmental studies. Along with its constant effort to regulate and adjust the language of chemistry to the new developments, IUPAC has also been instrumental in supporting teaching, and the growth of chemistry in less wealthy countries.

16. 2019 GENERAL ASSEMBLY & CONGRESS, PARIS

Lynn Soby reported that the presentation in Busan of IUPAC 2019 Paris has led to some concerns, due to the proposal to use separate venues for the Congress and GA. The presentation of their scientific program was well advanced and it was unclear how input from within IUPAC has been sought.

After consultation with the officers, it was decided that she and Colin Humphris should visit Paris at the time of the Finance Committee in February 2016, to review the proposed premises and meet with the organizing committee.

ACTION 22 To review with the organizers of IUPAC 2019 the logistics, venues, and program; LMS & CH to visit at the same time than the next Finance Committee (Feb 2016).

17. STATUS REPORT ON IUPAC SECRETARIAT**17.1 MANAGEMENT ACCOUNTING INFORMATION**

Lynn Soby recalled that beginning in October 2014, the financial accounting system and process were being redesigned and updated to enable a transition to the 2015 GAPP-compliant, cost accounting basis. This transition has been completed along with the hiring of a Financial

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Controller as a staff member. She stressed that there was a continuing effort being made to complete the general ledger alignment with the 2014 Audited Financial statement. The fourth quarter efforts are focused on completion of the IRS990 Form (non-profit tax report), year-end closing of accounts and pre-audit work for 2015 accounts. The 2015 Audit will be performed by BT&R and IUPAC directly.

The former accountant, Leslie Davis, has retired and provided IUPAC with her historical records and files.

17.2 STAFF AND THEIR RESPONSIBILITIES

LMS explained that since Jay Lucido started to work for IUPAC in July as financial controller, Linda Tapp's role has gradually shifted; Linda now manages all the Membership programs, including National Adhering Organizations, Company Associates, Affiliate Membership Programs, and Associated Organizations.

LMS planned to support the staff by adding professional training in IT. A goal will be to streamline and simplify the various processes that the office is currently handling.

17.3 NEW PROPOSALS FOR CLAIM FORM PROCESS

The processing of IUPAC's claim forms was reported as labor-intensive and the work has increased since a receipted reimbursement policy was put in place. The length of time for reimbursement of claims has been a difficult issue for some of our volunteers, as we no longer pay on a per diem basis. The General Assembly in Busan was the first GA where receipts were required. While we optimized the claim forms to enable a better tracking process, it remains a process that needs improvements if IUPAC is to manage cash flow more effectively. AT the time of the EC meeting, the Secretariat had handled 249 claim forms with an estimated 50 in process. Approximately 100 claim forms for the General Assembly were settled (19 August to 20 October 2015). The stretch target for this effort was ideally a 4-week (20 working days) turn- around time,. Difficulties continue in obtaining clear, concise and accurate claim forms with proper receipts. Thus, a formal Travel Policy is currently being drafted for future efforts. (Executive Director and Treasurer). A goal going forward will be an entirely digital process with an online submission form and claim.

ACTION 23 To draft a formal Travel Policy to provide more transparency and specific guidance for the claimant and ease the overall process (JC & CH)

ACTION 24 To plan to develop and implement an online submission form to streamline to process (LMS)

17.4 STATUS OF WEBSITE AND OTHER INFORMATION SYSTEMS

INFORMATION SYSTEMS

LMS briefly reviewed the status of the IT structure. The Secretariat office and remote office at Boston University have been upgraded and have compatible IT access to enable workflow optimization and improved backup capabilities.

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The current website and parents sites are running on different operating systems, on six virtual machines, and hosted offsite at Tranquil hosting. This will all be discontinued once the new website is released and the transfer of the information is completed with suitable back-up.

NEW IUPAC.ORG UPDATE

LMS gave a virtual tour and review of the new website front and back-end. There has been a lot of work done since Busan and the feedback received from the site mock-up presented at the GA has been very helpful. She indicated that content is currently being uploaded and that Bonnie Lawlor (CPCDS chair) has been a very active contributor to the process.

The current soft launch is planned for first quarter 2016 and preferred date of launch as 1 January 2016.

18. PUBLICATIONS18.1 STATUS REPORT *CHEMISTRY INTERNATIONAL*

Colin Humphris referred the committee to the Agenda and presented the CPCDS recommendations in some detail.

At the request of the IUPAC Executive Committee, the Committee on Publications and Cheminformatics Data Standards (CPCDS) developed recommendations for the future production and dissemination of the IUPAC news magazine, *Chemistry International* (CI). The recommendations were based upon a detailed review of the results of a survey sent earlier this year to an estimated 2000 CI readers and focused on such issues as:

- content, format, and mode of presentation;
- what CI content should be on IUPAC.org
- what might available and sold in the public domain;
- how the IUPAC web site can be used to engage members and others with CI;
- how CI can be used to engage members and others with IUPAC.

In summary, CPCDS believed that moving forward, CI, in conjunction with the new IUPAC website, should serve as a key promotion and communication tool to increase awareness and visibility of IUPAC; both internally to members and externally to other Chemical Societies, students, researchers, and interested members of the general public. Its current editorial perspective can and should serve a broader audience to IUPAC's advantage. At present, CI is underutilized. The full CPCDS report is in the Agenda Book p. 163

Colin Humphris commented that CI has somewhat suffered from misunderstandings by both parties -IUPAC and DeGruyter (DG)- which resulted in some tension during the production process. Also, DG had questions about the future of CI and asked where/how IUPAC sees the magazine evolving.

CH outlined CPCDS recommendations and in particular the following points: CI is currently under-utilized; it should continue as an internal promotion/communication tool and expand its

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role as a voice of chemistry. CI should move forward with a focus on digital, but continue with a seasonal print with issues published 4 times per year by 2017. CI's presence on the website should evolve in a transition to digital-only and leverage publishing opportunities offered by the new IUPAC website. A new business model is needed in view of the impact on member benefits. An Editorial Advisory Board (EAB) should be established and volunteers will be sought for help with CI production. The feedback received on content as part of the CI survey could serve as a pool for consideration by the CI Editorial Advisory Board. A production schedule for 2017 will be developed by mid-2016 for use by the publisher and for possible recruitment of advertisers.

CH mentioned that if the EC was satisfied with the CPCDS recommendations, a discussion with DeGruyter will follow shortly. He indicated that in 2015, CI cost was about \$80k and the goal was to reach a zero net cost in 2017.

Mei-Hung Chiu supported the idea the producing an e-journal; she gave the example of one with which she is involved and that has a simple production based on thematic issues: after the themes are outlined, special editors are identified and writers invited. Social media initiatives are also used to broaden the reach.

With 4 issues per year, the value of CI as a suitable medium to publish news was questioned; it would no longer be a 'news magazine'. In response, it was pointed out that news might better be relayed via the new website; CI can support the new website by referring readers to the online content. The view was expressed that may be "it is time to reconnect CI to IUPAC the website".

Mark Cesa asked who will be part of the EAB and how will it work?

CH explained that the EAB composition was not set. The EAB will probably focus on different needs as the project of transformation evolves: initially it might be very hands-on and while ultimately it might be a sounding board.

The EC voted unanimously in support of the CPCDS recommendations.

ACTION 25 To follow-up with CPCDS and share with the chair EC support of the committee recommendations and establish an CI-EAB (CH)

18.2 STATUS REPORT *PURE AND APPLIED CHEMISTRY*

Colin Humphris reported that DG has ambitious marketing plan for PAC, despite the decline in subscribers and that the recent sale were down. He echoed Hugh Burrows (PAC scientific editor, conference and special topic) concern regarding the quantity of content that was in decline recently. Hugh's plan includes a special topic issues that should make-up an entire issues. CH indicated that the Advisory Board met in Busan and the revival of the committee should positively impact PAC future (see more under items 18.4)

The EC asked if more detailed numbers could be obtained from DG, including revenue and status of the print and online distribution. There was discussion about the impact factor and the question as to how can PAC improve and remain open.

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ACTION 26 To request from De Gruyter more detailed numbers of revenue and analytics of PAC online distribution (LMS)

18.3 VIRTUAL PUBLISHING AND DATABASES

18.3.1 IUPAC Standards OnLine with DeGruyter

Colin Humphris briefly commented on the development by DeGruyter of the “IUPAC Standards online” database. The development carried out entirely by DeGruyter with input of CPCDS that was consulted on the structure and on future development. CH indicated that DeGruyter’s plan was to launch the database online in January 2016 and he referred to DG promotional material in the Agenda book (p. 197), CH commented that this was a very interesting project for IUPAC to gauge DeGruyter’s capacity in developing new database products.

18.3.2 Solubility Data Series with NIST

Lynn Soby informed the EC that she had been in touch with NIST regarding the digitalization of the earlier Solubility Data Series (SDS) book. She recalled IUPAC’s long history of working with NIST on the SDS data series to digitize the printed volumes. Recently, there has been an update from NIST regarding their work (Dave Martinsen/Clara Magalhães). IUPAC’s current agreement is to allow NIST copyright protection for digital versions of the SDS so they can feature on the NIST public websites. This is a non-exclusive agreement and covers Volumes 1-65. The JPCRD publishes Vol. 66-102 and are available to purchase.

18.3.3 Solubility Data Series with Springer

Lynn Soby commented that Springer-Nature had expressed interest in developing a digital database of the SDS and that an initial proposal for acquiring rights to the SDS content for database development as part of their STM offerings had been reviewed in Busan with D. Brynn Hibbert, Earl Wagnhorne, and Clara Magalhães (SSED Chair). A follow-up conference call has been held on 13 October 2015 with Springer-Nature Director of Springer Materials (Germany) and Sharon George, Director of Springer Materials Content Acquisition.

Two action items were agreed: (1) IUPAC will send Springer some sample chapters or volumes. Springer will access the work involved in digitizing the data and building a database out of this book series. (2) IUPAC will evaluate and propose possible business models for collaboration with Springer.

LMS indicated that she was in favor of having multiple partners and especially with partners as prestigious as Nature. Conversations are on-going and a follow-up call is set for December 2015.

18.4 PAC EDITORIAL ADVISORY BOARD

Colin Humphris commented that the PAC-EAB met in Busan and that, after several GA without meetings or records. The meeting purpose was to review the objectives, functions,

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modus operandi and make-up of the Board to ensure it can continue add value to PAC and IUPAC. CH chaired that meeting which was well-received and well-attended.

CH referred to the minutes of the EAB meeting that are included in the Agenda Book (p.199). Briefly he commented that the EAB seemed reenergized and willing to step up for example to broaden the scope and increase the featuring of special topics. The Divisions will work with the Hugh Burrows to scope these options. CH indicated that PAC-EAB was also interested in metrics and some data had been reported since Busan.

CH commented that the chair of the PAC-EAB is the Secretary General and that he will work with Richard Hartshorn on that transition. In addition of meeting during the GA, the PAC EAB will held a virtual meeting in the interim year.

18.5 BOOK PUBLICATION AND BOOK SALES

This item was not discussed.

19. THE NAMING OF NEW ELEMENTS – TASK GROUP REPORT

John Corish updated the EC on the status of the naming of new elements and confirmed that the Joint working party reports were in preparation; there will be 2 reports assessing the verification of the claims for 4 elements: one report covering elements 113, 115, and 117 and a second report covering 118. The exact time when these reports will be available will depend on the final preparation and that could be as early as December 2015 or early 2016. JC indicated that he had reviewed the detailed actions that shall take place simultaneously and in anticipation with the releases with Lynn Soby. The laboratories will know first, along with the EC of both IUPAC and IUPAP. Division II can initiate the task of inviting the laboratories to proposed name only after these reports are published. JC indicated that IUPAC should recognize the commitment of Professor Paul Karol who is leading the JWP.

Mark Cesa thanked John Corish for keeping the EC informed.

20. MEMBERSHIP RELATIONS COMMITTEE

Kaz Tatsumi noted that the MRC met in Busan. MRC stressed the importance of retaining updated contact information for all NAOs. The MRC recommended that communication about IUPAC activities should regularly be shared with NAOs, such as approval of recent projects and support of conferences.

The EC discussed specific countries that IUPAC might like to approach as prospective members; e.g. Caribbean countries, Columbia, Costa Rica, Mexico, Vietnam, Singapore, Lithuania, Guatemala, or Kenya. All have uniqueness, potentially bringing diversity to IUPAC. Some have experience working with IUPAC but there are challenges due to complex national structures. KT stressed that in all cases, IUPAC needs to be patient.

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Mark Cesa stated again the importance to develop a clear value proposition for both existing members and potential new members in line with the new strategic plan. May NAOs don't really know what they value from IUPAC. Colin Humphris suggested that NAOs who have members involved in current activities should see clear benefits. 'Developed' and 'emerging' NAOs constitute two very different groups and benefits for each categories will be different. Richard Hartshorn commented that we need to be specific in claiming what we do and then a more tailored presentation can be developed for each NAO categories.

Lynn Soby offered to circulate the 2015 presentation as a starting point for revisions.

Mei-Hung Chiu echoed the feeling that non NAO members have difficulty seeing the value of membership based on her experience with the CCE flying chemists in Croatia, Panama, or Mexico. They often consider the alternatives becoming an IUPAC member versus that of becoming international chapter ACS. In China many individuals are ACS members, but not IUPAC affiliates. MC stressed that we must state clearly how IUPAC is unique and how we can enable these organizations to build themselves up. IUPAC is also an important link to international bodies such as UNESCO or ICSU.

CH suggested we consider the value seen by existing members; we should ask them. In addition let's ask why did Spain come back? What have we learned from the situation in Belgium?. CH suggested that everybody have that conversation within his/her country and to report. RH commented that for New Zealand, the key benefit is international connectivity.

Individual benefits are a different issue, but IUPAC similar challenge is to articulate these clearly, including the opportunity to be part of a global network, access shared knowledge (e.g. in education/safety). CH commented that the AMP fee of USD 35 has not been reconsidered for at least 15 years; the MRC should review this aspect of the program as well. A current list of AMP membership was in the Agenda Book. We currently have 814 Paid and Sponsored (complimentary). IUPAC has 2178 Fellows in our database.

Lynn Soby commented that AMP has 2 categories: sponsored (i.e. free for under 35 sponsored) and regular (paid) AMP. While a few years ago there were approximately 5000 affiliates, today that number is less than 1000 (not including US).

It was noted that Romania runs an AMP program but is not an NAO.

Mark Cesa thanked everyone for the lively discussion and asked that everyone reports what values their NAO sees in IUPAC membership. The MRC will meet next at the time of Bureau and the discussions will continue.

ACTION 27 To initiate a survey among EC (and later Bureau) members to assess what values their NAO see in IUPAC (MC)

21. REVIEW OF COMPANY ASSOCIATES PROGRAMME (UPDATE)

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This item was not discussed; it referred to a project initiated by the Committee on Chemistry and Industry (COCI), project 2014-018-2-022 in progress.

22. PROJECTS REVIEW

The latest commitments report and projects expenditures (30 Sep 2015), and proposals under review were included in the Agenda book.

Lynn Soby explained that the financial and project expenses reports have been reengineered in an attempt to provide ease of use for all stakeholders, transparency of information and reduce time and labor associated with this task.

This report was generated with updated information triggered by the approval of new projects and in conjunctions with the financial record from QuickBooks.

LMS recognized that there are still areas of improvement needed regarding the consistency and quality of the data to insure minimal mistakes in the report, which are being addressed. Work will continue on improving the workflow between the financial and project systems.

The second report is a simple list of proposals under review.

Lynn Soby pointed out to the ‘SWEEP’ amounts in the report (highlighted in blue) and recognized that these projects are overdue, some more than a year overdue, and showing no sign of activity. She stressed that this is not look good and that it will be important to obtain updates in order to get a realistic picture of what the pool of current project actually is.

Richard Hartshorn indicated that he expected that the new website will improve the tracking of these projects by providing more visibility and ability for the task group chair to provide input directly.

23. COMMITTEE ON CHEMISTRY RESEARCH FUNDING

Kaz Tatsumi reminded EC of his report on CCRF to Bureau in Busan. Markus Behnke (German Research Foundation) had stepped down as secretary but fortunately Laura McConnell stepped in. The committee agreed to coordinate an initiative with CS3, the Chemical Sciences and Society program hosted by US, Germany, China, Japan and UK, and have the subject of the CCRF call in line with CS3 priorities which include water, health and the environment; detection; treatment; and recovery of materials from wastewater. CS3 will meet in September 2015 in Leipzig, Germany, and a draft report of this meeting will be available by the end of the year.

Kaz Tatsumi indicated that he has had no specific updates since Busan and that July 2017 was still the target date to review proposals selection for a ultimate presentation in Paris. The timeline for proposal solicitation shall therefore be mid 2016.

Mark Cesa asked if a decision has been made about the specific topic for the next call? And/or if first the agencies shall be invited to take part and also make suggestion for a topic.

KT will follow-up with the funding agencies and later provide clarification to the EC.

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ACTION 28 To obtain clarification from funding agencies re their future involvement and about CS3 plan/report following their recent meeting in September (Kaz Tatsumi)

24. IUPAC/SOLVAY AWARD

Lynn Soby indicated that the 2016 IUPAC-Solvay prize call for nominations has been posted on the website and that an online application was being prepared to collect the nominations and supporting documents. Following a suggestion made by Kaoru Yamanouchi, LMS confirmed that a request to submit a brief abstract in addition to the essay will be included in the submission form.

John Corish confirmed that Solvay support is in place. It was also confirmed that the prize money will be awarded the year of the announcement and not at the time of the award presentation at the Congress (i.e. the prizes awarded in 2016 will receive their cash award in 2016 and not in 2017).

As Past President in 2016, Mark Cesa will chair the award committee.

ACTION 29 To add a request for a brief abstract in the IUPAC/Solvay award submission form (LMS)

25. THE PHOSAGRO PROJECT

John Corish commented that the PhosAgro/UNESCO/IUPAC project initiated the 3rd call with proposals due early 2016. He confirmed that 6 awards of USD 30,000 each were made in 2014 and in 2015. The program has been successful in attracting more than 100 applications from around the world in each year.

The award winners in 2015 presented their projects at Busan at a symposium that contributed to the theme of Green Chemistry at the Congress. The formal presentation of their awards will take place in a ceremony to be held in the framework of the Discussion Panel being organized in conjunction with the meeting of the UN Secretary-General's Scientific Advisory Board (SAB), in St Petersburg on 15 December 2015.

The project is scheduled to continue for a total of five years.

Members asked if these presentations made in Busan will result in a PAC publications. This will be raised with the scientific editor.

To ensure contact and continuity, John Corish suggested that the EC name a Bureau member for the task. Also, to better highlight these activities, he offered to write an article for *Chem Int*.

ACTION 30 To review with Hugh Burrows (PAC scientific editor) the option of publishing papers from the Busan Symposium, especially from the 2014 winners whose projects are either completed or nearing completion. (J. Corish)

ACTION 31 To prepare an article for *Chemistry International* outlining the scope of the proposals awarded (J. Corish)

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ACTION 32 The EC to name a new contact with PhosAgro from within the Bureau to succeed to John Corish.

26. INChI TRUST

Richard Hartshorn reported that he attended both the Annual General Meeting and the Board Meeting last August in Boston. The latest dealt with the various aspects of the development of the InChI and the plans for the future.

RH stressed that new developments such as those relevant H&S and inventory management could prove important for InChI and in turn could translate into an opportunity for IUPAC to promote its activities and contribution.

RH indicated the Trust noted the recent changes in terms of reference for the CPCDS and that has led to a proposal to change some details of the relationship between the InChI Trust and IUPAC, specifically to allow for both Division VIII and CPCDS to be involved in evaluation and endorsement of InChI developments. The new document was prepared in consultation with Bonnie Lawlor, Chair CPCDS, and presented for consideration by the Executive Committee and subsequent signature.

The comment was made that InChI has reached 15 years and the belief is that it provide good visibility for IUPAC. Division VIII has continuously provided the scientific expertise through specific projects. LMS indicated that DeGruyter was interested in including InChI in the standards database.

The EC was asked to approve the revised InChI Trust-IUPAC relationship.

The EC approved the revised InChI Trust-IUPAC relationship, and the current Secretary General will proceed.

27. NPU

Colin Humphris pointed out to the minutes from the most recent Scandinavian meeting on the NPU Terminology in Trondheim (1-2 September 2015) are included in the Agenda Book (p. 254).

CH explained that the NPU (Nomenclature for Properties and Units) guidelines for clinical chemistry are currently being used in Denmark, Sweden and Norway. The IUPAC NPU subcommittee has initiated projects to support the integration of NPU terminology with the international health standard, SNOMED CT. The integration of NPU with the SNOMED CT still requires acceptance by the owner of SNOMED CT, and adoption by additional countries.

CH will continue to monitor progress and keep the EC informed. The EC approved CH role to act as IUPAC representative on NPU.

28. OPCW ETHICAL GUIDELINES WORKSHOP

Mark Cesa and Natalia Tarasova briefed the Executive Committee on the recent workshop (17-18 Sep 2015) at the headquarters of the Organization for the Prohibition of Chemical Weapons on

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development of ethical guidelines related to the Chemical Weapons Convention, for chemists and chemical practitioners.

The resulting ethical guidelines were included in the agenda book (p. 255); they are published on the OPCW website (<https://www.opcw.org/special-sections/science-technology/the-hague-ethical-guidelines>)

MC provided some background* and recalled that IUPAC has been involved with OPCW as early as 2007. OPCW goal is also to promote a culture of responsible conduct and guard against misuse of chemistry. As such OPCW supports education and outreach, which NT underlined are fundamental issues relating also to SDGs. MC indicated that IUPAC involvement in the future could involve periodic reviews of the technology and via a series of focused workshop. One of them could be organized by IUPAC. Richard Hartshorn asked how will IUPAC be engaged and involved to organizing such a workshop. MC indicated that OPCW scientific advisory board turns to IUPAC for scientific expertise. MC also mentioned that IUPAC will have a seat a new advisory board starting this coming December.

Colin Humphris asked what IUPAC proposes to do with OPCW guidelines? The EC might want to establish process to review the document and consider how IUPAC should/could endorse it. MC stated that the document is not today presented to the EC for endorsement, and RH agreed that it should be reviewed more broadly than EC. The EC could suggest how to proceed forward. The EC agreed that a follow-up discussion shall take place during the next Bureau and to and consider if the OPCW ethical guidelines deserve or not endorsement.

ACTION 33 To follow-up the discussion at the Bureau and consider if the OPCW ethical guidelines deserve or not endorsement. (all)

(* For a detailed account, see “IUPAC, OPCW, and the Chemical Weapons convention”, Leiv K. Sydnes, *Chem Int July 2013, 35(4), pp. 48*); <http://dx.doi.org/10.1515/ci.2013.35.4.4>)

29. CONFERENCE ENDORSEMENT/SPONSORSHIP PROGRAM

29.1 RATIFICATION OF ENDORSEMENT/SUPPORTED SYMPOSIA

The list provided in the Agenda book was not the list of all conferences endorsed since last Bureau (i.e. since July 2015); instead it was only the list of conferences having received financial support via the FSC program.

Natalia Tarasova pointed out that some events that she is aware of have been awaiting for communication after having submitted their application. She urged the Secretariat to review pending applications and provided update as necessary.

Lynn Soby indicated that a list will be generated and shared for later approval.

ACTION 34 To provide the EC with a list of the endorsed conferences for which endorsement was processed since last compilation (i.e. July 2015 in advance of the Bureau). (*Secretariat*)

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30. NEXT BUREAU MEETING MONTREAL 8 -10 APRIL 2016

The next Bureau meeting will be held at McGill University in Montreal, Canada, on April 8 to 10, 2016, and the EC will have a short meeting at the end of the Bureau.

Mark Cesa asked that if any item should be brought onto the Bureau Agenda that these be communicated as early as possible.

Richard Hartshorn would like to ask the Division Presidents to think hard about the Strategic Plan and suggested that a specific time slot be allocated to that only.

Mei-Hung Chiu suggested that during the meeting, the motions should be introduced more formally.

ACTION 35 To ask the new Division Presidents to consider the new Strategic Plan and have time to discuss in Montreal (RH)

31. DATES AND PLACE OF NEXT EXECUTIVE COMMITTEE MEETING

Mark Cesa confirmed that in this instance, the 'next' EC meeting refers to the full meeting similar to the present. He indicated that Professor Zhou has invited the EC in Beijing.

The EC is all in favor.

Dates will later be clarified but it shall be sometime early November.

32. ANY OTHER BUSINESS

There was no other business. The President thanked everyone for their participation and in particular thanked the retiring member, Kaz Tatsumi, John Corish, and Ram Lamba. He again welcomed the new members. Natalia Tarasova thanked Mark Cesa for his dedication and all the work done during his presidency.

ACTION 36 To complete a list of actions in one week or two.

Lynn Soby reminded everyone of the departure for a visit of the new Secretariat office.

[end]

International Union of Pure and Applied Chemistry

155th MEETING OF EXECUTIVE COMMITTEE

Beijing, China, 12-13 November 2016

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Attendees: Prof. Natalia Tarasova (Chair) Dr. Mark Cesa, Mr. Colin Humphris, Prof. Qi-Feng Zhou, Prof. Richard Hartshorn, Prof. Mei-Hung Chiu, Prof. Chris Brett, and Prof. Kaoru Yamanouchi
Guest: Prof. Xuefeng Jiang (East China Normal University; Executive Director of IUPAC Office of the Chinese Chemical Society (CCS)), Ms. Minjie Huang, Dr. Lynn Soby, Dr. Fabienne Meyers (secretary)

1. INTRODUCTORY REMARKS AND FINALIZATION OF AGENDA

Natalia Tarasova welcomed all participants and members of the Executive Committee (EC) and thanked our host for all the arrangements.

Referring to the Agenda, Natalia Tarasova stressed that the EC has several important and difficult items to review, including the national subscriptions; the new elements, the ICSU-ISSC merger and several others. She asked if there were any additional items.

Natalia Tarasova indicated that in addition to receiving an update of the naming of the new elements, she will bring forward details on the establishment and terms of reference of the new Joint Working Party. This is timely because that aspect of the process should be outlined in the press release under preparation and which present the latest names and acronyms that have completed on November 8, the public review. This will be discussed under Agenda item 17.

Colin Humphris commented on item 7 on the National Subscription Task Force and stressed that the EC will be asked to consider the proposed new approach before the task force initiates a wider consultation with NAOs. This item will be reviewed in detail under item 7.

2. MINUTES OF 154TH (RTP, 31 OCT-1 NOV 2015) 2015 MEETING OF EXECUTIVE COMMITTEE

The minutes of the 154th Executive Committee meeting are included in the Agenda Book for reference.

The EC was asked to review and approve the minutes. The minutes were approved.

2.1 MATTERS ARISING FROM MINUTES (NOT COVERED BY ITEMS ON AGENDA)

2.1.1 Revision of Division VIII Roster: For approval

The roster as included in the Agenda Book was approved.

Richard Hartshorn indicated that part of the delay was due to the fact that Division VIII had been waiting for a representative from the Chemical Abstracts Service.

3. MINUTES OF 98TH MEETING OF THE BUREAU (MONTREAL 9-10 APRIL 2016)

3.1 STATUS OF BUREAU MINUTES

Richard Hartshorn indicated that a draft of the minutes of the 98th Bureau meeting held in Montreal, Canada, in April 2016 was in preparation.

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The expectation is that a draft will be distributed for input by the end of November 2016.

Chris Brett stressed that it will be helpful to have draft just right after the meeting, especially when follow-up is required on specific action items.

4. ACTION ITEMS FROM PREVIOUS MEETINGS

Richard Hartshorn referred to the list of actions items included in the Agenda Book and asked EC members to review and provide updates.

{Mark Cesa confirmed that [154EC13] *To revise proposed ToR for the IUPAC committee for ICSU: update (iii) To promote and coordinate ... and add a statement to reflect that while being the official representative on ICSU, the IUPAC President should also be an ex officio on the new committee* has been completed.}

5. VICE PRESIDENT'S CRITICAL ASSESSMENT

Qi-Feng Zhou provided an update on his Critical Assessment. He started by stressing that the recent review of the Strategic Plan and its implementation were important and that as a consequence the Union can focus on sustainable development. The new website and accounting system, as well as the new interdivisional subcommittee on green chemistry and sustainable development, puts the Union in a good position. Qi-Feng Zhou outlined the four areas that he will be examining (ref. report in Agenda Book): 1. membership relations; 2. project system; 3. Interdivisional Committee on Green Chemistry for Sustainable Development; and 4. relationships and collaboration with other organizations.

Natalia Tarasova invited comments and questions.

Of relevance to relations with NAOs, a question was raised regarding the Conference endorsement program and that is how/when is the corresponding NAO's are involved and/or made aware of these conference endorsements. Natalia Tarasova suggested that the organizers should be asked to approach and inform the NAO even before applying for endorsement. After some discussion and recognizing that the organizers may not know who to approach, it was suggested that initially the application form be modified to include a question requesting the organizers to indicate if they did or did not approach the relevant NAO. Depending on that input, the review process can be adapted and involve consultation with the NAO. In all cases, the endorsement approval should be copied to the NAO (as is the current practice for financially supported conferences).

Action 1: Add a question in the Application for IUPAC Endorsement (AIE) form, asking if the conference organizers have or not approach the relevant NAO.

The Divisions should be reminded that if they know about an event that is part of a series and is generally endorsed, they should make sure that the formal endorsement has been requested. Additionally, an event report usually ends with the indication of where the next event in the series will be held and who is to organize it; this provides a lead for the Secretariat to follow up directly with the organizers.

Natalia Tarasova referred to national events where IUPAC poster prizes can be presented. She asked if that program which provides visibility for IUPAC should be expanded.

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Lynn Soby confirmed that only a few NAOs have made effective use of the program but those that do, appear to be satisfied and there has been no request to present poster prizes at more than one national event per year.

{FM note - the program provides visibility for IUPAC, so we should explore ways to reciprocate and for instance advertise these national events in the web calendar}

Colin Humphris stressed that the Union is running in deficit and that while the new strategy was being implemented, the EC must also identify activities and/or programs that could be eliminated. He recalled, for example, that while we keep supporting projects, it is simultaneously important to ensure that project outcomes are delivered as they constitute content for the IUPAC journal PAC which is a part of the revenue stream. Similarly to the national subscription issues, it is our responsibility to explain to our stakeholders what we gain from these projects and that relates to explaining the relevance of the Union.

Colin Humphris alluded to the complication that in IUPAC all decisions are taken by NAOs and not by individuals, and yet there is a desire to increase the number of individual members. Lynn Soby concurred that there is an opportunity to better inform NAOs about the affiliate members program while increasing income.

6. FINANCE AND BUDGETS

Colin Humphris referred to the Agenda and Agenda Book for details.

The report included in the Agenda is reproduced below. *All financial information presented at the EC meeting and contained in the Agenda and documents is pre-Audit and is subject to change.*

6.1 AUDITED FINANCIAL STATEMENT FOR 2015

The audited Financial Statement for 2015 is included in the Agenda Book. It confirms the deficit of \$133k forecast at the Bureau meeting. The 2016/17 budgets are also deficit and this is not sustainable in the long term. It requires us to consider carefully how to maintain existing income streams, how to find new funding. We also need to stop non-essential or lower priority activities especially as new initiatives inevitably come along.

6.2 REPORT ON CURRENT FINANCIAL SITUATION

The Income Statement and Balance sheet as of 30 September 2016 are included in the Agenda book. IUPAC is now reporting on a full accrual basis providing far greater insight into the financial performance of the Union and importantly its cash needs. Cash Flow management remains the critical issue.

On the accrual basis, income is recorded when it is invoiced and expenses when the costs are incurred. NAO income is therefore shown in total as invoiced on January 1st. The balance sheet shows account receivables of \$336k of the \$834k remains to be paid. The NAO status including those countries approaching two years in arrears will be reviewed under item 6.5.

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An important part of our income is from publishing. The Income Statement shows \$110k for publications that is the 2016 prepayment for De Gruyter and royalty income from book publishing (\$14k). We will be reviewing the outlook for PAC and CI with De Gruyter shortly before the Executive Committee meeting to help estimate the final position including any royalty income from the new Standards Online database. We will also be seeking continuation of the annual prepayment (€100k Euros).

The expenses data gives a good picture of performance against budget. Salaries and benefits are on plan, and travels costs well within plan. Other costs are above plan including IT support, and two non-budgeted items for consulting for the National Subscription Task Force and a pilot assessment of IUPAC's database needs. Both items were approved by the officers. A key structural investment in the databases that will lie behind the website \$47k was also approved recently as essential by the officers.

The expectation is that the year 2016 will be in deficit as budgeted, reducing our reserves.

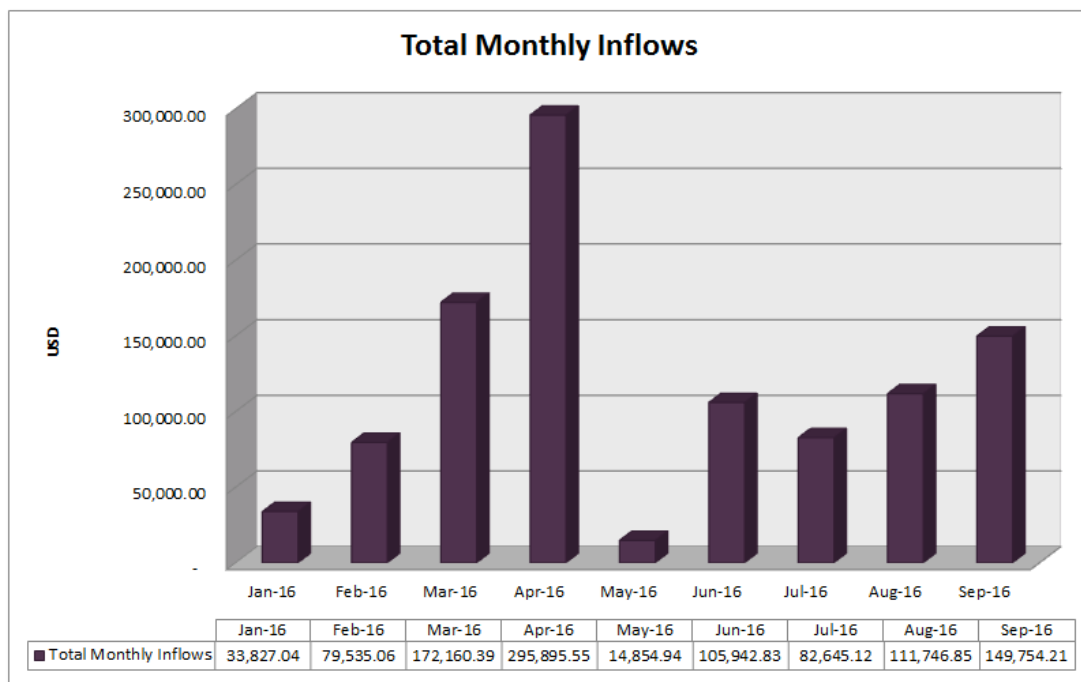
Key points on the balance sheet are the subscriptions receivable (\$336k), the new website (\$133k) (shown as an asset. It will be depreciated over 5 years) and the BB&T line of credit of that has been extended to the \$100k to help manage cash. IUPAC has drawn fully on its line of credit to help manage cash flow i.e. we have effectively borrowed to cover the shortfall in National Subscription payments.

The ongoing cash issues remain. We have little control over the timing of income payments or expense claims. We have maintained a target to settle expense claims within 30 days. We also have however regular expenses to meet for the operation of the Secretariat and supporting systems and programs (\$60k/month). A major challenge for the Secretariat is managing this delicate balance continuously. An example of a weekly cash flow statement is included in the Agenda Book that is used to assess cash flow needs. The year-to-date financial and cash flow analysis is shown below and is included in the Agenda Book.

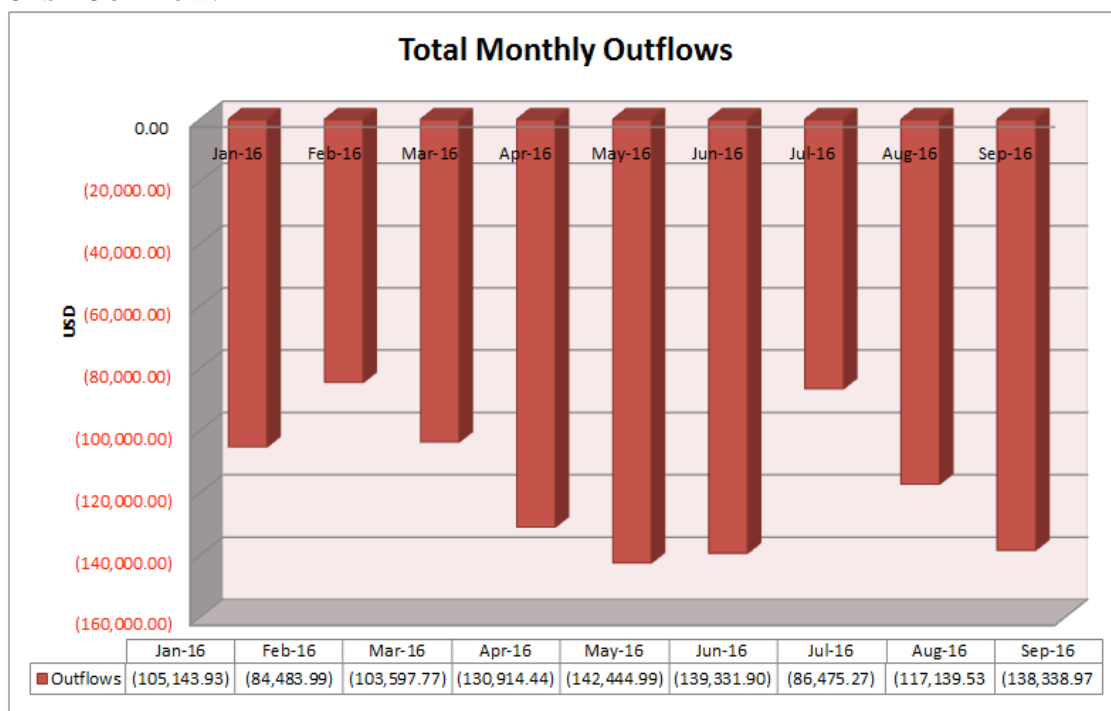
CASH INFLOW:

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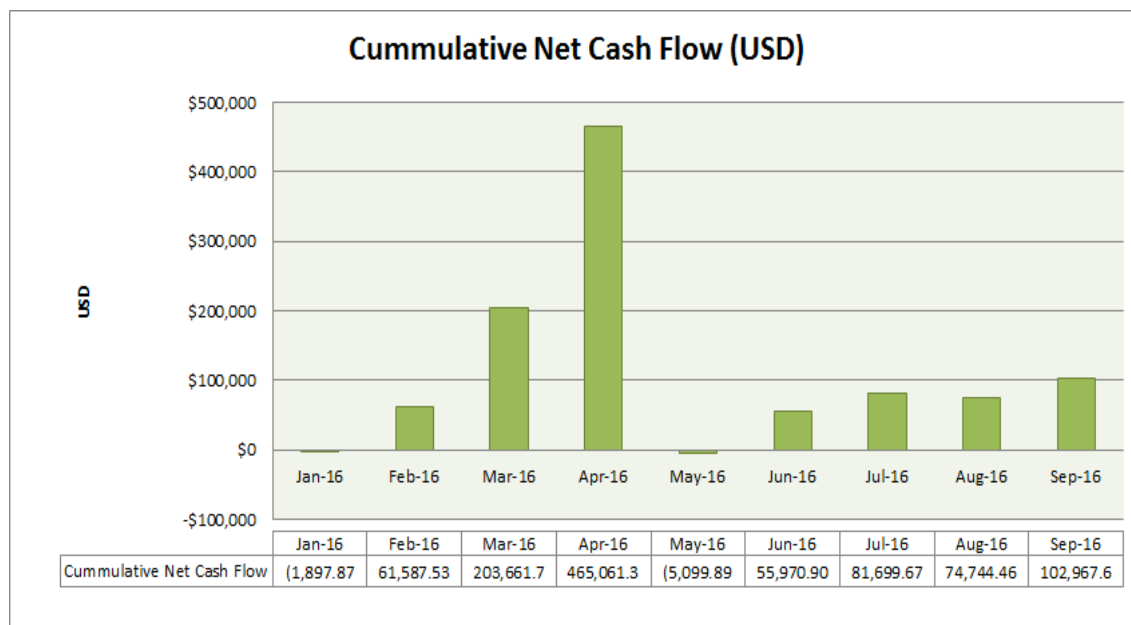
CASH OUTFLOW:



CUMULATIVE NET CASH FLOW:

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6.3 PERFORMANCE OF INVESTMENT PORTFOLIO

The investment performance of IUPAC's portfolio since inception with BB&T / Scott & Stringfellow as of 3 October 2016, is yielding 3.45% with an estimated annual income of \$138,711. Overall market value of the portfolio is currently \$4,021,043. As of 30 September 2016, the asset allocations were as follows and have slightly changed in the past month.

<i>ALLOCATION</i>	<i>AMOUNT</i>	<i>PERCENTAGE</i>
Bonds	\$1,022,119	25.42%
Mutual Funds	\$1,366,226	33.98%
Equities	\$1,583,554	39.38%
Cash Sweeps	\$49,144	1.22%
	\$4,021,043	100.00%

The asset allocation is relatively stable for the 2016 time period, and reported below:

	<i>Jan-16</i>	<i>Feb-16</i>	<i>Mar-16</i>	<i>Apr-16</i>	<i>May-16</i>	<i>Jun-16</i>	<i>Jul-16</i>	<i>Aug-16</i>	<i>Sep-16</i>
Equities	\$1,483,237	\$1,451,690	\$1,534,098	\$1,541,162	\$1,576,603	\$1,621,491	\$1,600,617	\$1,573,982	\$1,583,554
Bonds	\$1,046,963	\$1,046,867	\$1,005,707	\$1,032,901	\$1,027,430	\$1,035,093	\$1,027,061	\$1,023,548	\$1,022,119
Mutual Funds	\$1,301,133	\$1,300,273	\$1,324,326	\$1,336,356	\$1,337,846	\$1,340,453	\$1,357,148	\$1,362,485	\$1,366,226
Cash Sweeps	\$29,703	\$63,233	\$128,642	\$86,312	\$73,022	\$23,915	\$81,279	\$53,953	\$49,144
Total	\$3,861,037	\$3,862,064	\$3,992,772	\$3,996,731	\$4,014,901	\$4,020,953	\$4,066,106	\$4,013,968	\$4,021,043
Delta		\$1,027	\$130,709	\$3,959	\$18,170	\$6,052	\$45,153	(\$52,137)	\$7,075

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6.4 BUDGET UPDATE 2016-2017

The Budget approved by Council for the 2016-17 biennium is shown in the Agenda Book as are the resulting National Subscriptions for each of the two years. Also shown are the budgets allocated to the Divisions and Standing Committees. The method used to produce this biennium budget was an interim measure adopted to deal with a difficult situation that arose from the failure of the usual method to produce a reasonable set of allocations of the National subscriptions. This led to the creation of the National Subscription Task Force which was approved by Council in Busan. (See item 7.)

6.5 NAO NATIONAL SUBSCRIPTION: STATUS AND ISSUES

A summary of the status of the NAO National Subscriptions for 2014-2015-2016 is included in the Agenda Book. IUPAC has received \$575,694 (~65%) of the 2016 budgeted amount of \$888,781. We estimate the total receivables for 2016 to be \$880,000 with the difference due to exchange rates (\$5,770 to date). The exchange rate loss in 2016 is significantly less than 2015, which was \$44,789 in October 2015. As a result of outstanding and delayed National Subscriptions payments, we have taken a \$100,000 Line of Credit (LoC) Loan and our investment interest and dividends to manage cash flow. We paid back the LoC from 2015 in first quarter 2016 and are currently paying interest (\$375/month) on the draw against the LoC.

6.5.1 NAO's approaching 24 months in arrears

The following NAOs were sent an early reminder regarding their status 18 July 2016 in order to provide them with enough time to respond and make their 2015 NS payments.

Argentina, Bulgaria, Kazakhstan and Pakistan were notified of their payments due and deadline for payment of 2015 and 2016 being 30 December 2016. In addition to the letter, a complete list of members was provided.

NAO	2016 Paid USD	2016 Due USD	2015 Paid USD	2015 Due USD	2014 Paid USD
Argentina		\$4,758.34		\$8,910.00	\$8,422.00
Bulgaria		\$1,869.45	\$1,769.00	\$1,753.49	\$1,781.00
Kazakhstan		\$1,050.00		\$1,000.00	\$1,000.00
Pakistan		\$4,380.00		\$4,200.00	\$4,000.00
Total Due		\$12,057.79		\$14,094.49	
Grand Total		\$26,152.28			

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Bulgaria has recently made their 2015 NS payment. Pakistan was in same situation last year and we are experiencing similar communications and delays. We are in contact with them regarding their questions. We have a new contact person in Argentina and are currently working with them on their subscription(s). Kazakhstan was approved by Council in Busan to receive NAO status. No communication has been received regarding their subscription payments. Prof. Tarasova called the Secretary of Kazakhstan's NAO and discussed the current situation. A letter, past due invoices and readmission policy was sent to the Secretary on 21 October 2016 as a result of her discussion.

A second letter was sent 20 September 2016 to all countries still approaching loss of NAO status. Bulgaria will not lose status and will be eligible to cast votes at Council if 2016 invoice is paid.

6.5.2 NAO Applications

No new applications have been received for National Adhering Organization status.

Colin Humphris informed the EC that following the discussion with De Gruyter, it has been agreed that De Gruyter will continue to make the annual prepayment of €100k Euros. In reference to the Line of Credit (LoC), he stressed that while managing our funds and revenues, a LoC was a suitable option to retain interest income. Also, the Union is required to operate with the equivalent of a biennium of operation expenses in saving. Overall, the current situation is clearly not sustainable and Colin Humphris pointed to the budget of each Division and questioned their actual needs. He suggested that he would communicate with the Divisions to ask about their needs compared with their spend in this biennium. He also recognized that the bulk of the income comes from NAOs and that the total was not significantly increasing. There is an urgent need to generate income from other sources.

7. NATIONAL SUBSCRIPTION TASK FORCE

Colin Humphris referred to the Agenda and the Agenda Book for details. He recalled that IUPAC was committed to propose a new approach to National Subscriptions to Council in July 2017. In practice this means that the new approach and associated budget have to be completed for the Finance Committee consideration in early February 2017 to enable proper notice to Council. There are two core considerations. The first is the actual approach and the second how this might be implemented. Any new formula will generate some winners and losers so we will have to consider some principles for implementation; for instance, should no one see an increase in 2018?

The task force has undertaken a benchmarking survey of other science unions, and half responded. A tabulation of the responses is included in the Agenda Book. Many see the same payment issues as IUPAC and some are undertaking reviews today. All have a banded structure for national subscriptions, most of which are based on an assessment of national wealth and/or a measure of size of the science activity. The subscription bands link directly to the number of votes each country has with only a couple of exceptions. None give the choice IUPAC offers for the currency of payment, and none offer inducements for early payment.

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A survey of the NAOs was also initiated to assess their views on the core principles of a new system. Only six have responded so conclusions can only be drawn with caution. The results are tabulated and included in the Agenda Book. There is acknowledgement that this is a complex task and that internationally comparable data may be hard to find. There is acceptance of a composite measure encompassing the academic and industry knowledge base and national wealth but with some caveats about data. Views among the survey respondents differed widely on the question of inducements for early payment. There was a plea from one respondent that the new system should not result in major swings as this will make it difficult to implement.

The task force has taken advice on currency management and it does not appear practicable for IUPAC to be hedging given the number and amounts of currencies we accept.

Potential data sources have been assessed for information on publishing and patenting as proxies for chemistry activity. The recognized sources (Thomson Reuter) are expensive even for a not for profit organization such as IUPAC (\$12,000 p.a.). A proof of concept consulting study is therefore being undertaken to evaluate a composite measure of academic publishing, patenting, chemical industry turnover and National wealth by country. This is for a sample of our members in order to assess alignment with the previous model and implementation issues. The aim is to identify an acceptable approach using publically and freely available data from credible and sustainable sources. We should not seek spurious accuracy but are considering an approach to enable us to categorize member countries into bands that align with our existing voting categories with a special category for China and USA. An assessment of the possible current banding and voting is included in the Agenda Book and shows a reasonable fit.

Next steps are a further round of consultation with the NAOs and finalization of the recommended data sources.

Lynn Soby reviewed in more detail how the proof of concept had been developed. The model includes two major components: academic activity (including H-index and number of patents averaged over 5 years) and industry knowledge (including the chemical industry turnover {i.e. currently the only index factored into the NS calculation} and National wealth by country, or GDP). The two components are intended to mirror the pure and applied nature of the chemistry enterprise. A study has been completed including 20 countries and each member of the EC is invited to review the details. Colin Humphris asked each member to provide feedback. After that round of input, everyone shall be prepared to present the case study to their respective NAO.

The proof of concept focusing on a multi index approach was well received.

Motion: The EC endorses the approach taken by the NS Task Force to develop a model that encompasses a multi-index model.

Vote: all in favour.

Motion: The EC authorizes the Task Force to further communicate with each NAO on the progress and development of the new model.

This will include providing the NAOs the benchmarking of other Unions, sharing the data from the countries that have responded to the survey, and laying down the principles of the model and how it might be used in a banded or tiered structure to avoid major swings in subscriptions.

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Vote: all in favour.

8. FUTURE OF CHEMRAWN

Richard Hartshorn referred to his report included in the Agenda Book.

Before focusing on CHEMRAWN, Richard Hartshorn reported on his attendance at the meeting of the Inorganic Chemistry Division (Div II), the Committee on Chemistry Education (CCE), and the Committee on Publications and Cheminformatics Data Standards (CPCDS).

He reported that Division II has had an extremely busy year and a steady momentum also with projects being planned around the periodic table and jointly with CCE.

CCE met at the International Conference on Chemical Education (ICCE) as the committee traditionally does, and because this meeting provides a broad exposure and opportunity to run joint activities with other organizations, e.g. OPCW running a Symposium on Chemical Weapons Convention & Chemical Safety and Security.

A joint workshop with the cheminformatics group of the Research Data Alliance (RDA, <https://iupac.org/event/prioritizing-digital-data-challenges-in-chemistry>) was held directly prior to the CPCDS meeting last July. Issues related to data standards, data exchange and data mining are at the core of the new “CDS” of the committee. Richard Hartshorn stressed that this area of work is extremely important, for example allowing the interconversion of the traditional nomenclature which IUPAC has developed, and the trend towards graphical representation and related standards such as InChI. He foresaw much needed work being done jointly between Division VIII and CPCDS, and commended the developing relationship with the RDA.

Both CHEMRAWN and COCI were asked to provide a report. The work of COCI, specifically in relation to the CA program and the prospect for further relation with industry, will be reviewed under item 20.

The CHEMRAWN report is included in the Agenda Book. Richard Hartshorn recalled that the future of the committee had been raised at the previous EC meeting, and particularly in the context of possible developments in green chemistry.

The EC raised questions and exchanged ideas about the CHEMRAWN. Why is the committee activity limited to conferences? Does the current activity have an impact? Should the committee conferences be catalytic in generating new series? How can the committee (or should it) be preserved, and can the principle of “Applied to World Needs” be preserved within the Divisions? Can IUPAC sustain two overlapping committees: CHEMRAWN and the new Interdivisional Committee on Green Chemistry for Sustainable Development? Could the current CHEMRAWN events be self-sustained and also generate income that will allow CHEMRAWN to do future planning and operational activities? What will be in IUPAC’s view a “good” CHEMRAWN? Can their operational budget be transformed into 50:50 operations:projects to trigger an incentive to consider alternative activities? Should CHEMRAWN’s focus be addressing the UN Sustainable Development Goals?

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The EC concurred that the chair of CHEMRAWN should be asked to review CHEMRAWN's plan for the future and articulate a new vision. A deadline of February 2017 will allow for consideration at the next Bureau meeting.

Action 2: The Secretary General, with the President, will raise the EC concerns with the CHEMRAWN chair and ask that the committee prepares a new vision and propose a new plan by Feb 2017.

9. INTERDIVISIONAL COMMITTEE ON GREEN CHEMISTRY FOR SUSTAINABLE DEVELOPMENT

9.1 TERMS OF REFERENCE

Natalia Tarasova referred to the proposed Terms of Reference included in the Agenda Book. The Bureau was asked to vote on the Terms of Reference via email by 31 October 2016.

Lynn Soby confirmed that 24 votes have been cast: 23 for and 1 against.

9.2 COMPOSITION AND PROPOSED MEMBERSHIP

The Composition was presented for review. Natalia Tarasova confirmed that the Divisions had been asked to propose representatives and the resulting roster was proposed:

Titular Members

Pietro Tundo (Chair), IUPAC Bureau member, Italy
Janet Scott (Secretary), TM Division III, UK
Chris Brett, IUPAC EC member, Portugal
Christine Luscombe, Vice President Division IV, USA
Pierangelo Metrangolo, TM Division I, Italy
Michael Schwenk, Secretary Division VII, Germany

Associate Members

Paul Anastas, Member former Subcommittee on Green Chemistry, USA
Jorge C3lon, AM Division II, Puerto Rico
John Corish, IUPAC former Treasurer, Ireland
Hemda Gerelick, IUPAC Bureau member, UK
Buxing Han, Member former Subcommittee on Green Chemistry, China
Philippe Knauth, NR Division II, France
Anna Makarova, NR COCI, Russia
Claudio Mota, Member former Subcommittee on Green Chemistry, Brazil
Bipulbehari Saha, AM COCI, India
Kenneth Seddon, Member former Subcommittee on Green Chemistry, UK
Supawan Tantayanon, NR CCE, Thailand

National Representatives will be nominated after committee formal approval by Council.

An Advisory Board will include the former Chairs of IUPAC Green Chemistry Conferences (Wolfgang Hoelderich, Germany; Ekaterina Lokteva, Russia; Philip Jessop, Canada; Vania Zuin, Brazil; Liliana Mammino, South Africa), and other distinguished experts (e.g. Roger Sheldon, Netherland; Takashi Tatsumi, Japan) and the remaining Members of former Subcommittee on Green Chemistry.

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The EC concurred that the membership is provisional until approval by Council. The same membership will continue in 2018-2019 and during that time, the Committee will be invited to proceed with an election to establish its 2020 membership.

9.3 BUDGET IMPLICATIONS

Natalia Tarasova confirmed that the Committee will be submitting project proposals; when approved, these projects shall clearly be assigned to the new Committee. The Treasurer stated that apart from these projects there is no assigned budget for 2017. Looking forward to the biennium 2018-2019, Colin Humphris suggested that the committee be asked to articulate their actual plan and needs. The EC will have to clearly justify such eventual expenses if it is to ask the Council to approve the new body.

Colin Humphris suggested that one way to budget for this committee would be to consider redistribution of the current Division and Committee budgets. While preparing the budgets for the next biennium, an option will be to reconsider the “traditional” distribution/allocation.

Action 3: Natalia Tarasova will ask the ICGCSD Chair to outline a plan and propose a budget.

9.4 IMPLEMENTATION AND APPROVAL PATHWAY

Richard Hartshorn confirmed that the Committee plan and membership will be presented at Council for approval.

10. ELECTION PROCESS

10.1 STATUS UPDATE

10.1.1 Lynn Soby referred to the detailed timeline for the 2016-2017 election process in the Agenda Book and confirmed that all tasks have so far been completed on time. The NAO's received the first communication regarding the election process and timeline.

An online form for all nominations (NAO's and Nominating Committee) will be made available to further streamline the election process and reduce workload in the Secretariat; the target date to deploy such a form is 1 December 2016.

The eligibility for all Divisions, Standing Committees, Commissions and ICTNS has been completed and sent to all DP's, STCC's on 20 September 2016. Eligibilities of each body were sent to the NAOs on 19 October 2016.

10.1.2 Lynn Soby confirmed that names of Nominating Committee Chairs were due 31 October 2016 and all have been received and reviewed. Two Standing Committees, CCE and CHEMRAWN, have been asked to revise their membership. All others have been approved by the Secretary General.

10.1.3 Division Committee Electorate

Richard Hartshorn explained that he proceeded to review the feedback gathered soon after the last Bureau where the question of the electorate has been raised. He presented

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his recommendations to harmonize the electorate for the upcoming elections. The proposed electorate for Division Committee elections will include:

- Division Committee members (Officers, TMs, AMs, NRs)
- Sub-Committee Chairs and Secretaries
- Commissions Chairs, Secretaries, and TMs (I.1, II.1 and JCBN)
- Task Group Chairs of current projects
- Members of the current Nominating Committee and that for the previous biennium, and

with the additional comment that Task Group Chairs of projects that span more than one Division will get to vote in all of those Divisions (since they are presumed to have an interest in who should have such leadership roles and the knowledge to decide who those people may be).

There were no comments or questions.

Motion: The EC approved the recommendation of a single electorate for all Divisions and Standing Committees and the proposed composition.

Vote: All in favour.

The comment was made that this was an important clarification considering the ongoing quest for more transparency.

11. IYCN DEVELOPMENTS

Richard Hartshorn referred to his correspondence with Maarten van Sisseren who led the submission of a project proposal aimed at establishing/developing the International Young Chemists Network (IYCN). He recalled that the proposal had been shared for comments with the Bureau, but that it was somewhat ill-defined in that it essentially asked for funding to support bringing a leadership group together to decide what should be done then – it was essentially a project to design a project, and was not sufficiently delineated in terms of eventual outcomes to be funded.

The view of the Officers had been that the idea of a Young Chemists Network had considerable merit and that IUPAC should support the development of such an organization and try to find ways to incorporate it within IUPAC structures.

In the correspondence, steps were proposed and several have already been initiated. Currently IYCN is already involved in activities including the WCLM for São Paulo and the IUPAC100 program development.

Natalia Tarasova suggested that the IYCN be made aware of the forthcoming elections.

Action 4: Richard Hartshorn to inform IYCN of the forthcoming elections and related timelines.

A question was asked about whether their proposed status as Associated Organization (AO) status was obtained. As of today, it does not appear on the IUPAC website.

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Action 5: Lynn Soby will formalize the AO status of IYCN as it has been proposed and approved by the Officers.

Mark Cesa suggested that besides specific project proposals and/or involvement in current activities, IUPAC should consider developing a MOU with IYCN, similar to that being developed with other organizations.

Action 6: Richard Hartshorn to raise the possibility of developing a MoU with IYCN.

12. 2017 GENERAL ASSEMBLY & CONGRESS, SÃO PAULO, BRAZIL

Lynn Soby referred to the Agenda and Agenda Book for details.

12.1 REPORT FROM ORGANIZING COMMITTEE

Prof. Roberto Torresi has provided an update regarding fundraising, exhibitors, plenary lectures, financial status and other logistics. A summary report from his emails is included in the Agenda Book. The www.iupac2017.org site has been updated to include the International Advisory Board members. The Secretariat has received their Application for Endorsed Conferences for review. Abstract submission is open and a detailed review with their developers on registration was completed. The organizers provided IUPAC a "Call for Abstracts" poster which will be sent to the NAOs and Chemical Societies. A copy is included in the Agenda book. We also have the poster in Portuguese, if needed.

Lynn Soby indicated that she will be negotiating the daily room rate for the hotel (the current proposal is USD 240)

12.2 GA SCHEDULE

Lynn Soby confirmed that the schedule of the General Assembly is designed after the Busan GA schedule. The organizing committee and MCI will be working on room assignments and logistics. They are aware of the needs for space prior to the conference for Task Group meetings, the interdivisional meetings and Council needs.

Lynn Soby indicated that the Council room has been confirmed and will be held in the Hilton Hotel across from the conference center.

12.3 WCLM

The co-chairs of the 2017 WCLM, Christopher Ober and Hemda Garelick, have submitted a project proposal titled "IUPAC's role in developing interdisciplinary/ collaborative work in the Chemistry community and beyond". A copy of the project proposal is included in the Agenda Book.

The proposal is under review and Fabienne Meyers confirmed that it needs EC recommendation to be moved to the Project Committee.

Action 7: Richard Hartshorn will provide a recommendation for the proposal to be considered by the Project Committee.

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Fabienne Meyers commented that clarification on the status of the Strategic Opportunities Fund was needed. Recognizing that the project is not a regular project, and that the Bureau “invited” such application, and similarly to WCLM 2015, the PC could possibly recommend an allocation from the SOF.

{The WCLM 2015 received USD 15000 of support, including USD 3000 shared equally between the Committee on Chemistry Education, the Chemistry and the Environment Division, and the Committee on Chemistry and Industry, and USD 12000 from the Strategic Opportunities Fund.}

12.4 YOUNG OBSERVER PROGRAM

Lynn Soby referred to the addendum to the Agenda Book in which is included a summary of the YOs program as she presented to the Congress organizers. The summary outlines the planned WCLM and the involvement of the YOs in the regular Divisions and Standing Committees meetings.

Fabienne Meyers recalled that the programming involving the YOs in the WCLM was relatively new (the first time was at the General Assembly in Istanbul in 2013) and that the primary intent is to foster engagement in the Committees’ activities.

*{For reference is the recent announcement posted on RSC.org of their YO bursaries:
<http://www.rsc.org/news-events/articles/2016/oct/iupac-assembly-bursaries/>}*

12.5 WOMEN IN SCIENCE SYMPOSIUM

The Women in Science Symposium will be held during the congress as one of 3 special symposia. Work is ongoing regarding this important event.

Fabienne Meyers confirmed that good links with the Congress Organizers had been established and that she, together with Carolyn Ribes (COCI), was working with Vanderlan Bolzani. The Congress fully embraced the opportunity to feature the Symposium as a high profile activity of the Congress.

The call for nomination for the 2017 award was released online on 23 October 2016 (<https://iupac.org/2017-women-in-chemistry/>) and is to appear in print in the November CI issue. It has been shared with the Congress Organizers who are considering how to feature it on the Congress website. Fabienne Meyers suggested that the call be more broadly disseminated and be sent to the NAOs along with other calls, e.g. the IUPAC Solvay Award and/or the nomination for election.

Action 8: The Secretariat will provide the NAOs with an update on current calls for nominations and other upcoming deadlines.

12.6 INTERDIVISIONAL MEETING RESOLUTION FROM DIVISION V AND OTHER INTERDIVISIONAL ACTIVITIES

A resolution from the Analytical Chemistry Division (Div V) regarding holding an Interdivisional Discussion of Critical Evaluation of Chemistry Data was received for Bureau discussion. However, given the lack of time on the Agenda, Bureau did not discuss the resolution.

The resolution is included in the EC Agenda Book.

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Lynn Soby indicated that during discussions with Jan Labuda, she suggested that he involves CPCDS, given their activities in Big Data and their request to hold a special symposium about Big Data and data standards in São Paulo.

The symposium “Research Data, Big Data, and Chemistry” is to be organized by David Martinsen and Leah McEwen (both CPCDS), has been accepted by the Congress, and is listed as a special symposium.

Lynn Soby also confirmed that, given the importance of the topic and relevance to many, if not all, IUPAC Divisions, Jan Reedijk, as chair of the last Division Presidents meeting, has been asked to express an opinion about the Div V proposal. Division V (David Shaw) is drafting a discussion paper and possible meeting details to seek input from the Divisions and Standing Committees.

EC has no comment.

Action 9: Lynn Soby will pursue discussion and consult with both Division V and CPCDS.

13. BIDS RECEIVED FOR 2021 AND 2023 GENERAL ASSEMBLIES AND CONGRESSES

Lynn Soby confirmed that a letter had been sent to the NAOs on 7 September 2016 regarding 2021 and 2023 solicitation of bids. A copy is in the Agenda book. The deadline for submission is 15 February 2017 and bids will be reviewed at the April Bureau meeting.

Lynn Soby indicated that we have received letters of intention for the 2021 and 2023 WCC and GA from Canada (2021), China, Israel, The Netherlands. A request for information on requirements was received from Nigeria, but no formal letter has been received.

The EC recalled that in 2013, China also made a proposal for 2019 and that it was retracted recognizing that France will be a more suitable place for the Congress held during the centenary year.

{Quote from 2013 Bureau minutes: *China and France have submitted some materials in preparations for bidding on the General Assembly and Congress for 2019. Early in the discussion, Prof. Zhou made a motion that China would withdraw its bid for 2019 because of the significance of the centennial year for IUPAC and its history with France. China's proposal was to move their application for hosting the GA to 2021. The Bureau voted unanimously to accept the withdrawal from China and thanked Prof. Zhou and China for this kind gesture of collaboration and consideration.*}

14. STATUS REPORT ON IUPAC SECRETARIAT

14.1 WEBSITE, INFORMATION SYSTEMS, SOCIAL MEDIA

The current status and future plans of the new IUPAC website was discussed. A review of information systems with a focus on the future IUPAC database and current systems in place and use of digital platforms was presented.

14.2 FACILITIES

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Lynn Soby reported on the status of the Secretariat office. The office has completed its relocation last July. Meanwhile, the systems and processes keep being reviewed and improved taking advantages of various online services. For example, applying to become an affiliate member now can be done using an online application form with the option to pay online. Lynn Soby explained that an important migration of all data related to members, subscriptions, events, and projects, to a central database (zoho.com) is being now developed and which will also serve the back-end of the website.

The Vice President asked if a description of the IUPAC logo was available and if this can be added on the website for information.

Natalia Tarasova thanked Lynn for all the work that has been done to lift-up the Secretariat and manage all the changes both in the building and the supporting infrastructure, all of which allow the Secretariat to function efficiently.

14.3 POLICIES-PRIVACY AND DATA SECURITY (WEBSITE/MEMBER DATA/CPCDS)

Lynn Soby commented that IUPAC currently does not have a formal privacy policy in place for our members and volunteers. This question was raised at CPCDS and as policies differ around the world and data security issues are a constant concern, CPCDS recommended that IUPAC needs to put in place a Privacy Policy. This is particularly important with respect to what information is shared via our website about our members and programs.

The EC recognized the need to have a clear policy. A question was raised about how the new website can accommodate a default where by only members can have access to member's information. Currently members have the option of not having their details displayed and the defaults is to list name, email, telephone, and country.

Action 10: Lynn Soby to clarify the current privacy policy on the web.

15. PUBLICATIONS

15.1 STATUS REPORT *CHEMISTRY INTERNATIONAL*

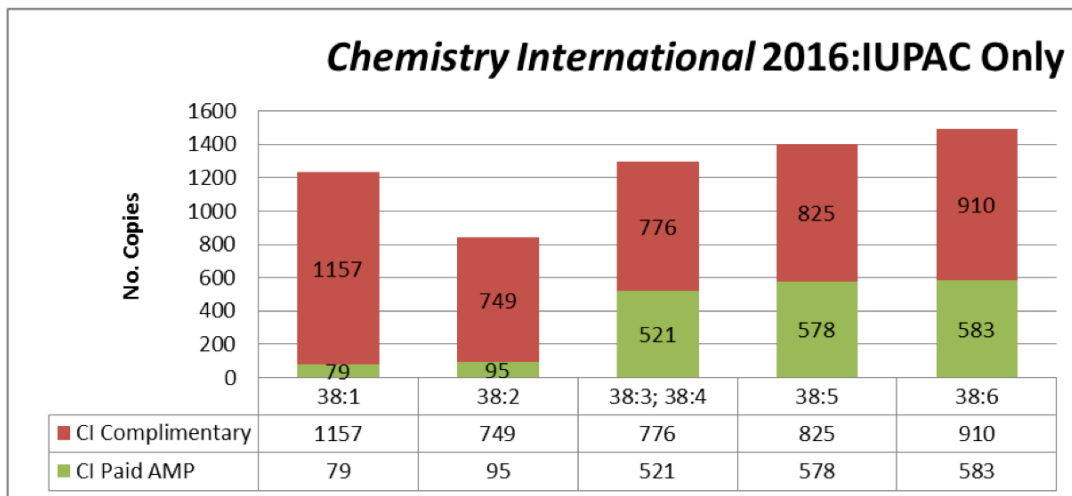
The following details on CI subscription were included in the Agenda. The letter sent with the renewal notice to 2017 CI Subscribers is in the Agenda book.
See Item 15.4.

The 2016 CI Print numbers and breakdown of Paid versus Complimentary for IUPAC Only (does not include ACS numbers of Paid) is below.

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	CI Paid AMP	CI Complimentary	Members Comp	CI Comp
38:1	79	1157		
38:2	95	749	467	282
38:3; 38:4	521	776	371	405
38:5	578	825	483	342
38:6	583	910	584	326
Total Copies	1856	4417		
20 USD/copy	\$37,120.00	\$88,340.00		

15.2 STATUS REPORT *PURE AND APPLIED CHEMISTRY*

In order to increase awareness and visibility of publishing in *PAC*, De Gruyter has recently prepared a marketing flyer to be sent to our endorsed conferences. The Secretariat provided the contact list and will continuously update the information for De Gruyter (and Hugh Burrows). A copy of the brochure is in the Agenda book.

See Item 15.5.

15.3 VIRTUAL PUBLISHING AND DATABASES

15.3.1. IUPAC Standards On Line with De Gruyter

Colin Humphris informed the EC that a recent call with Karin Sora had been held to review the standing of the activities. He stated that De Gruyter had only sold 3 copies (i.e. access) and that IUPAC will consider how to help with the promotion.

15.3.2 Solubility Data Series with SpringerNature

Lynn Soby described that discussions were ongoing with SpringerNature as they are interested in obtaining the content of the Solubility Data Series and incorporating it into SpringerMaterials database.

In August 2016, she attended a meeting to review SpringerNatures' capabilities and proposals for the IUPAC SDS with their Director Product Management, Dr. Michael Klinge, Dr. Robin Padilla, Scientific Editor and Sharon George, Content Acquisition. This meeting was important

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for the discussion of possible business options as well as to build a relationship and determine their capabilities and interest. A broader discussion of both organizations was helpful to establish deeper understanding of possible interests beyond the SDS dataset. After consultation with Colin Humphris and Bonnie Lawlor, the decision was to move forward with their proposal. Currently, we are awaiting to receive a formal contract which would provide IUPAC a license fee each year (20,000 €) for the time of use of the SDS (Vol.1-104) and future editions will be compensated at 13,000€ in addition to the license fee. It will take Springer an estimated 5 years to build the database and incorporate it into SpringerMaterials.

15.4 CI EDITORIAL BOARD

Colin Humphris reviewed the activities of the CI Editorial Board. CI EB would still like volunteers from Asia. The EB is getting on with ensuring the article pipeline for CI is full with articles from within the IUPAC community and on chemistry related items from other stakeholders. The EB is seeking to maximize the coverage of major activities by coordinating features in CI, events and papers for PAC such as for Big Data through 2017.

A copy of the CI Editorial Board minutes of 3 October 2016 is included in the Agenda Book.

The CI EB is preparing for a transition to 4 paper editions a year in 2017 that will also be available electronically via De Gruyter. Equally importantly, the Board is also developing a proposal for a digital-first version for the IUPAC website for more immediate news and review articles to be launched in Q1 2017. A key development will be the authentication of those in our community entitled to view the electronic version or those paying for the paper version. Colin Humphris confirmed that the plans for CI had been shared with De Gruyter and that they have no problem with IUPAC developing a digital-first version.

Colin Humphris suggested to work with the Membership Relations Committee to propose new subscriptions for Affiliate members to cover the cost of paper versions going forward if this remains their preference. The eventual default position will be digital to save cost. De Gruyter recommended that a print subscription for CI to be around USD 65. It was pointed out that the number of complimentary copies still is higher than the number of paid subscriptions.

15.5 PAC EDITORIAL ADVISORY BOARD

Richard Hartshorn informed the Executive Committee that the PAC EAB held a conference call on 24 October 2016 and that the primary concern was to ensure that content was continuously available. It was noted that maintaining a sufficient flow of conference papers was important to delivery of the required number of issues.

The membership of the PAC EAB for 2016-2017 has been updated and a current roster is in the Agenda Book.

16. THE MOLE PROJECT

The technical report (TR outcome of project 2013-048-1-100) prepared by the task group led by Jurgen Stohner had been sent to the Bureau and to NAOs for input in August 2016.

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Natalia Tarasova referred to the Agenda Book containing the TR, a follow-up memo from Jurgen Stohner, and a more recent letter from Roberto Marquardt.

The proposed definition of the unit mole is:

“ The chemical amount, n , is a measure of the number of specified elementary entities. An elementary entity may be an atom, a molecule, an ion, an electron, any other particle or specified group of particles. The mole, symbol mol, is the SI unit of chemical amount. One mole contains exactly $6.022\,140\,857 \times 10^{23}$ elementary entities. This number of elementary entities is called the Avogadro number. “

{The number $6.022\,140\,857 \times 10^{23}$ is used in the TR and in Jurgen Stohner memo of 7 Sep 2016, while Roberto Marquardt in his letter of 20 Oct 2016 used a slightly different value $6.022\,141\,29 \times 10^{23}$. In the Sep memo, it is noted that “in the definitive version of the new definition of the mole, the number of elementary entities contained in one mole will be that number that will be adopted by the date of July 1, 2017, as explained at the 22nd CCU meeting.}

In his letter, Roberto Marquardt indicated that the new definition of the mole was highly recommended and well received by CCU. The issue however not only relates to the definition of the unit mole but also to the redefinition of the name for “amount of substance” which in the proposed definition, is referred to as “chemical amount”.

IUPAC is asked by the Chair of CCU, Prof. Joachim Ullrich, to send an official request to the Consultative Committee for Amount of Substance (CCQM) to discuss and eventually adopt the proposed new definition of the quantity “amount of substance” and its SI unit, the mole.

The Executive Committee concurred that the redefinition of the mole will be a significant and valuable clarification for the community and especially for educators. There was no view expressed about the term “chemical amount” itself, and the EC endorsed the recommendation of the task group position.

Motion: The EC endorsed the proposed new definition of the unit mole ~~and the proposed redefinition of the name for “amount of substance”~~. *{strike added following Roberto Marquardt’s request sent to the President on Nov 12; see below}*

Vote: All in favour.

[follow-up/update discussion on Nov 12]

In a letter sent to the President overnight (between Nov 11 and Nov 12), Roberto Marquardt informed the EC that Commission I.1 has reconsidered the text for a new wording of the definition of the mole and, as the result of the discussion, the following suggestion is made:

1. To disentangle the definition of a new name for the physical quantity, *i.e.* the term “chemical amount”, from the wording of the new definition of the unit mole.
2. To propose only a new definition of the mole, *i.e.* in the text to write:
“The ~~chemical amount~~ amount of substance, n , is a measure of the number of specified elementary entities. An elementary entity may be an atom, a molecule, an ion, an electron, any other particle or specified group of particles. The mole, symbol mol, is the SI unit of ~~chemical amount~~ amount of substance. One mole contains

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exactly 6.022×10^{23} elementary entities. This number of elementary entities is called the Avogadro number."

Roberto Marquardt stressed that the term "chemical amount" has been controversially discussed within the Commission for decades. The Commission is of the opinion that a more thorough discussion is needed to propose a new name and more time should be given to that discussion. He also recalled that criticism was raised against the name "chemical amount" also during the off-year meeting of Division I in Lansing, MI, earlier this year and also at the CCU meeting that he attended. Disentangling the two items will be helpful in making the IUPAC proposal acceptable to CCQM, CCU and CIPM.

Action 11: Lynn Soby will confirm with Roberto Marquardt the exact wording to include in the letter to CCU.

17. THE NAMING OF NEW ELEMENTS – TASK GROUP REPORT

Natalia Tarasova reviewed briefly the process and the status of the provisional recommendations confirming the names and symbols for elements 113, 115, 117 and 118. Following the end of the public review which was on 8 Nov 2016, Jan Reedijk promptly revised the text of the recommendations, while the proposed names and symbols remain unchanged. The recommendations have been approved by Division II.

Motion: EC approved that the recommendations be put to vote by the Bureau as authorized by Council at its meeting of 13 August 2015.

Vote: All in favour.

Action 12: Lynn Soby will circulate the recommendations to the Bureau for approval.

Next, Natalia Tarasova presented the proposed Terms of Reference that have been outlined jointly with Jan Reedijk and IUPAP for the implementation of a Joint Working Party (JWP). She asked the EC to review the following text and provide feedback.

Two steps were proposed going forward: first is to have a JWP tasked with reviewing the criteria that must be satisfied for the discovery of a new chemical to be recognized; and second, the application of these criteria in practice and have a JWP tasked to review new claims.

The idea is that the first JWP can also include expert members of the laboratories whose recent claims were validated, while the second JWP should not include members of the laboratories filing claims.

{strikes added following the later discussion}

Terms of Reference for a IUPAC/IUPAP Joint Working Party to Examine the Criteria used to Assign
~~Priorities for the Discovery of New Elements~~ Verify Claims for the Discovery of a New Element

Rationale: Some twenty-five years have now elapsed since the criteria that are currently used to verify claims for the discovery of a new element were set down. The recent completion of the naming of the one-hundred and eighteen elements in the first seven periods of the Periodic Table of the elements provides a natural opportunity for a necessary expert review of these criteria in the light of the

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experimental and theoretical advances in the field. It is proposed to set up a IUPAC/IUPAP Joint Working Party (JWP) to examine these criteria under the terms of reference set out below.

Composition and Establishment of the JWP

The JWP will be established following the guidelines below:

1. The Presidents of IUPAC and IUPAP will appoint by mutual agreement a Joint IUPAC/IUPAP Working Party of six members with relevant expertise in the Discovery of New Elements, three to be nominated by the President of IUPAC, with advice from the Division of Inorganic Chemistry; three to be nominated by the President of IUPAP, with advice from the Commission for Nuclear Physics.
2. Appointments are made respecting the importance of continuity and new experience in the process of discovering new elements.
3. The Joint Working Party will elect a Chair and a Vice Chair, subject to the approval of the Presidents of IUPAC and IUPAP.

N.B.: Clearly the restriction excluding the appointment of members from claimant laboratories will not apply as there are no claims currently awaiting verification.

Terms of Reference

The JWP will review and, if necessary, make recommendations for the revision of the criteria originally set down for determining the discovery of a new element and given by the Transfermium Working Group in 1991 [Wapstra *et al* "Discovery of the Transfermium Elements" (*Pure and Appl. Chem.*, Vol.63, No. 6, pp. 879-886 (1991)).

The JWP will report using the procedures laid down below

1. The Joint Working Party shall report within of 12 months on the progress of its work to the Presidents of IUPAC and IUPAP.
2. The Joint Working Party shall also report to the Presidents of IUPAC and IUPAP when there are new developments which it feels should be reported, or when a report is requested by the President of one of the Unions.
3. A copy of the draft report as sent for technical review will be provided to Presidents of IUPAC and IUPAP.
4. A copy of the report of the Joint Working Group as submitted for publication as a Provisional Recommendation in *Pure and Applied Chemistry* will be provided to the Presidents of IUPAC and IUPAP.

~~Should the JWP recommend any changes to these criteria it will examine and include in its Provisional Recommendation its assessment of the effects, if any, that such changes may have on the priorities assigned to any of the recently discovered elements.~~

The JWP report will be approved following the procedure laid down below:

1. The ~~Provisional Recommendation~~ Report, as it is to be published shall be approved by the Presidents of IUPAC and IUPAP, on the advice of the Division of Inorganic Chemistry and the Commission for Nuclear Physics, respectively, and published.
2. The provisional report is open for comment for five months. Comments will be forwarded to the Presidents of IUPAC and IUPAP, who will, with advice from the Division of Inorganic Chemistry and the Commission for Nuclear Physics, respectively, decide whether to make the report final, or on what other action should be taken.

This JWP is set up for the specific task of reviewing and, if necessary, updating these criteria. If and when new claims for the discovery of new elements appear in the literature, a new JWP will be appointed; this later JWP may also examine any assignments made for earlier elements that may have been challenged.

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Full text of Wapstra 1991 “*Discovery of the transfermium elements. Part I: Criteria that must be satisfied for the discovery of a new chemical element to be recognized*” is available as <http://dx.doi.org/10.1351/pac199163060879>

[resumed review on the following day]

Richard Hartshorn pointed to inconsistencies and/or redundancies:

1. The title and the 1st sentence in the rationale differ and refer two different set of criteria – as the criterion for assigning priority is simple (who did it first), as opposed to the criteria for determining whether a new element has actually been discovered.
2. Referring to the last sentence in the rationale, he suggested that a sentence be added here that explicitly says that this JWP is not for examining any claims, but merely to set the criteria.
3. Referring to the sentence starting with “Should the JWP recommend any changes...”, and recognizing that there might be members of the JWP who are from any of the labs who were involved in any of the past claims, this task should be the first assigned to the second JWP.
4. Referring to the last sentence, it validates the comments made directly above (point 3) and confirm that the task of reexamining the assignment made for earlier claim is a task of a second JWP.

Mark Cesa concurred with the comments made and suggested that the title be revised and the sentence relevant to RH comment 3 be removed.

It was also pointed out that, like the Wapstra 1991 document, the report of the JWP will likely be a Technical Report and not a Recommendation in the ICTNS sense (IUPAC Recommendations are on terminology, nomenclature and symbols). This should be checked with ICTNS chair.

Action 13: Natalia Tarasova will consult again with IUPAP and share the amended version of the ToR.

Natalia Tarasova confirmed that it has been agreed with IUPAP that approval of this document should be obtained before the actual release on the name of the new elements. She recalled that the release of June 8 alluded to the establishment of such a new JWP and an update and clarification should therefore be provided in the release that is in preparation.

Natalia Tarasova will keep the EC informed on the status and final resolution.

18. IUPAC COMMITTEE FOR ICSU

18.1 2016 ICSU GRANT PROGRAMME APPLICATION

Mark Cesa recalled that IUPAC has contributed to the preparation of a proposal that has been submitted to ICSU on October 1st. He invited Mei-Hung Chiu to review that application.

IUPAC has applied to ICSU for a grant in the 2016 ICSU Grants Programme, with the IMU as co-lead applicants and with IUPAP, IAU, IUBS, ICIAM, UNESCO, and GenderInSite as supporting applicants. The proposal is titled, “A Global Approach to the Gender Gap in Mathematical and Natural Sciences: How to measure it, how to reduce it?” A copy of the application is included in the Agenda Book.

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IUPAC would take the lead in managing and coordinating a global survey comparing experiences of men and women scientists globally, and will help identify sources of publication metadata in chemistry for analysis of a joint data-based study on publication patterns.

Review of the proposals by ICSU will take place in November, and announcement of the accepted grant proposals is scheduled for January 2017. IUPAC has pledged up to 10,000 Euros per year for the three-year period of the grant, if the grant is accepted. The IUPAC funding will be applied for as a project proposal.

Mei-Hung Chiu indicated that CCE was prepared to commit 4k if the ICSU grant was awarded.

18.2 UPDATE ON ICSU-ISSC MERGER

Mark Cesa explained that ICSU held an Extraordinary General Assembly on 24 October 2016 in Oslo, Norway, at which a vote was requested by the ICSU leadership to agree in principle to a merger with the International Social Sciences Council, ISSC. The draft of the planning framework for the proposed merger is in the Agenda Book.

Mark Cesa explained briefly that several scenarios were looked at while ultimately the goal of the merger is for both organizations to have a more effective voice in working with policy makers. The outcome of the vote was to pursue the principle of a merger, with the goal of voting on the actual merger by October 2017. The membership of the transition team is still not known, and Mark Cesa suggested that IUPAC should offer to be involved.

Action 14: Mark Cesa will prepare a letter to offer IUPAC support and involvement in the transition team that is to look at scenarios of the ICSU-ISSC merger.

19. MEMBERSHIP RELATIONS COMMITTEE

Mark Cesa informed the EC that he was working with the consultant who helped construct the new IUPAC Strategic Plan to develop a set of value propositions for the major IUPAC stakeholder groups and a strategy for branding the Union's activities. A survey is being developed to gather data to determine stakeholder viewpoints on the current and future of IUPAC to provide the basis for the value propositions.

A copy of the project proposal, which describes the work plan, is included in the Agenda Book.

20. REVIEW OF COMPANY ASSOCIATES PROGRAM

Colin Humphris explained that the Committee on Chemistry and Industry (COCI) has been reviewing the CA program for several years and has now developed a specific plan to revise this activity. The outline of the proposed CA program is included in the Agenda Book.

The objectives are to increase the engagement and contribution of industry to IUPAC. The proposal defines individual industrial members and three categories of Company Associate membership and their contributions and benefits. The intention will be to seek Council approval for the CA program for formal launch in 2018.

Colin Humphris invited EC members to review the plan in details and provide feedback.

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The renewed program should provide greater engagement with industry. It should also provide a sustainable income (in contrast to the current scheme). Colin Humphris expressed the view that to be significant the income should be on the order of USD 50k per year.

It was noted that such an increase in engagement could have implications for governance. If indeed the industry was to be more engaged, should it be only NAOs that have can vote in IUPAC or nominate people for election?

In principle, the EC supports the new proposed CA schema. Recognizing that questions will arise, Colin Humphris invited the EC to continue this discussion by email.

21. IUPAC/SOLVAY AWARD

Lynn Soby confirmed that the announcement for the 2017 IUPAC-Solvay International Award for Young Chemists has been posted on the IUPAC Web site (<https://iupac.org/2017-iupac-solvay-international-award-for-young-chemists>). An online application form has also been developed for submissions and management of the process. Winners of the 2016 Award have also been posted (<https://iupac.org/the-winners-of-the-2016-iupac-solvay-international-award-for-young-chemists/>).

Recognizing that there were relatively few applications last year, the Secretariat will advertise the prize and remind the NAOs of the coming Feb 1st deadline for application.

Action 15: Fabienne Meyers to develop a frontpage slide for the website to feature IUPAC-Solvay award and the call for applications.

22. PROJECTS IN REVIEW

22.1 PROJECTS IN REVIEW

The most recent report (04 October 2016) of project proposals in review is in the Agenda Book.

22.2 PROJECT AND FINANCIAL REPORT

The most recent project (30 September 2016) and financial report is in the Agenda Book. The format of that report has been revised last year. The report only includes projects that have a none-zero budget.

22.3 EVALUATION COMMITTEE UPDATE

Christopher Brett (chair of the Evaluation Committee) described the work that will be undertaken by the evaluation committee this biennium, of which he is the current chair. The project profile of each division, CCE, COCI and CPCDS will be examined with particular reference to recent past and current projects and other activities, to suggesting best practices and to suggest what to do if unforeseen situations arise in project execution. An activity snapshot will be taken on 31st December 2016.

It is also intended to identify the most successful recent IUPAC projects that IUPAC can and should publicize widely in the media and advertise to NAOs.

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For this purpose, the responsibility of obtaining such information has been distributed between the 5 members of the Evaluation Committee. The information will then be collated and analyzed for presentation in the Sao Paulo GA.

23. THE PHOSAGRO PROJECT

Natalia Tarasova reviewed briefly the recent progress of the PhosAgro/UNESCO/IUPAC Programme on Green Chemistry for Life. The programme, which is a very tangible outcome of the 2011 International Year of Chemistry, has now completed three years of its planned five-year duration. Six awards of approximately €30,000 have been made in each of the years 2014, 2015 and 2016 with the eighteen prizewinners coming from sixteen different countries spread right around the world. The International Jury meets in May of each year in UNESCO Headquarters in Paris and has had the difficult task of choosing the award winners from among the more than three hundred applications received to date. The successful young researchers have made presentations at a special meeting at the headquarters of PhosAgro in Moscow, at the IUPAC General Assembly at Busan, at a meeting of the Scientific Advisory Board of the UN Secretary General in St. Petersburg and, most recently at the 6th IUPAC Conference on Green Chemistry in Venice in September 2016. An additional special Prize for a project associated with phosphogypsum has now been added by the sponsor and the call for this, as well as for the six regular prizes for 2017, is now open with a closing date of 28 February 2017.

This has been an outstandingly successful program attracting as it has young researchers from the best-known Institutions in the world of green chemistry as also very importantly from many of the countries in the developing world. It is to be hoped that its success can be maintained and grown even further after this initial five-year program.

Colin Humphris asked if PhosAgro will have a problem if IUPAC was to approach other companies to do a similar program. Natalia Tarasova did not think so; however, one must also recognize the partnership with UNESCO which coordinates the program in practical terms.

24. INCHI TRUST

Richard Hartshorn referred to his report from the meeting of the InChI Trust that is provided for information.

The more recent work on mixtures, reactions, and QR codes is likely to expose InChI to new applications beyond the publishing and traditional data management. The Trust is planning an InChI Conference not only to review progress on all the current projects but also to explore new ideas. The meeting will be held 16-18 Sep 2017 in Washington DC

<https://iupac.org/event/chemical-identifier/>

25. NPU

Colin Humphris briefly informed the EC that he continues to monitor developments and the international adoption of NPU; now in Denmark, Sweden and Norway. IUPAC has renewed the agreement for the operation of the steering committee that involves IUPAC, IFCC and the participating nations.

{the relevant IUPAC project is <https://iupac.org/project/2014-017-1-700> }

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26. 2019 GENERAL ASSEMBLY & CONGRESS, PARIS, FRANCE

Lynn Soby referred to the Agenda Book which includes their updated presentation. She reported that the organizing committee has been very active and has recently submitted its Scientific Program proposal to IUPAC Division Presidents and Standing Committee Chairs, with comments due by 31 December 2016.

Lynn Soby also informed the EC that alternative locations were being explored, especially for the Council meeting, recognizing that the auditorium at the Convention Center might not be optimum. The importance of having a single point of contact (Lynn Soby) with Congress organizers was also noted.

Action 16: Lynn Soby to resolve and confirm the locations with the 2019 Paris Congress organizers.

27. IUPAC 100 - CENTENARY PLANNING STEERING GROUP

Natalia Tarasova referred to the interim report of the Centenary Planning Steering Group included in the Agenda Book and invited Mary Garson to present remotely. A connection via GoToMeeting was established.

Mary Garson reported that the group has had a couple of calls but has not yet reached a steady momentum of activities. An unknown parameter and issue of concern is related to fundraising and the consensus among the Steering Group is that there is a need for a separate subcommittee to focus on fundraising initiatives. Mary Garson indicated that she has had a call with Lynn Soby about this issue and they would like the Treasurer to join the group, which already includes Mark Cesa and Bonnie Lawlor.

Colin Humphris stated that he was willing to join the IUPAC100 Fundraising Subcommittee.

Colin Humphris indicated that he is willing to approach ICCA and various chemical industry related organizations but in all cases, we must formulate an approach by which they can easily identify an activity or reason to commit support. He recalled that during IYC, the specific Water activity was effective. He stressed that IUPAC100 needs to outline specific proposals for specific sponsors.

Mary Garson indicated that she will work with Lynn Soby to make an initial review of CAs that may be interested in approaching various sectors. Colin Humphris proposed to discuss with Bernard West how best to approach the industries.

Mary Garson recalled that a project proposal was currently under review. In addition, it was suggested that specific terms of reference might help clarify the duties and responsibility of the IUPAC100 management group. Mary Garson also indicated that the group should be meeting at the occasion of the GA in Brazil, and that a specific time not clashing with other meetings has to be identified.

The comment was made that as the planning is progressing, a more predominant spot on the website should feature the centenary activities.

28. INTERNATIONAL YEAR OF THE PERIODIC TABLE OF THE ELEMENTS

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[the item was discussed before item 27 and intertwined with 29]

Chris Brett reviewed the recent developments made towards a possible International Year of the Periodic Table of the Elements. 2019 will celebrate the 150-year anniversary of D. Mendeleev's publication of the Periodic Table. Initial contacts with EuCheMS, RSC (UK) and IUPAP suggest that there is a tangible interest in putting forth a request to the UN/UNESCO to recognize 2019 as the International Year of the Periodic Table. The idea to request that 2019 be designated as the "International Year of the Periodic Table" has been welcomed by the IUPAC100 Steering Group.

Chris Brett reported that he had an initial call with Peter Mahaffy to review how the process has been accomplished in advance of IYC2011. In the case of IYPT the Russian delegation via the foreign minister could lead the submission to UNESCO. Chris Brett recognized that a lot of preparative work had been done earlier (as much as 3 to 4 years in advance of IYC) by Julia Hasler and within UNESCO. Chris Brett foresees that beside the iconic periodic table, a case can be made that the sustainability of key elements is a challenge and that scarcity of specific elements is to be addressed.

Colin Humphris questioned the need to add such IYPT when 2019 is already IUPAC100. His concern is that IUPAC will lose full control of the planning by 'diluting' the focus. He asked what will IYPT add to the IUPAC100 celebration opportunity.

Natalia Tarasova invited all EC members to continue sharing views and comments and suggested that we await for the feedback that is now expected from the preliminary discussions she has had with the UNESCO contact (the same person working on the PhosAgro program).

29. INTERNATIONAL YEAR OF POLYMERS

Natalia Tarasova referred to the report included in the Agenda Book which is a summary provided by Alexei Khokhlov to Greg Russell. She informed the EC that these plans towards a possible 2020 International Year of Polymers were being developed separately and that it was not clear how this would conflict with plans for the IYPT. Some might consider that both years are in conflict.

Richard Hartshorn reported that Wolfram Koch has indicated that he will favour an IYP but not an IYPT. Yet, it is unclear if Koch's view is personal or that of the GDCh.

Action 17: Richard Hartshorn will ask Wolfram Koch about the GDCh position viz a proposal for an International Year of Polymers for 2020.

Natalia Tarasova suggested that IUPAC keeps a close oversight on developments. She perceived that instead, the case for IYP could be better put forth to UNESCO with the support of the German delegates.

30. OPCW

30.1 MOU UPDATE

Mark Cesa confirmed that IUPAC and the Organization for the Prohibition of Chemical Weapons (OPCW) are developing a Memorandum of Understanding to outline a framework for

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cooperation between the organizations with a view towards achieving their common objectives and providing benefits to their respective areas of work. A draft should be available soon and be ready for signature early December. The main contact at OPCW is Jonathan Forman.

30.2 2017 WORKSHOP ON REMOTE SENSING

Mark Cesa informed the EC that IUPAC was currently working with OPCW to organize a workshop on remote sensing, to be scheduled for July 2017 {*Dr. Cesa to confirm month/date*}. This workshop is the latest in a series of workshops to identify recent developments in science and technology related to the Chemical Weapons Convention. The results of this workshop will be part of a report that the OPCW Technical Secretariat and the OPCW Scientific Advisory Board will make in advance of the 2018 Review Conference for the CWC.

Bernard West and Laura McConnell are part of a planning committee that will work on organizing the scientific outline of the workshop. Attendance at the workshop will be by invitation only. The location is still to be confirmed. Mark Cesa indicated that two options were being considered: Brazil and Canada.

After discussion, the EC took the view that there is not likely to be significant benefit in having such a workshop held at the GA/Congress.

30.3 ADVISORY BOARD ON EDUCATION AND OUTREACH

Mark Cesa reported that in 2016 OPCW established an Advisory Board on Education and Outreach, in which IUPAC has permanent observer status. Mark Cesa attended the first two meetings.

Natalia Tarasova will attend the next Session of the Conference of the States Parties, and she will continue to explore what is best to build a strong collaboration.

31. EUChEMS SEVILLE DECLARATION ON THE USE OF CHLORINE IN WARFARE

Mark Cesa reported that in reaction to recent news of possible chemical attacks in Syria and elsewhere, a declaration condemning the use of chlorine and other chemicals as weapons (<http://www.euchems.eu/seville-declaration-use-chlorine-warfare/>) was signed at the EuCheMS Congress in Seville, Spain in September 2016. The leaders of nearly every chemistry organization belonging to EuCheMS signed the declaration. Other regional chemistry organizations are considering similar declarations or communications on the issue to OPCW.

Mark Cesa suggested the EC consider endorsing this declaration and writing to OPCW.

Motion: The EC endorses the Seville Declaration condemning the use of chlorine in warfare.
Vote: All in favour.

Action 18: Mark Cesa will prepare a letter and Lynn Soby will proceed to sign online the Seville Declaration.

32. CONFERENCE ENDORSEMENT/SUPPORTED PROGRAM

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32.1 RATIFICATION OF ENDORSEMENT AND FINANCIALLY SUPPORTED CONFERENCES

The EC was asked to ratify the endorsed and supported conferences approved after the Council meeting in Busan 10 August 2015 to 18 October 2016. An updated list is provided in the Agenda book listing 26 Endorsed Conferences and 2 Financially Supported Conferences.

There was no question, no comments.

Motion: The EC ratified the conference endorsement approved since the last meeting and as listed in the Agenda Book. The motion was approved unanimously. This approval encompassed 26 conferences.

Vote: All in favour.

33. NEXT BUREAU MEETING

The next Bureau meeting is scheduled for 8 April 2017 and will be held remotely via GoTo Meeting from the Secretariat's Office.

Lynn Soby confirmed that the officers will attend in person from the Secretariat. Time should be scheduled to review the items that require action and/or clarification in advance and for the preparation for the Council.

34. DATES AND PLACE OF NEXT EXECUTIVE COMMITTEE MEETING

Natalia Tarasova confirmed that the EC will meet next in São Paulo. Also, later in the year, there will be a transition meeting including incoming and outgoing members. She had initially thought that such a meeting could be organized at the time of the 7th ICGC in early October in Moscow, but that date is not suitable for the Secretary General.

Colin Humphris offered to inquire to the RSC if a meeting can be held in November in Cambridge. Richard Hartshorn will confirm what dates will be suitable for him and a poll will follow.

35. ANY OTHER BUSINESS

Natalia Tarasova invited the EC to review Item 16 again and showed an update that she received overnight from Roberto Marquardt. See amendments report in item 16.

The President thanked everyone for their participation and thanked our host for the practical arrangements.

The Past President thanked the President for her effective management of an agenda which was full and complex.

[end]

Candidate for Vice President

Prof. Christopher M.A. Brett
(Portugal)



Christopher Brett is a professor of chemistry in the Faculty of Sciences and Technology, University of Coimbra, Portugal, where he has been since 1981, lecturing mainly electrochemistry, physical chemistry, materials chemistry and analytical chemistry.

He has been an elected member of the IUPAC Bureau since 2012 and is an elected member of the Executive Committee 2016-17. He is currently chair of the Evaluation Committee and is a member of the Membership Relations Committee, National Subscriptions Task Force and the Centenary Planning Steering Group. He is also a Titular Member of the new Interdivisional Committee on Green Chemistry for Sustainable Development which is being constituted. He has gained extensive experience in IUPAC matters since 1994. He was President of the Physical and Biophysical Division (Division I) of IUPAC from 2006-7, having been a Titular Member of the Division Committee since 2000 and Vice-President 2004-5. Before this, he was a member of the Electrochemistry Commission (Commission I.3) from 1994, having been Secretary in 1998-9 and Chairman from 2000-1. He is currently a member of the Green Chemistry Subcommittee (since 2005) and of the Division I Advisory Subcommittee, and was also a member of the Chemistry Education Committee in 2002-5. He has been or is involved in 8 IUPAC projects and was a member of the ad hoc Committee on the Revision of the Statutes and Bylaws of IUPAC in 2007-8.

He was President of the International Society of Electrochemistry (ISE) - an associated organization of IUPAC - from 2007-8 and was a member of the ISE Executive Committee from 2003-10; he was also coordinator of the 2011 International Year of Chemistry activities of ISE. He was President of the Analytical Chemistry Division of the Portuguese Chemical Society (Sociedade Portuguesa de Química) in 1996-9 and 2003-5.

Research interests include new nanostructured electrode materials and modified electrode surfaces, electroactive and redox polymers, corrosion and its inhibition, electrochemical sensors and biosensors, with applications in the environmental, food and pharmaceutical areas, which have been the subject of over 280 publications and have been presented in numerous conferences. He is also Director of the Electroanalysis and Corrosion Laboratory, Instituto Pedro Nunes, Coimbra, the technological innovation link between the University of Coimbra and the industrial sector, with an award-winning science-based incubator of new enterprises.

CURRICULUM VITAE – MARCH 2017



Christopher Michael Ashton Brett

Full Professor, Faculty of Sciences and Technology,

University of Coimbra, Portugal

Departamento de Química, Faculdade de Ciências e Tecnologia,

Universidade de Coimbra, 3004-535 Coimbra, Portugal

e-mail: cbrett@ci.uc.pt

Web: www.uc.pt/pessoal/chrisbrett

Born: 1954, Letchworth, Herts, UK

Nationality: British and Portuguese (since 1983)

Academic qualifications:

BA (Hons.)	Chemistry	University of Oxford	1977
DPhil	Electrochemistry	University of Oxford	1981
DSc “Agregação”	Chemistry	University of Coimbra	2002

1981 until present Faculty of Sciences and Technology, University of Coimbra, Portugal

1980-1 Oil Trading and Supply Dept., British Petroleum (BP), London

1993-6 Honorary lecturer, University of Manchester Institute of Science and Technology.

Fellow of the Royal Society of Chemistry (UK) and Chartered Chemist (CChem, FRSC).

Director of the Laboratory of Electroanalysis and Corrosion, Instituto Pedro Nunes (IPN), Coimbra, Portugal (www.ipn.pt). IPN is a technological innovation institute and award-winning incubator of new enterprises, linking the University of Coimbra with the industrial sector.

International Union of Pure and Applied Chemistry (IUPAC)

Elected Member of the Bureau, 2012-15, 2016-19

Elected Member of Executive Committee, 2016-17

Chair, Evaluation Committee, 2016-17

Member, Membership Relations Committee, 2012-17

Member, National Subscriptions Task Force, 2016-

Member, IUPAC Centenary Planning Steering Group, 2015 –

Member, Web Vision Task Force, 2014-15

Member, Committee on Chemistry Research Funding, 2012-15

Member, Interdivisional Committee on Green Chemistry for Sustainable Development (under constitution)

Physical and Biophysical Chemistry Division (Division I): President, 2006-7; Past President 2008-9, Vice-President, 2004-5, Titular Member, 2000-2003

Division I Advisory Subcommittee: 2010-15

Green Chemistry Subcommittee: Associate Member 2002-17

Committee on Chemical Education: Associate Member 2002-5

Electrochemistry Commission (Commission I.3): Chairman 2000-2001, Secretary 1998-9, Titular Member 1996-1997, Associate Member 1994-5.

Member, ad hoc Committee on the revision of the IUPAC Statutes and Bylaws, 2007-8.

Selected IUPAC project activity:

- Project No. 2016-024-2-020: “Planning and coordination of global activities for the celebration of IUPAC100 in 2019”

- Project No. 2010-052-1-500: Electroanalytical Chemistry - Revision of the Orange Book Chapter 7

- Project No. 2007-032-1-100: Green Book - Abridged Version

- Project No. 1999-005-1-100 - chairman: Electrochemistry and Interfacial Chemistry in Environmental Clean-up and Green Chemical Processes. The project included organization of an international symposium with ICSU support and publication of a special issue of Pure and Applied Chemistry.

International Society of Electrochemistry (ISE) – associated organization of IUPAC
(www.ise-online.org)

President 2007-8 (Past President 2009-10, President-Elect 2005-6; Vice-President 2003-4). Chair of Publications Committee 2016-20.

Sociedade Portuguesa de Química (SPQ) (Portuguese Chemical Society)

President of the Analytical Division, 2003-5 and 1996-9.

Chair of the organising committee of the international 7th European Conference on Electroanalysis (ESEAC'98) Coimbra, May 1998, and of "Electrochemistry and Interfacial Chemistry for Environmental Clean-Up and Green Chemical Processes (IUPAC/ICSU)", Coimbra, April 2001; co-chair of the 59th Annual Meeting of the International Society of Electrochemistry, Seville, Spain, September 2008. Member of organising committee or scientific committee of many international conferences.

Current research interests, through national and international projects, and in international collaborations in Europe and the rest of the world are on:

- Development and characterisation of new electrode materials and composite electrode materials, particularly based on carbon, surface-modified electrodes, nanostructured materials with layer-by-layer and nanoparticle modification, and electroactive and conjugated polymers. Electrocatalytic effects.
- Development of electrochemical enzyme biosensors and immunosensors: new architectures using layer-by-layer structures and functionalised carbon nanotubes, sol-gel enzyme immobilisation, core shell structures, nanotechnological aspects. Application to foods and beverages for food safety and quality monitoring.
- Sensors for electroanalysis and speciation in waters and effluents, particularly of trace biotoxic chemically labile species, using flow and injection systems. Environmental toxicity sensors based on enzyme inhibition. Electroanalysis of pharmaceutical compounds.
- Corrosion and its inhibition: aluminium, steels, coated steels, copper and titanium alloys, dental amalgams in biological fluids. Protection of reinforced concrete structures. New adsorption inhibitors.
- Electrochemistry in ionic liquids and deep eutectic solvents – characterisation and application to sensor fabrication.

Author or co-author of 2 books, 20 book chapters and 281 scientific articles (238 ISI).

Co-editor of special issues of *Electrochimica Acta* (1998, 2004, 2012 (to celebrate the International Year of Chemistry)) *Analytica Chimica Acta* (1999), *Pure and Applied Chemistry* (2001), *Analytical Letters* (2004, 2006) and *Microchimica Acta* (2008, 2010). Member of the Advisory Editorial Board of the journals *Electrochimica Acta*, *Electroanalysis*, *Analytical Letters*.

BOOKS

C.M.A. Brett and A.M. Oliveira Brett

Electrochemistry. Principles, methods and applications

Textbook, Oxford University Press, Oxford, 456 pages, June 1993. 2nd printing 1994, 3rd printing 1996, 4th printing 1998, 5th printing 2005.

Electroquímica. Princípios, métodos e aplicações

Translation published by Livraria Almedina, Coimbra, 496 pages, December 1996.

C.M.A. Brett and A.M. Oliveira Brett

Electroanalysis

Textbook, Oxford University Press, Oxford, 96 pages, October 1998.

Statement by Christopher Brett, VP candidate

It is an honour to be nominated as a candidate for the position of Vice-President of IUPAC for 2018-19. I am a professor of electrochemistry in the University of Coimbra and have been involved with IUPAC activities since 1994, first in the Electrochemistry Commission, then in the Division of Physical and Biophysical Chemistry and most recently as a Bureau Member since 2011, as well in other committees and subcommittees. In the current biennium, my membership of the Executive Committee has enabled me to become more aware of the administrative aspects of the governance of IUPAC, which will stand me in very good stead if elected.

IUPAC is looking towards its centenary in 2019 and to the future with high expectations. There are many challenges that IUPAC and the chemistry community face at a world level as they did in 1919, the fruits of which include the common language of chemistry that has been established. The year 2019 will also be the 150th Anniversary of the periodic table, which will give the opportunity for many educationally-related activities and involvement of young people. A united, strong effort to continue the projected and new impetus generated with the centenary celebrations, with a forward looking and global perspective, is needed, in line with IUPAC's vision, mission and core values. This will be a primary objective for me as well as the fomentation of initiatives, scientific and educational, undertaken to involve chemists from the developed and developing world.

These are challenging times for IUPAC, for the National Adhering Organisations, Associate National Adhering Organisations, Associate Organisations and Company Associates, as well as individual Affiliate Members. Worldwide events impact on us all, in the academic and industrial spheres. It is particularly important to listen constantly to all those who contribute to IUPAC in different ways, to have an open door to their opinions and seek to address their concerns and reach out to the chemistry community. Apart from sustainability, these include health, foods and the environment. IUPAC's mission is concerned with many of the UN Sustainable Development Goals and should make continuing efforts in this regard as well as cooperating with other international organisations that have the same aims. IUPAC's work is directed not only to its adhering organisations and associates, but also to provide a service to the whole chemistry community; this includes countries that are currently under-represented where we should seek to demonstrate the mutual benefits of being associated with IUPAC and persuade them to become part of IUPAC as National Adhering Organisations. The project system needs some revitalisation. Educational activities directed especially to young people should be further fomented, a recent excellent example being the creation of the new International Young Chemists' Network.

IUPAC has made big strides in recent years in making use of current communication technologies, backed up by a new website platform. This has been extremely important in altering the perceptions of IUPAC and increasing public awareness of the wide range of activities undertaken. This and other forms of communication need to be exploited to demonstrate and be perceived by the community as reflecting all that IUPAC does and what it can do on behalf of and for the global chemistry community.

It would be a privilege for me to serve IUPAC as Vice-President, aiming towards an ever-increasing role for IUPAC in the chemical community, both academic and industrial, at a worldwide level, demonstrating the relevance of chemistry and the important role of IUPAC and its activities.

Candidate for Vice President

Dr. Javier García-Martínez

(Spain)



Prof. Javier Garcia Martinez

University of Alicante, Spain

Co-Founder, Rive Technology, Inc.,
Cambridge, MA, USA

Professor of Inorganic Chemistry and Director of the Molecular Nanotechnology Laboratory at the University of Alicante, Spain, where he teaches at both undergraduate and graduate levels. Published extensively in the areas of catalysis and nanomaterials in some of the most important chemistry journals and is inventor in more than twenty patents. He has been invited contributor and guest editor of special issues on inorganic chemistry and advanced materials and delivered over 50 keynote or plenary lectures. His latest books are "The Chemical Element" (Wiley, 2011), "Chemistry Education: Best Practices, Opportunities and Trends" (Wiley 2015), and "Mesoporous Zeolites" (Wiley 2015). www.nanomol.es

Co-founder and Chief Scientist of Rive Technology Inc (Boston, MA), a MIT spin-off commercializing hierarchical zeolites for diffusion-limited applications. Rive's proprietary technology improves traditional zeolite catalysts and adsorbents through the introduction of mesoporosity, which overcome the diffusion limits of these materials, leading to better yields, process efficiency, and process economics. Javier developed its core technology during his postdoctoral stay with a Fulbright Grant at the Massachusetts Institute of Technology (MIT). Rive catalysts are being commercializing in several U.S. refineries with a significant increase in the production of liquid fuels and energy efficiency of the process. www.rivetechology.com

Recognized as a leader in nanotechnology and materials chemistry. In 2007, Javier received the TR 35 Award from MIT's Technology Review magazine. In 2014, Javier received the Rey Jaime I award from His Majesty the Queen of Spain, and in 2015 the Emerging Research Award by the American Chemical Society. Since 2009, the candidate is member of the World Economic Forum where he advises government and industry leaders on technology, innovation, and entrepreneurship. Javier is Fellow of the Royal Society of Chemistry, member of the American Chemical Society, European Association for Chemical and Molecular Sciences EuCheMS, the Spanish Royal Society of Chemistry, and the International Zeolite Association.

Member of IUPAC for more than a decade, the candidate has been an AM or TM of the Division of Inorganic Chemistry since 2006 and Elected Member of the Bureau from 2011 to 2016. Javier is an active member of the Committee of IUPAC100, the Committee of the WCLM2017, the IUPAC Strategic Review, and Editorial Board of Chemistry International. In the past, the candidate has been member or chaired over 10 IUPAC projects including the Analysis of the IYC Activities, the Global Experiment of the IYC, How to Name New Chemical Elements, and Increasing IUPAC's Social Media Presence. <https://iupac.org/member/javier-garc/>

Prof. Javier Garcia Martinez

Molecular Nanotechnology Lab, Director | Rive Technology, Founder and Chief Scientist
Department of Inorganic Chemistry, University of Alicante, E-03690, Alicante, Spain
tlf: +34-628327439 | j.garcia@ua.es | <https://es.linkedin.com/in/javiergarciamartinez>

Director of the Molecular Nanotechnology Lab and Full Professor, University of Alicante 2009 –
Leads an award winning research centers on molecular nanotechnology and on its application to catalysis and energy technologies. Teaches at both undergrad and graduate levels and coordinate several programs.
Co-founder, Chief Scientist, Rive Technology, Inc. 2006 –
Invented the core technology, transferred it from MIT, co-founded the company, secured intellectual property, and devolved over twenty patents. Helped to rise \$80M and hire over 40 employees. Marketed and sold novel catalysts to energy companies.

EDUCATION

Fulbright Post-doctoral Fellow , Massachusetts Institute of Technology	2001 – 2003
Ph.D. Chemistry , Summa Cum Laude, University of Alicante	2000
Master of Science , Summa Cum Laude, University of Alicante	1998
B. Sc. Major: Chemistry , University of Alicante	1996

VISITING SCHOLAR

Oxford University , Oxford Martin Visiting Fellow	2015
Princeton University , Keller Center, Visiting Scholar	June – Sept., 2010-2016
Yale University , Executive Education Program	2012
Harvard University , Executive Education Program	2010
Royal Institution of Great Britain , 3 months Ph. D. stay, Prof. G. Sankar	1999
University of California at Berkeley , 3 months Ph. D. stay, Prof. E. Iglesia	1998
California Institute of Technology , 3 months Ph. D. stay, Prof. Mark E. Davis	1997

AWARDS

Emerging Research Award, American Chemical Society | Rey Jaime I Award, 2014 | Liderazgo Joven, Fundación Rafael del Pino, 2014 | Member, Global Young Academy, 2012 | INNOVADORES Award, Spain 2012 | IMPORTANTE Award, 2011 | Fellow, Royal Society of Chemistry, 2011 | Round Table of Top Entrepreneurs, EIT, 2010 | Young Global Leader, World Economic Forum, 2009 | TR35 Innovator of the Year, Technology Review, MIT, 2007 | European Young Chemist Award, EuCheMS 2006 | Europa Medal. Europe's Top Younger Chemical Researcher, 2005 | Science Outreach "Teresa Pinillos" Award, Spain, 2004 | Ramón y Cajal Award, Ministry of Education, Spain, 2003 | Fulbright Postdoctoral Fellowship, 2001-2003

BOOKS

E. Li, **J. Garcia Martinez**, (ed.) *Mesoporous Zeolites: Preparation, Characterization and Applications*. WILEY-VCH (2015)
E. Serrano Torregrosa, **J. Garcia Martinez**, *Chemistry Education: Best Practices, Opportunities and Trends*, WILEY-VCH (2015)
J. Garcia Martinez, *Nanotechnology for the Energy Challenge*, 2nd Edition, WILEY-VCH (2013)
E. Serrano Torregrosa, **J. Garcia Martinez**, *The Chemical Element: Chemistry's Contributions to our Global Challenges*, WILEY-VCH (2011)
J. Garcia Martinez, *Nanotechnology for the Energy Challenge*, WILEY-VCH (2010)

FIVE SELECTED PUBLICACIONES (from over 80 publications, h index =27, 3750 citations)

K. A. Cychosz, R. Guillet-Nicolas, **J. García-Martínez**, M. Thommes, *Recent advances in the textural characterization of hierarchically structured nanoporous materials*, Chem. Soc. Rev. Advance Article, (2017)
M. Rico-Santacruz, Á. Sepúlveda, C. Ezquerro, E. Serrano, E. Lalinde, J. R. Berenguer, **J. García-Martínez**, *Bottom-up construction of highly photoactive dye-sensitized titania using Ru (II) and Ir (III) complexes as building blocks*, Applied Catalysis B: Environmental 200, 93-105 (2016)

WH Koppenol, J Corish, **J. García-Martínez**, J Meija, J Reedijk, *How to name new chemical elements*, Pure and Applied Chemistry 88 (4), 401-405 (2016)
T. Prasomsri, W. Jiao, S. Z. Weng, **J. Garcia-Martinez**, *Mesostructured zeolites: bridging the gap between zeolites and MCM-41*, Chem Commun 51, 8900-8911 (2015)
M. Ojeda, A. Grau-Atienza, R. Campos, A. A. Romero, E. Serrano, J. M. Marinas, **J. García-Martínez**, R. Luque, *Hierarchical Zeolites and their Catalytic Performance in Selective Oxidative Processes*, ChemSusChem 8(8) 1328-1333 (2015)

FIVE SELECTED PATENTS (from a total of 23)

J. Garcia Martinez, *Mesoporous zeolite catalyst supports*, US 20140128246 A1 (2014)
J. Garcia Martinez, L. Dight, B. Speronello, *Methods for enhancing the mesoporosity of zeolite-containing materials*, US 8685875 B2 (2014)
L. Dight, **J. Garcia Martinez**, I. Valla, M. Johnson, *Compositions and methods for improving the hydrothermal stability of mesostructured zeolites by rare earth ion exchange*, US 8524625 B2 (2013)
J. Garcia Martinez, M. Johnson Marvin, *Methods of Recovery of Pore-Forming Agents for Mesostructured Materials*, US Patent, US8,206,498 (2012)
J. Garcia Martinez, M. Johnson, I. Valla, *Caustic healing of composition having enhanced mesoporosity*, US Patent, 61/586,457 (2012)

ORGANIZATION OF SCIENTIFIC CONFERENCES AND SYMPOSIA

International Symposium on Mesoporous Zeolites, Washington, DC, 2017 | International Symposium on Mesoporous Zeolites, Philadelphia, PA, 2016 | International Symposium on Mesoporous Zeolites, Boston, MA, 2015 | International Conference on New Materials for Clean Energy Processes, Alicante, 2015 | International Symposium on Mesoporous Zeolites, San Francisco, CA, 2014 | Shape Europe, World Economic Forum, Madrid, 2013 | International Symposium on Mesoporous Zeolites, Indiana, IN, 2013 | Nanotechnology for Energy Applications, University of Palermo, 2012 | Trends in Inorganic Chemistry, Stockholm University, 2012 | Education in Chemistry through On-line Communities, Rome, 2012 | Nanotechnology: Challenges and Opportunities, Universidad de Alicante, 2011 | Advanced Nanomaterials for Energy Applications, Puerto Rico, 2011 | Chemistry's Contribution to our Global Future, Puerto Rico, 2011

INVITED TALKS

Euro Asia Zeolite Conference, Bali, Indonesia, 2017 | World Chemistry Leadership Meeting, Busan, South Korea, 2015 | Presidential invitation, ACS National Meeting, Boston, 2015 | Oxford University, Oxford Martin School, 2015 | World Economic Forum, Dead Sea, Jordan | Opening of the Science Week, Barcelona, Spain | Stanford University, Palo Alto, 2014 | Chinese Academy of Sciences, Beijing, China, 2014 | Tsinghua University, Beijing, China, 2014 | 5th EuCheMS Chemistry Congress, Istanbul, Turkey, 2014 | World Economic Forum, Dubai, UAE, 2014 | Conference on Solid State Chemistry, Slovakia, 2014 | Latin American Chemistry Conference, Lima, Peru 2014 | Industrial Technologies, Athens, Greece, 2014 | Annual Summit of the Global Network of the Science Academies, Rio, Brazil 2013 | World Chemistry Congress, Istanbul, Turkey, 2013 | D. Mendeleyev University of Chemical Technology of Russia, Moscow, Russia, 2013 | Innovation Forum, Moscow, Russia, 2013 | EuroNanoForum, Dublin, Ireland, 2013 | University of Palermo, Italy, 2012 | Universitat Autònoma de Barcelona, Barcelona, Spain, 2012 | Water Water Forum, Marseille, France, 2012

TEACHING EXPERIENCE

Green Chemistry (Degree in Chemistry) Taught 2016-2017 | Inorganic Chemistry, (Degree in Chemistry) Taught: 2014-2016 | Solid State Chemistry (Master in Nanoscience and Nanotechnology Molecular), Newly developed course, Taught: 2010-2016 | Introduction to Nanoscience and Nanotechnology, (Master in Nanoscience and Nanotechnology Molecular), Newly developed course, Taught: 2010-2016 | Carbon Science and Technology (Degree in Chemical Engineering) Taught: 2014 | Fibers and Composite Materials (Degree in Chemical Engineering) Taught: 2011 | Industrial Inorganic Chemistry (Degree in Chemical Engineering) Taught: 2009 | Structure and Properties of Matter (Degree in Chemical Engineering) Taught: 2007 | Chemical Bonding and Materials Properties, (Degree in Chemistry) Taught: 2007

For more information: <http://rivetechnology.com/>; <http://www.nanomol.es>

Tackling the Challenges of the Future through Chemistry

The Second 100 Years of IUPAC

Many of you know me through my involvement in the work of the Divisions, especially in Division II, where I have served for over 10 years, in CCE, and as a member of the Bureau. During this time, I have had the privilege to work with many of you and enjoy the opportunity to contribute to a number of IUPAC projects, meetings, and activities, including the Global Experiment of the International Year of Chemistry. Under the leadership of several of our Presidents, I have served on a number of committees including the IUPAC Strategic Review, the Analysis of the IYC Activities, the Global Experiment of the IYC, the Editorial Board of Chemistry International, and more recently in committee organizing the activities for our 100th anniversary. Over the last few years, I learned a lot about our Union, met many colleagues, and enjoyed many great opportunities. Now I feel that it is time to step forward, to commit and serve to create a stronger, more effective and impactful IUPAC.

I have always believed that IUPAC gets very little recognition for the tremendous value and amount of the work done by our volunteers. Among my priorities is to better communicate what we do at IUPAC and the unique value we provide to our NAOs, industry, academia, and the chemistry community as a whole. IUPAC should serve as the international platform to discuss, promote and advance chemistry. If we don't occupy this privileged position others will do so. Therefore, I plan to work with national chemical societies and federations, as I have been doing with FLAQ and chemical societies in Latin America and Europe in the past, to create joint programs and activities where we can present our work on nomenclature, terminology, data, and technical and educational materials. We also need to expand the number of our NAOs, especially in those parts of the World that are underrepresented including Africa, Latin America, and the Middle East. But at the same time, it is critically important to strengthen our relationship with existing NAOs. For that, I will work together with our staff and Officials to first listen to their needs and then find ways to better serve each one of our NAOs. I strongly believe that we need to get the best talent to our Divisions and Committees and strive for diversity and excellence in everything we do. Because of that, I will work with our Division Presidents and the Chairs our Committees to reach out to a wider talent pool using our personal contacts, but also building on our NAOs, the Young Observer Program, and printed and online publications. I feel very passionate about chemistry education and green chemistry, so I will work to find new opportunities for synergy with international organizations with similar goals and to expand our Associated Organizations Program. Finally, I want to strengthen our relationship with leading chemical companies, through our Company Associates Program but also by personally meeting with the leaders of the main chemical companies, who may not be aware of the tremendous amount of work we do for them and how much more we can do together.

In the last years, I have had the privilege to serve with many of you to create a bigger stronger IUPAC. We have done a lot together, but there are still many challenges in front of us. Chemistry has a critical role in tackling our most pressing challenges and in building a more suitable future. It has never been so important to have a global community committed to advance chemistry and to provide objective scientific expertise for the benefit of humankind. Because of all of this, I am asking you for your vote but more importantly your suggestions and contributions to build a stronger, bigger and more effective IUPAC in the threshold of its second century of history.



March 10, 2017

Dr. Lynn M. Soby
Executive Director, IUPAC
P.O. Box 13757,
Research Triangle Park,
NC 27709-3757
Phone: 919-485-8700
Email: lsoby@iupac.org

Dear Dr. Soby,

As Canada's National Adhering Organization to IUPAC, the National Research Council of Canada (NRC) provides accreditation for the nomination of

Prof. Russell J. Boyd

as the Bureau member for IUPAC.

Please find the enclosed documents as listed below:

1. Two-page CV of Prof. Boyd;
2. His biographical sketch;
3. His head and shoulders photograph;

If you require additional information, please do not hesitate to contact me.

Sincerely yours,

Ryan Hordy
Director, International Relations
Government and International Relations
1200 Montreal Road, Bldg. M-50
Ottawa, ON K1A 0R6
Phone +1 (613) 993-4265
Ryan.Hordy@nrc-cnrc.gc.ca

c.c. Dr. Shan Zou, Secretary, CNC-IUPAC (shan.zou@nrc.gc.ca)

Candidate for Bureau

Prof. Russell J. Boyd

(Canada)



Biography of Russell J. Boyd

Russell Boyd's contributions to IUPAC include serving on the Bureau and Project Committee since 2014. As a member of the Canadian National Committee for IUPAC, he has fostered IUPAC's goals in Canada. He is a member of the Scientific Board of the World Association of Theoretical and Computational Chemists and has served on selection panels for the National Science Foundation of the USA, the Canada-US Fulbright Program, and many committees of the Natural Sciences and Engineering Research Council of Canada.

Dr. Boyd has a long-standing interest in the advancement of the chemical sciences through his many activities relating to chemical education and research and the promotion of public awareness of chemistry. His international activities include holding visiting professor positions in Australia, Germany, Israel, Spain and Sweden, participation in international accreditation activities on behalf of the Canadian Society for Chemistry (CSC), and leading a delegation of Canadian chemical professionals to China in 2008.

Russell Boyd's service to the CSC, a constituent society of the Chemical Institute of Canada (CIC), includes serving as President for 2007-2008, Chair of the Division of Physical and Theoretical Chemistry, Director of Accreditation, principal organizer of the CSC annual conferences in 1981, 1990 and 2006 and Chair of the 2016 CSC conference. He was the Chair of the CIC for 2012-13. In recognition of his distinguished contributions to the profession of chemistry in Canada, he received the 2009 Montreal Medal of the CIC.

Dr. Boyd received his BSc from the University of British Columbia (UBC) and his PhD from McGill University. He was a National Research Council of Canada Postdoctoral Fellow with Charles Coulson at the University of Oxford and a Killam Fellow at UBC prior to joining Dalhousie University in 1975. He rose through the ranks to become a Professor in 1985. Dr. Boyd served as Chair of the Department of Chemistry from 1992 to 2005. In 2001 he became the seventh Alexander McLeod Professor, which was established in 1884 and is one of the oldest named professorships in Canada. In 2013 he was granted a lifetime appointment as the Alexander McLeod Professor Emeritus. He has supervised 25 PhD students and a similar number of postdoctoral researchers, published about 280 peer-reviewed papers and 12 review chapters in computational and theoretical chemistry, and co-edited in 2007 *The Quantum Theory of Atoms in Molecules*.

Russell Jaye Boyd

Position Alexander McLeod Professor Emeritus, Department of Chemistry, Dalhousie University

Education B.Sc. (First-Class Honours in Chemistry), UBC, 1967
Photoelectron Spectrometric Studies of Boron Trihalides, B.Sc. thesis
Ph.D., Theoretical Chemistry, McGill University, 1971
Approximate Self-Consistent Molecular Orbital Theory, Ph.D. thesis
NRC Postdoctoral Fellow, University of Oxford, 1971-73
Killam Postdoctoral Fellow, University of British Columbia, 1973-75

Honours and Awards

Lefevre Gold Medal and Scholarship for the Highest Standing in Honours Chemistry at the University of British Columbia, 1967
Society of Chemical Industry Merit Award, 1967
Chemical Institute of Canada Book Prize, 1966
Allied Chemical Canada Scholarship, 1966-67
Mallinckrodt Chemical Works Limited Prize, 1966
Transmountain Oil Pipe Line Company Scholarship, 1963-65
Government of British Columbia Scholarship, 1963-67
1967 Science Scholarship of the National Research Council of Canada, 1967-71
National Research Council of Canada Postdoctoral Fellowship, 1971-73
Killam Postdoctoral Fellowship, 1973-75
Fellow of The Chemical Institute of Canada, 1983
1983 APICS/Fraser Medal
1986 CNC-IUPAC Award
Fellow of the World Association of Theoretical Chemists, 1986
Dalhousie University Senior Killam Fellow, 1989-90
Faculty of Science Killam Professor, 1997-02
Alexander McLeod Professor of Chemistry, 2001-13
Dalhousie Innovation Award, 2008
Montreal Medal, The Chemical Institute of Canada, 2009
Schrödinger Medal nominee, 2010
Inaugural Honorary Lecturer of the Canadian Association of Theoretical Chemists, 2010
Charles A. Coulson Lecture, University of Georgia, 2011
Science Atlantic Hall of Fame, 2012
Distinguished Service Award, Dalhousie University, 2013
Alexander McLeod Professor Emeritus, 2013-
Honoree, Synergistic Relationships between Computational Chemistry and Experiment, Pacificchem 2015 (70 invited talks)

Positions

Assistant Professor, Department of Chemistry, Dalhousie University, 1975-80
Associate Professor, Department of Chemistry, Dalhousie University, 1980-85
Professor, Department of Chemistry, Dalhousie University, 1985-2013
Chair, Department of Chemistry, Dalhousie University, 1992-2005

Associate Vice-President Research (50%), Dalhousie University, 2006-11
Acting Director, Institute for Research in Materials, Dalhousie University, 2008

Selected Activities

First President of the Canadian Association of Theoretical Chemists, 1983-86
Chair, 8th Canadian Symposium on Theoretical Chemistry, 1983
Judge-in-Chief, Canada-Wide Science Fair, 1984
Chair of the Education Committee, Atlantic Provinces Council on the Sciences, 1987-90
Editor for Theoretical Chemistry, Canadian Journal of Chemistry, 1988-98
Chair, CSC Division of Physical and Theoretical Chemistry, 1990-92
Chair, NSERC Strategic Grant Selection Panel on New Directions, 1993-95
Director of Accreditation, Canadian Society for Chemistry, 1996-99
Selection Committee for NSERC Chairs for Women in Science and Engineering, 1997
Executive Member, Atlantic Provinces Council on the Sciences, 1988-90
Member of Selection Committee, CNC-IUPAC Awards, 1991-94
Member of the College of Reviewers, Canada Research Chairs Program, 2000-
Member, NSERC Grant Selection Committee for Physical and Analytical Chemistry, 2001-04
Scientific Board, World Association of Theoretical and Computational Chemists, 2002-
Member, Long-Range Planning Panel for High-Performance Computing in Canada, 2002-05
Member, NSERC Atlantic Advisory Board, 2006-10
President, Canadian Society for Chemistry, 2007-08
Leader of the Chemical Institute of Canada delegation to China, 2008
Adjudication Committee, Canada-US Fulbright Program, 2008-11
Selection Panel, S and T Centers, National Science Foundation of the USA, 2009
Chair, 7th Canadian Computational Chemistry Conference, 2009
Member, NSERC Chemistry Scholarships and Fellowships Committee, 2009-12
Member, National Initiatives Committee, Compute Canada, 2010-
Research Director, Atlantic Canada Computational Excellence Network, 2010-
Member, Canadian National Committee of IUPAC, 2011-
Chair, Chemical Institute of Canada, 2012-13
Member, Killam Selection Committee, Canada Council for the Arts, 2014-17

Supervision of Co-Workers

Supervised more than 25 postdoctoral researchers, 25 completed PhD theses, 6 completed MSc theses and 22 completed BSc theses

Invited Seminars and Special Lectures

More than 150 presentations at universities in Canada, USA, Europe, Australia, Japan, etc.
More than 160 conference presentations, including about 80 by invitation

Publications

About 280 papers in leading international journals, including two in *Nature*, and twelve book chapters written by invitation. Co-edited with Chérif F. Matta *The Quantum Theory of Atoms in Molecules*, published by Wiley-VCH in 2007. One of 25 authors of *Concepts in Chemistry*, an innovative textbook specifically written for the first-year Chemistry classes at Dalhousie University. One of eight authors of *Engines of Discovery: The 21st Century Revolution (The Long Range Plan for High Performance Computing in Canada, 2005)*. H-index is 47.

Candidate for Bureau

Prof. Mary Garson

(Australia)



Professor Mary GARSON



My involvement in IUPAC commenced in 1994 when I facilitated a bid for the Australian NAO to host the General Assembly and Scientific Congress in Brisbane. Subsequently, I was the Executive Secretary of the organising committee which successfully delivered these combined meetings in 2001. I joined Division III (organic and biomolecular), first as a Titular Member (2006-present), then as Secretary, and eventually as Division President for the 2014-2015 biennium. Within the Division, a focus has been on facilitating communication and decision-making. I have been an Associate Member of the Committee for Chemistry Education (CCE), and contributed to projects in both Divisions III and in CCE. I currently lead a joint project of Divisions I and III entitled *A critical review of reporting and storage of NMR data for spin-half nuclei in small molecules*. I have organized two international meetings (28ISCNP/8ICOB in 2011; CHEMBIOTECH in 2007) on behalf of Division III.

In 2011, I created and convened a global breakfast event *Women sharing a chemical moment in time* for the International Year of Chemistry; over 40 countries shared their individual events with each other through social media websites. Some countries organized radio and media coverage, and a video was presented at the Opening Ceremony for IYC2011 in Paris.

In 2016, the IUPAC President Natalia Tarasova invited me to chair the Management Committee overseeing planning of the centenary year in 2019. This committee reports to the Bureau of IUPAC. Activities planned will celebrate the achievements of IUPAC, as well as look to future challenges including sustainability and global energy. A website will celebrate chemical stories that highlight the work of IUPAC, while a breakfast function will “connect” women chemists around the world.

During 1996-2004, I chaired the International Relations Committee of the Royal Australian Chemical Institute and was thereby a member of the National Committee for Chemistry; this committee reports to the Australian Academy of Sciences, the adhering organization to IUPAC. I have chaired the board of Australian Science Innovations, responsible for Australia’s teams in international science Olympiads. It is my view that the future of IUPAC lies in the hands of “millennials” who will shortly commence their careers in chemistry and allied scientific disciplines.

I have completed 425 SCUBA dives for sample collection linked to research into marine natural products chemistry; the flatworm *Maritigrella marygarsonae* (“little female sea tiger”) is named in my honour.

Professor Mary J Garson – Curriculum Vitae

Personal Details

Full name: Mary Jean GARSON
Date of birth: 6 November 1953
Citizenship: Dual Australian/British nationality
Contact details: +61-7-3365-3605 (office); +61-402-715-893 (mobile)

Academic Record and Qualifications

- PhD, University of Cambridge UK, 1977, *The biosynthesis of polyketides* (with Prof J Staunton).
- MA (1978) and BA (Hons) University of Cambridge UK (1974, natural science tripos, part II chemistry).

Professional Experience

- Professor of Chemistry, School of Chemistry and Molecular Biosciences (SCMB), The University of Queensland, 2006- present.
- Deputy Head of School (SCMB), The University of Queensland, 2005-2009.
- Past positions at The University of Queensland: Associate Professor (1998-2005)/Senior Lecturer (1992-1997)/Lecturer (190-1991).
- Past positions at The University of Wollongong: Senior Lecturer (1990)/Lecturer in chemistry (1986-1989).
- Queen Elizabeth II Research Fellow, James Cook University of North Queensland, 1983-1986.
- Medicinal chemist, Smith Kline and French Research Ltd., Welwyn UK, 1981-1983.

Awards and Fellowships

- Named as one of the “175 Faces of Chemistry” by the Royal Society of Chemistry, UK, 2014.
- Distinguished Woman in Chemistry or Chemical Engineering award of IUPAC, 2013.
- Fellow of the Royal Society of Chemistry (RSC) elected 2013.
- Leighton Memorial Medal of the Royal Australian Chemical Institute, 2011, awarded for distinguished service to the Institute in the broadest sense.
- Inducted into *Everyday Women, Extraordinary Lives* tribute gallery, QLD government initiative, 2011; finalist, *Smart State Smart Women* awards (QLD state government) 2009.
- National citation for contributions to Royal Australian Chemical Institute (2001)
- Fellow of the Royal Australian Chemical Institute (RACI), elected 1993.
- Queen Elizabeth II Research Fellowship (James Cook University of North Queensland), 1983-1986.
- College Research Fellowship, Murray Edwards College (New Hall) Cambridge UK, 1978-1981.
- Overseas Research Fellowship, Royal Society of London (Rome), 1977-1978.
- UK postgraduate scholarship (Science Research Council; 1974-1977) & Bathurst scholarship (Newnham College, 1976-1977) held at the University of Cambridge.

Professional Service (professional societies/NGOs)

International Union of Pure and Applied Chemistry (IUPAC)

- Chair, IUPAC100 Management Committee reporting to IUPAC Bureau (2016-).
- Member, Australian delegation to the Council meetings of the IUPAC General Assembly, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015 and 2017.
- President of Division III (organic and biomolecular), and member of IUPAC Bureau, 2014-2015.
- Titular Member (Division III), 2006-2017 (including as Secretary (2008-2011), Division Vice-President (2012-2013), Division President (2014-2015) and Past President (2016-2017); evaluation of project proposals; currently task group leader of project *critical review of reporting and storage of NMR data for spin-half nuclei in small molecules*; Associate member of Committee for Chemical Education (CCE).
- Creator and international convenor *Women sharing a chemical moment in time*, global networking activity held in 44 countries in January 2011 and involving ~5000 women chemists worldwide; video presentation at the Opening Ceremony of the International Year of Chemistry (2011) at UNESCO Paris.

- Executive Secretary organizing the IUPAC General Assembly, Brisbane, 2001; member of Organising Committee, IUPAC World Chemistry Congress, Brisbane, 2001.
- Co-chair, Organising Committee, 27th International Symposium on the Chemistry of Natural Products/7th International Conference on Biodiversity, 2011.

Royal Australian Chemical Institute (RACI)

- Chair, International Relations Committee of RACI ; Member National Committee for Chemistry, 1996-2004;
- President, Queensland branch and member of Full Council of RACI, 1996-1997; committee member (1991-1999) and secretary (1994-1995) of Queensland-RACI; committee member (1991-1997), Chemical Education Group of Queensland-RACI; committee member, Wollongong section, NSW-RACI, 1987-1989; organiser, RACI titration competition, Wollongong section, NSW-RACI, 1987-1989.

Australian Science Innovations (= Australian Science Olympiads)

- Chair of Board, Australian Science Innovations/Rio Tinto Australian Science Olympiads, 2002-2005; member of Board, Rio Tinto Australian Science Olympiads, 2000-2002; accompanied competition teams to 4th Asian Physics Olympiad (2003) and 14th International Biology Olympiad (Belarus, 2003); hosted official visits involving industry partnership dinners and public lectures.
- Chair, Organising Committee 15th International Biology Olympiad (Brisbane, July 2004).

UNESCO regional network for the Chemistry of Natural Products in SE Asia

- National point of contact representative (NPCR) for Australia (1996-2003); member, Australian delegation to the World Conference on Science (UNESCO), Budapest, 1999.

Other Professional Contributions

- Co-chair, CHEMBIOTEC symposium (World Chemistry Congress, Italy, August 2007; with Professor F. Nicotra); member, organizing committees, 13th Int. Conference on Metabolomics (2017); Australia-New Zealand Magnetic Resonance meeting (2017); 17th Int. Biotechnology Symposium (2016); Australian Coral Reef Society meeting (1997); 15th divisional meeting in organic chemistry, RACI (1991).
- Membership of International Advisory Boards: 17th IBS (2016), ICOS (2014, 2016); World Chemistry Congresses (2013, 2015); ISCNP/ICOB (2002-2016); MaNaPro (2004, 2007); ASOMPS (2003, 2006).
- Member, panel reviewing the teaching of chemistry at Victoria University of Wellington, NZ (2016).
- Advocacy and mentoring for Women in Science includes: presentation to Ministerial Advisory Committee for Queensland Women (1998); discussion leader, RACI Heads of Department of Chemistry meetings (1997, 1995) and at career advancement workshops (2009, 1996, 1995); invited speaker, Conference on Status of Women in Universities, (1995); opinion articles, radio interviews, talks (1994-present).
- Advocacy on biodiversity issues includes: Plenary speaker, Biobusiness conference (1998); delegate, UNESCO-funded workshop, Kuala Lumpur (1996); presenter, media forum on biodiversity, Sydney (1995), and at Round Table sessions in Asian Symposia on Medicinal Plants, Spices & Other Natural Products (1994, 1998, 2003); expert witness to Commonwealth-State working group on *Access to Biodiversity* (1994).

Research Contributions

- >175 research publications in international quality peer-reviewed journals.
- Plenary (12) and invited (35) lecture presentations at international meetings in chemistry or marine science; invitations to Gordon research conferences include short talks (2); main lectures (2); discussion leader (2); Bert Halpin lecture (UoW, 2012); Monash Chemical Society lecture (1998, 2009); invited speaker at regional or national meetings in marine science, biodiversity and biobusiness.
- Research funding (Australia Research Council etc.) totaling >\$5m (AUD).
- Member, editorial boards *ACS Omega* (2016-), *J. Nat. Prod.* (2014-2019), *Phytochemistry* (2008 onwards), *Comp. Biochem. Physiol.* (1994-1995); reviewer for >20 journals and for various grant agencies.

Teaching and Mentoring

- Research supervision of 30 PhD or MSc candidates, 19 Honours students; mentoring of 6 postdoctoral fellows and of 22 international visiting scholars; undergraduate lecturing in organic chemistry (UQ: 1990-present; UoW 1986-1990) and in field-based marine chemical ecology (UQ).
- Overseas course delivery: regional workshops on marine natural products (Thailand 2007, 1999, Malaysia 2001, Brazil (1999).

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

U.S. National Committee for the
International Union of Pure and Applied Chemistry

30 March 2017

Richard Hartshorn
IUPAC Secretary General
IUPAC Secretariat
P.O. Box 13757
Research Triangle Park, NC 27709

Dear Professor Hartshorn,

On behalf of the U.S. National Committee for IUPAC, I respectfully nominate Professor Christopher K. Ober to serve a second term as an Elected Member of the IUPAC Bureau.

Chris has served as a leader in IUPAC for many years. In 2004 he was elected as a Titular Member of the Polymer Division. Having served as division president 2008-2011, he continues to serve the division in a variety of ways, including as a current member of the division subcommittees for Polymer Terminology and Polymer Education. He has been an active leader in developing educational websites for polymer and materials chemistry. He is currently the chair of the Interdivisional Subcommittee on Materials Chemistry.

During his first term as an Elected Member of the Bureau, Chris has been active in several important IUPAC activities. He currently serves as a co-chair for the task force developing the 2017 World Chemistry Leadership Meeting. He is also a member of the task force planning activities for the IUPAC centenary celebrations for 2019.

Currently the Francis Bard Professor of Materials Engineering at Cornell University in Ithaca, New York, Chris served as the university's Interim Dean of Engineering in 2009-2010. In 2015, he was honored for his research in lithography with the Photopolymer Science & Technology Outstanding Contribution Award. Chris is also a strong mentor to younger chemists, encouraging them in their research and toward involvement in IUPAC.

In both his research and in his IUPAC activities, Chris Ober has displayed both a willingness and an ability to be a dedicated leader. The U.S. National Committee believes that IUPAC would benefit from having Chris continue to serve as an Elected Member of the Bureau.

Sincerely,



Lois Peterson Kent
Senior Program Officer

Enclosures:
Brief bio and photograph
Two-page CV

Christopher Ober is the Francis Bard Professor of Materials Engineering at Cornell University. He received his B.Sc. in Honours Chemistry (Co-op) from the University of Waterloo, Ontario, Canada in 1978 and his Ph.D. in Polymer Science & Engineering from the University of Massachusetts (Amherst) in 1982. From 1982 until 1986 he was a senior member of the research staff at the Xerox Research Centre of Canada where he worked on marking materials. Ober joined Cornell University in the Department of Materials Science and Engineering in 1986. He recently served as Interim Dean of the College of Engineering. He is presently Director of the Cornell Nanoscale Facility. From 2008 to 2011 he was President of the IUPAC Polymer Division and he is an elected member of the IUPAC Bureau, its governing body.

He has pioneered new materials for photolithography and studies the biology-materials interface. A Fellow of the ACS, APS and AAAS, his awards include the 2013 SPSJ International Award, 2009 Gutenberg Research Award from the University of Mainz, the 1st Annual FLEXI Award in the Education Category (for flexible electronics) awarded in 2009, a Humboldt Research Prize in 2007 and the 2006 ACS Award in Applied Polymer Science. In 2014 he was a JSPS Fellow in Tokyo, Japan and in 2015 he received the ICPST Outstanding Achievement Award.



CURRICULUM VITAE

Christopher Kemper Ober

Cornell University, Materials Science & Engineering, 310 Bard Hall, Ithaca, NY 14853

EDUCATION

Ph.D., 1982. Department of Polymer Science & Engineering, University of Massachusetts, Amherst, MA; NSERC Canada Graduate Fellow, 1978-1982

M.S., 1980. Department of Polymer Science & Engineering, University of Massachusetts, Amherst, MA

B.Sc., 1978. University of Waterloo, Waterloo, Ontario, Canada
Major: Honours Chemistry (Co-Operative Programme)

Publications: 628 Presentations: 527 Patents: 48 PhD Students: 45 Post-docs: 76

PROFESSIONAL EXPERIENCE

Francis Norwood Bard Professor of Materials Engineering (1/01 to present), Department of Materials Science & Engineering, Bard Hall, Cornell University, Ithaca, NY 14853

Director, Cornell Nanoscale Facility, (7/16 to 6/21) Duffield Hall, Cornell University, Ithaca, NY

Interim Dean of Engineering, (1/09 to 7/10) Carpenter Hall, Cornell University, Ithaca, NY

Associate Dean of Engineering for Research and Graduate Studies, (9/07 to 12/08)

Carpenter Hall, Cornell University, Ithaca, NY 14853

Director (1/00 to 12/03) Department of Materials Science & Engineering, Bard Hall, Cornell University, Ithaca, NY 14853

Professor, (7/98 - present) Department of Materials Science & Engineering, Bard Hall, Cornell University, Ithaca, NY 14853

Associate Professor, (7/92 - 6/98) Department of Materials Science & Engineering, Bard Hall, Cornell University, Ithaca, NY 14853

Assistant Professor, (9/86 - 6/92) Department of Materials Science & Engineering, Bard Hall, Cornell University, Ithaca, NY 14853

Senior Member of Research Staff, (9/84 - 8/86) Xerox Research Centre of Canada, Mississauga, ON, Canada.

NSERC Canada Industrial Postdoctoral Fellow, (4/82 - 8/84) Xerox Research Centre of Canada, Mississauga, ON, Canada.

PROFESSIONAL AFFILIATIONS AND ACTIVITIES

International Union of Pure and Applied Chemistry

Chair, Interdivisional Sub-committee on Materials Chemistry, 2011-present

Past-president, Polymer Division, 2012-2013

President, Polymer Division, 2008-2011

Vice President, Polymer Division, 2006-2007

Titular member, Polymer Division, 2004-2006; Chair, Sub-committee on Developing Polymers

American Chemical Society

Chair, PMSE Division of ACS, 2000

Member, PMSE Long Range Planning Committee, 2001-2006
Chair Elect and Vice Chair, PMSE Division of ACS, 1998 - 1999.
Secretary, PMSE Division of ACS, 1997 - 1998
Member-at-Large, PMSE Division of ACS, 1993-1994, 1995-1996
Chair: Workshops committee, 1997 to 1998.
Member, ACS Petroleum Research Fund, Advisory Board, 2005-2010.
Member, ACS Polymer Division Program Committee, 1990 to 1995.
Member, Executive Committee, Cornell Section, American Chemical Society, May 1989 to April 1991.

Additional memberships: Materials Research Society, American Physical Society, Society of Photographic and Imaging Engineers (SPIE)

Associate Editor, *Macromolecules* (1995 - 2010).

Member, Editorial Boards, *Journal of Macromolecular Science - Pure and Applied Chemistry* (1990 – 2007); *Polymers for Advanced Technologies* (1991- present); *Polymer Bulletin* (2004 – 2014); *Chemistry of Materials* (2009 - 2014); *International Editorial Board of 'Green Materials' (GMAT)* (2012 – present); *International Advisory Board, Journal of Photopolymer Science and Technology*

AWARDS & HONORS

- 2016, Japan Photopolymer Science and Technology Award
- 2015, Japan Photopolymer Science and Technology Outstanding Achievement Award
- 2015, Fellow of the American Association for the Advancement of Science
- 2014, American Chemical Society PMSE Division Distinguished Service Award
- 2014, Japan Society for the Promotion of Science (JSPS) Fellow, TokyoTech
- 2014, Fellow of the American Physical Society
- 2013, Society of Polymer Science Japan (SPSJ) International Prize
- 2011, Humboldt Research Prize and Visiting Professor, University of Freiburg, Freiburg, Germany
- 2009, Gutenberg Research Award, University of Mainz
- 2009, ACS Fellow, Inaugural Class
- 2007 University of Waterloo Faculty of Science Alumni of Honour Award
- 2007 Humboldt Research Prize and Guest Professor, University of Bayreuth, Bayreuth, Germany
- 2006 ACS Award in Applied Polymer Science
- 2005 Xerox Lecturer, Canadian High Polymer Forum, Aylmer, Quebec
- 2003 SRC Award for Creative Invention *with Junyan Dai*
- 2003 International Sematech Outstanding Contribution Award



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Kaoru Yamanouchi

March 30, 2017

Dr. Richard Hartshorn
IUPAC Secretary General
P.O. Box 13757 Research Triangle Park,
North Carolina 27709 USA

Re: Letter of Recommendation for Professor Ken Sakai as a bureau member of IUPAC

Dear Professor Hartshorn,

It is my pleasure to recommend Professor Ken Sakai at the Department of Chemistry, Kyushu University as a bureau member of IUPAC from 2018.

Professor Sakai is a renowned and world-leading researcher whose scientific achievements in the field of inorganic chemistry and photoinduced solid state catalytic chemistry have been recognized internationally. In these two decades, he has been exploring newly designed molecular systems and the mechanisms of their photochemical processes and catalytic activities. Among his achievements, the development of hybrid materials acting as artificial photosynthetic nanoreactors for solar fuel generation, which will contribute significantly to the reduction of atmospheric carbon dioxide, is noteworthy. His recent studies also involve development of metalorganic-inorganic hybrid materials and their applications to solar energy conversion and storage.

The series of his pioneering studies have been attracting much attention in the related research communities, and consequently, during the most recent five years of 2012 - 2016, he was invited to give a talk at as many as 44 international conferences and symposia, and among them, four are keynote talks. Even more impressively, he organized seven international gatherings in these five years, and played a role as symposium chair in five symposia among them.

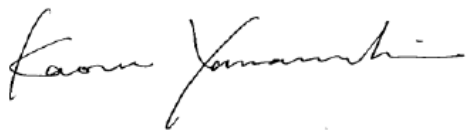
Beside his superb scientific activities, he has been devoting himself to services in a number of academic societies, such as Chemical Society of Japan, Japan Society of Coordination Chemistry, and IUPAC. In IUPAC, he has been a member of Division II for nine years until now (Observer in

2007, AM in 2008-2009, TM in 2010-2013, AM in 2014-2015, AM in 2016-2017). In 2009, he proposed to launch a project in Division II, entitled “*Guidelines for measurement of luminescence spectra and quantum yields of inorganic and organometallic compounds in solution and solid state,*” and played a role as one of the task group members and monitored the progress of the project. Because of his sincere effort, the outcome of the project was published last year as Technical Report in *Pure Appl. Chem.* (PAC-16-701-Guidlines). It should also be mentioned that he is currently a member of the IUPAC Sub-Committee at Science Council of Japan, which is an NAO of IUPAC for Japan.

Professor Sakai has also been active in organizing international symposia, such as Pacificchem in 2010 and 2015 held in Honolulu and the first Asian Conference on Coordination Chemistry in 2007 as Secretary. He is now currently serving as Secretary to International Conference on Coordination Chemistry to be held next year in Sendai, Japan.

I sincerely hope that an opportunity is given to Professor Sakai so that he could play a more prominent role in IUPAC. I am quite sure that his sincere efforts will lead to the promotion of chemistry on a world-wide scale. Without any reservations, I strongly recommend Professor Sakai as the most promising candidate to be a bureau member of IUPAC.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Kaoru Yamanouchi', with a stylized, cursive script.

Kaoru Yamanouchi
Professor of Chemistry, the University of Tokyo
Chairman, the IUPAC Sub-Committee,
Science Council of Japan

Photograph of Professor Ken Sakai, Candidate for a Bureau Member



Biographical Sketch of Professor Ken Sakai, Candidate for a Bureau member

Ken Sakai received his B.S. (1987), M.S. (1989), and Ph.D.(1993) from Waseda University by his achievements on the synthesis, crystal structures, and catalysis of multinuclear mixed-valent platinum(II,III) complexes under the guidance of Prof. Kazuko Matsumoto. In 1991, he was appointed as an assistant professor at Seikei University, and promoted his research for eight years on the photochemical hydrogen evolution catalyzed by platinum(II) complexes, the development of one-dimensional platinum chain complexes consisting of amidate-bridged dimeric entities, and the reactions and kinetics of various coordination compounds newly synthesized and developed in his group. In 1999, he was appointed as an associate professor at Tokyo University of Science, and, in 2004, became a full professor at Kyushu University. He obtained his concurrent position at the Center for Molecular Systems of Kyushu University in 2011 and became as a principal investigator for Kyushu University International Institute for Carbon-Neutral Energy Research in 2012.

He has been active in inorganic chemistry, and has been exploring newly designed molecular systems and the mechanisms of their photochemical processes and catalytic activities. Among his achievements, the development of hybrid materials acting as artificial photosynthetic nanoreactors for solar fuel generation, which will contribute significantly to the reduction of atmospheric carbon dioxide, is noteworthy. His recent studies also involve development of metalorganic-inorganic hybrid materials and their applications to solar energy conversion and storage.

Beside the pioneering scientific activities, he has been devoting himself to services in a number of academic societies, such as Chemical Society of Japan, Japan Society of Coordination Chemistry, and IUPAC. In IUPAC, he has been a member of Division II for nine years (Young observer in 2007, AM in 2008-2009, TM in 2010-2013, AM in 2014-2015, AM in 2016-2017). In 2009, he proposed to launch a project in Division II, entitled “*Guidelines for measurement of luminescence spectra and quantum yields of inorganic and organometallic compounds in solution and solid state,*” and played a role as a task group member. The results of the project were published last year as Technical Report in *Pure Appl. Chem.*

Professor Sakai has also been active in organizing international symposia, such as Pacificchem in 2010 and 2015 held in Honolulu as a symposium co-organizer and the first Asian Conference on Coordination Chemistry in 2007 as Secretary. He is now currently serving as Secretary to International Conference on Coordination Chemistry to be held next year in Sendai, Japan.

Professor Ken Sakai

Affiliation: Inorganic Chemistry, Department of Chemistry, Faculty of Sciences, Kyushu University; WPI-I2CNER, Kyushu University; Center for Molecular Systems (CMS), Kyushu University.

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URL: <http://www.scc.kyushu-u.ac.jp/Sakutai/index.eng.html>



Education

1983 – 1987 B. S. Waseda University (Chemistry)
1987 – 1989 M. S. Waseda University (Chemistry)
1989 – 1991 Ph.D. Waseda University (Thesis 1993)

Professional Career

1991.04 – 1999.03 Assistant Professor, Dept. Industrial Chem., Seikei University
1999.04 – 2003.03 Lecturer, Dept. Appl. Chem., Tokyo University of Science
2003.04 – 2004.07 Associate Professor, Dept. Appl. Chem., Tokyo University of Science
2004.08 – Present Professor, Department of Chemistry, Kyushu University
2011.04 – Present Professor, Center for Molecular Systems (CMS), Kyushu University
2012.01 – Present Principal Investigator, International Institute for Carbon Neutral Energy Research (WPI-I2CNER), Kyushu University
2014.10 – Present Member of Science Council of Japan

Activities in IUPAC

2007 Observer, attended General Assembly Meeting in Torino, Italy
2008-2009 Associate Member of Inorganic Chemistry Division (Division II)
2010-2013 Titular Member of Inorganic Chemistry Division (Division II)
2014-2015 Associate Member of Inorganic Chemistry Division (Division II)
2016-2017 Associate Member of Inorganic Chemistry Division (Division II)

Project in IUPAC

Project No. 2009-045-1-200: Guidelines for Measurement of Luminescence Spectra and Quantum Yields of Inorganic Compounds, Metal Complexes and Materials:

Published in IUPAC Report:

"Guidelines for measurement of luminescence spectra and quantum yields of inorganic and organometallic compounds in solution and solid state" by Hitoshi Ishida, Jean-Claude Bunzli and Andrew Beeby, *Pure Appl. Chem.* **2016**, 88, 701-711.

Selected Publications

1. "A New One-Dimensional Platinum System Consisting of Carboxylate-Bridged *cis*-Diammine-platinum Dimers", K. Sakai et al., *J. Am. Chem. Soc.*, **1998**, *120*, 11353-11363.
2. "New Partially-Oxidized 1-D Platinum Chain Complexes Consisting of Carboxylate-Bridged *cis*-Diammineplatinum Dimer Cations", K. Sakai et al., *J. Am. Chem. Soc.*, **2002**, *124*, 12088-12089.
3. "A Photo-Hydrogen-Evolving Molecular Device Driving Visible-Light-Induced EDTA-Reduction of Water into Molecular Hydrogen", H. Ozawa, M.Haga, K. Sakai, *J. Am. Chem. Soc.*, **2006**, *128*, 4926-4927.
4. "Homogeneous Catalysis of Platinum(II) Complexes in Photochemical Hydrogen Production from Water", K. Sakai, H. Ozawa, *Coord. Chem. Rev.*, **2007**, *251*, 2753-2766.
5. "Evidence for Pt(II)-Based Molecular Catalysis in the Thermal Reduction of Water into Molecular Hydrogen", K. Yamauchi, S. Masaoka, K. Sakai, *J. Am. Chem. Soc.*, **2009**, *131*, 8404-8406.
6. "Photo-Hydrogen-Evolving Molecular Devices Driving Visible-Light-Induced Water Reduction into Molecular Hydrogen: Structure-Activity Relationship and Reaction Mechanism", H. Ozawa, K. Sakai, *Chem. Commun.*, **2011**, *47*, 2227-2242 (**Feature Article, invited, Hydrogen Issue**).
7. "Kinetics and DFT Studies on Water Oxidation by Ce⁴⁺ Catalyzed by [Ru(terpy)(bpy)(OH₂)]²⁺", S. Masaoka, K. Sakai et al., *Chem. Commun.*, **2012**, *48*, 239-241.
8. "Photoinduced Hydrogen Evolution from Water Based on a Z-Scheme Photosynthesis by a Simple Platinum(II) Terpyridine Derivative", M. Kobayashi, S. Masaoka, K. Sakai, *Angew. Chem. Int. Ed.*, **2012**, *51*, 7431-7434.
9. "Cobalt Porphyrins as Homogeneous Catalysts for Water Oxidation", T. Nakazono, A.R. Parent, K. Sakai, *Chem. Commun.*, **2013**, *49*, 6325-6327.
10. "Pigment-Acceptor-Catalyst Triads for Photochemical Hydrogen Evolution", K. Kitamoto and K. Sakai, *Angew. Chem. Int. Ed.*, **2014**, *53*, 4618-4622.
11. "Progress in Base-Metal Water Oxidation Catalysis", A. R. Parent and K. Sakai, *ChemSusChem*, **2014**, *7*, 2070-2080.
12. "Improving Singlet Oxygen Resistance during Photochemical Water Oxidation by Cobalt Porphyrin Catalysts", T. Nakazono, A. R. Parent and K. Sakai, *Chem. Eur. J.*, **2015**, *21*, 6723-6726.
13. "Towards a Bioinspired-Systems Approach for Solar Fuel Devices", R. J. Detz, K. Sakai, L. Spiccia, G. W. Brudvig, L. Sun, and J. N. H. Reek, *ChemPlusChem*, **2016**, *81*, 1024-1027.
14. "Light-induced Water Oxidation Catalyzed by an Oxido-bridged Triruthenium Complex with a Ru-O-Ru-O-Ru Motif", Y. Tsubonouchi, Shu Lin, A. R. Parent, G. W. Brudvig, and K. Sakai, *Chem. Commun.*, **2016**, *52*, 8018-8021.
15. "One-dimensional Magnus-type platinum double salts", C. H. Hendon, A. Walsh, N. Akiyama, Y. Konno, T. Kajiwarra, T. Ito, H. Kitagawa, and K. Sakai, *Nat. Commun.*, **2016**, *7*, 11950.
16. "Tris(2,2'-bipyridine)ruthenium Derivatives with Multiple Viologen Acceptors: Quadratic Dependence of Photocatalytic H₂ Evolution Rate on the Local Concentration of Acceptor Site", K. Kitamoto and K. Sakai, *Chem. Eur. J.*, **2016**, *35*, 12381-12390.
17. "Molecular photo-charge-separators enabling single-pigment-driven multi-electron transfer and storage leading to H₂ evolution from water", K. Kitamoto, M. Ogawa, G. Ajayakumar, S. Masaoka, H.-B. Kraatz, and K. Sakai, *Inorg. Chem. Front.*, **2016**, *3*, 671-680.
18. "Dichloro(diphenylbipyridine)platinum(II) Derivative Tethered to Multiple Viologen Acceptors", K. Kitamoto and K. Sakai, *Chem. Commun.*, **2016**, *52*, 1385-1388.

7.1 President's Statutory Report on the State of the Union

Professor Natalia P. Tarasova, President

According to the Statute 6.23, "The President shall submit to each regular meeting of the Council a report on the general state of the Union". In this report, a general overview of the activities will be given. The details might be found in the reports of officers, division presidents and standing committees chairs.

IUPAC is one of the oldest scientific union of chemistry professional acting on the volunteer basis. Wikipedia defines the volunteering as follows: "Volunteering is generally considered an altruistic activity where an individual or group provides services for no financial gain "to benefit another person, group or organization". Volunteering is also renowned for skill development and is often intended to promote goodness or to improve human quality of life. Volunteering may have positive benefits for the volunteer as well as for the person or community served. It is also intended to make contacts for possible employment". This type of self – organization of human beings originated from the 19th century and is about hundred years old. I would like to mention that IUPAC, International Union of Pure and Applied Physics (IUPAP), International Astronomic Union (IAU) as well as several other sister-unions are approximately of the same age, thus demonstrating the ability of scientists to accelerated self-organization as a response to the changing environment (social, economic, "natural"). In my short report, you will easily identify examples of such adaptation.

The "volunteer" nature poses some specific limitations on the functioning of the Union. None of its' members (no matter, individual, national adhering organizations, company associates, other types of stakeholders) can't be made to contribute. The level of the involvement strongly depends on the dedication and human qualities. In several division reports the problem of "passive" titular members was mentioned, for example. Same problem appears if we look at the numbers of "delayed" projects. Some of them were to be accomplished years ago. So, the initiative of the Secretary General to analyze the activities of the IUPAC divisions and standing committees is welcome. He will present the outcomes in his reports to the Council.

The secure structural foundation for the development of the Union built up in the past biennium under the dedicated leadership of **Dr. Mark Cesa** assisted by **Mr. Colin Humphris**, to both of whom I would like to express my sincerest gratitude, includes the highly professional Secretariat led by **Dr. Lynn Soby**, the IUPAC Strategic Plan, National Subscriptions Task Force, IUPAC100 Task Force (led by **Professor Mary Garson**), cooperating division presidents and standing committees chairs (**led by Professor Jan Reedijk**), and thousands of volunteers from 57 countries. More details might be found in the Council Agenda Book. The specific example will be displayed the corresponding Agenda items.

The IUPAC Secretariat experienced two relocations in the recent three years, and it was an additional burden. Never-the-less, due to personal excellent management skills of Dr. Lynn Soby, the office functions in a sustainable manner. **The IUPAC web site** evolves so that in the nearest future to turn into the efficient resource of the Union, its' divisions and volunteers. Sites of Divisions II, IV, VII are amongst the most frequently visited, as well as several others. Alongside with *Chemistry International and Pure and Applied Chemistry*, the IUPAC web site must become the attractive face of the union and the efficient mean of communication with the general public. The IUPAC members are also invited to actively use the standard set of **IUPAC slides**, prepared by Dr. Lynn Soby. Depending on the types of the activities (conference, round table, public lecture,

etc.) the set might be modified. From my own very positive experience, I would highly recommend using it to promote the IUPAC.

It is well known that, as far as the general public and the media are concerned, the **discovery of new elements** and the future of the **Periodic Table of the Elements** usually attract the greatest attention. The biennial 2016-2017 was rich in events in this respect. The press-release announcing the discovery of elements 113, 115, 117 and 118 was published, under the signature of now the IUPAC past-President Dr. Mark Cesa, on December 31, 2015. The press-release with the names of the new super-heavy elements was issued on December 1st, 2016. Professor Jan Reedijk will inform you about the details of this process later (item 12 of the Agenda). I would like to thank him, as well as **Professor Lars Öhrström**, members of the Division II, **Dr. Fabienne Meyers**, **Dr. Lynn Soby**, and last, but not the least, **Professor Bruce Mckellar** (the President of the IUPAP) for the very effective team work during this difficult period. The scientific discussions within the SuperHeavy Elements (SHEs) community helped to highlight the problems that are now being discussed in the frame of the Joint Working Group appointed by the Presidents of IUPAC and IUPAP. Some twenty-five years have now elapsed since the criteria that are currently used to verify claims for the discovery of a new element were set down. The recent completion of the naming of the one-hundred and eighteen elements in the first seven periods of the Periodic Table of the elements provides a natural opportunity for a necessary expert review of these criteria in the light of the experimental and theoretical advances in the field. The report is expected to be published later this year in PAC.

Many other **scientific matters** (including IUPAC-sponsored conferences and other events) will be discussed in the reports of the Division Presidents and Standing Committee Chairs. IUPAC continues to strengthen its' position as the leading science authority when global consensus on chemistry related matters is needed.

Green chemistry is the field of chemistry that falls in this category of matters. From the theoretical concept (the invention, design and application of chemical products and processes to reduce or eliminate the use and the production of harmful substances) it has developed to become a basic instrument for sustainable development that touches many aspects of the environment and human welfare, and is relevant to 17 Sustainable Development Goals set by the UN. Division III was a cradle of the Subcommittee in Green Chemistry for more than 25 years. The child has grown up, and following the recommendations of the Bureau meeting in Montreal, the new Standing Committee – the Interdivisional Committee in Green Chemistry for Sustainable Development was created. The report on its' activities will be discussed under item 25.2. At this moment, I would like to deeply thank **Professor Pietro Tundo** for his dedication to green chemistry and his great enthusiasm – a really bright example of the volunteer.

As it was mentioned above, green chemistry is considered to become a basic tool for sustainable development. Sustainable development itself is a multifactor phenomenon, the intersection of environmental, social and economic issues. **The interdisciplinarity** of the IUPAC activities determines the important role of the Union in the International Council for Science (ICSU). IUPAC is a co-leader (together with the International Mathematical Union) of the ICSU project **“A Global Approach to the Gender Gap in Mathematical and Natural Sciences: How to Measure It, How to Reduce It?”** which has been approved and funded by ICSU for an annual amount of EUR 100,000 per year for three years (2017-18-19). The ICSU evaluation of the project was very positive. I would like to extend my particular thanks to **Professor Mei-Hung Chui** and **Dr. Mark Cesa** for the successful organization of the team to work on the project proposal.

In October 2016, members of the International Council for Science (ICSU) and the International Social Science Council (ISSC) met in Oslo, Norway, to consider a possible merger of these two organizations. Being ICSU active member, IUPAC was involved in the series of consultations, represented by **Dr. Mark Cesa**. The merger “pro- and contra” will be discussed under the items 6 and 7.2 of the Agenda. Supporting materials might be found in the Agenda Book.

Alongside with gender problems, **intergenerational equality** is considered crucial for sustainable development. Exploring the outstanding experience of the elder members of the union, the union was trying to involve younger chemists from all-over the world to its’ activities. Under the patronage of the Secretary General **Professor Richard Hartshorn**, the Memorandum of Understanding between The International Young Chemists Network and IUPAC was prepared and will be signed during the General Assembly. Other examples to be mentioned are the IUPAC sponsorship of International Chemistry Olympiads, IUPAC Poster Prizes for young chemists awarded at IUPAC-endorsed conferences, IUPAC-Solvay International Awards for Young Chemists, and other awards for young chemists. I would like to thank **Professor Jung-Il Jin**, who will represent IUPAC at the IChO in Thailand this July and present awards to the students with the highest scores on the theoretical and practical examinations, and all the members of the IUPAC Juries for the evaluation of hundreds of applications. **IUPAC Secretariat** is an indispensable resource taking care of diplomas and awards for the winners. As for the future, the Affiliate Membership Program should disclose its’ potential involving individual young chemists to IUPAC.

Special mention should be made of the UNESCO/PhosAgro/IUPAC grant program for young chemists “**Green Chemistry for Life**”. Launched in 2013 with the initial funding of 1.5 million USD, it had three calls for proposals resulting in about 20 research projects. The last call in the year 2017 attracted more than 130 applications from all the continents. PhosAgro plans to extend the program for another 3 years, with the same amount of financial support. I would like to express my sincere gratitude to **Professor John “Sean” Corish**, the permanent Chair of the International Jury and to wish the program every success.

Chemical industry is considered to be among the key stakeholders of IUPAC. COCI (led by **Professor Bernard West**) under the frame of the Project #2014-018-2-022 used a survey to discover what the various stake holders knew about the IUPAC Company Associates’ processes and their interaction with industry. Results were analyzed and the feedback used to explore options for changing the initiative to better serve the needs of the Companies and IUPAC, especially to line up with the Strategic Plan. More details on this survey, as well as the information on the other initiatives of this Standing Committee in strengthening the links with the chemical industry, might be found in the COCI report to the Council (item 18.3).

Chemical industry might become one of possible donors to the proposed **endowment fund** (the initiative led by the Treasure **Mr. Colin Humphris**). The endowment scheme was strongly supported by the Finance Committee chaired by **Professor Sean Corish** (I had the pleasure to participate in its’ meeting in Zurich in February 2017). The Finance Committee encouraged the union to progress this as a priority for areas in which IUPAC has unique competence. More information on this and other financial activities will be described in the report of the Treasurer (item 21 of the Council Agenda). I would like to specially mention the unprecedented activity in consultations with NAOs and sister-unions, concerning the methods of calculation of annual fees and other finance matters of vital importance for the union, organized by the Executive Director **Dr. Lynn Soby** and the Treasurer **Mr. Colin Humphris**.

The visibility of the Union among its' different **stakeholder groups**, including volunteers, affiliates, NAOs and CAs, as an essential step in recruiting new members and retaining current members was studied under the leadership of **Dr. Mark Cesa**. The results of the surveys will be presented under the item 7.1 of the Agenda. They are currently being analyzed to help with the writing of value proposition statements for these stakeholders and with generating new ideas for offerings to current and new member sets.

The visibility of the IUPAC on the global level comes through the cooperation with **global organizations**. Some examples have already been mentioned: UNSCO, ICSU. In recent years, IUPAC has been privileged to work with the **Organization for the Prohibition of Chemical Weapons** (OPCW), in contributing technical expertise to the Review Conferences of the Chemical Weapons Convention (CWC), in contributing to the OPCW Advisory Board on Education and Outreach (my gratitude to Dr. Mark Cesa), in developing educational resources on the multiple uses of chemicals, in organizing training workshop in Responsible Care initiative and in the dissemination of The Hague Ethical Guidelines.

On December 1st, 2017, the **Memorandum of Understanding** between the International Union of Pure and Applied Chemistry and the Organization for the Prohibition of Chemical Weapons was signed. I hope that it will deepen the cooperation between our organizations and help the humanity to achieve Sustainable Development Goals in a world, free of chemical weapons, in a world in which achievements in chemical science and technology are used only for the benefits of the humankind.

In conclusion, I would like to thank all the volunteers of the IUPAC who are contributing their knowledge, hearts and souls so that the union, while approaching its' centenary, could meet the challenges of the present based on the glorious past and looking into the future.

My special thanks to Dr. Mark Cesa, Professor Qi-Feng Zhou, Professor Richard Hartshorn, Mr. Colin Hymphris, Dr. Lynn Soby. It was a great pleasure to work with them as a team.

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I am grateful to all IUPAC Member Organization and all the other stakeholders for the commitment to the IUPAC work and their passion to chemistry.

I am grateful to my husband Igor and my son Pavel, as well as to my colleagues from UNESCO Chair in Green Chemistry for Sustainable Development, D. Mendeleev University of Chemical Technology of Russia, for their moral support and patience.

Respectfully submitted,



Professor Natalia P. Tarasova, IUPAC President



**INTERNATIONAL
COUNCIL
FOR SCIENCE**



international social science council

ICSU-ISSC Proposed Merger Process

Draft Planning Framework

July 2016

Introduction: Status and purpose of the Planning Framework

This Planning Framework has been developed and approved by the Executive bodies of the International Council for Science (ICSU) and the International Social Science Council (ISSC), during a meeting held on 28 June 2016. It is submitted to the members of the ISSC and ICSU in preparation for their joint General Assembly to be held in Oslo, Norway, on 24 October 2016.

The purpose of the Planning Framework is to outline a set of variables to be considered in a possible merger between ICSU and ISSC and, in each case, to:

- Highlight key issues and implications of the proposed merger;
- Make recommendations about the transition process, as well as preferred options for a new organization; and
- Identify the need for additional external expertise to develop specific options and facilitate transition processes.

Background materials

Important background information to the issues addressed in this Planning Framework is provided in a series of Appendices, as follows:

- Appendix 1: Proposed roadmap towards a merger, as presented in the 5 May 2016 communiqué to ISSC and ICSU members.
- Appendix 2: Overview of current ICSU (a) and ISSC (b) activities
- Appendix 3: Overview of existing ISSC (a) and ICSU (b) members and membership fees
- Appendix 4: List of ICSU Executive Board (a) and ISSC Executive Committee's (b) positions and current incumbents
- Appendix 5: Overview of current ISSC (a) and ICSU (b) Paris-based staffing arrangements
- Appendix 6: ICSU (a) and ISSC (b) 2016 budgets

In addition, the existing statutes/rules of procedures of ISSC and ICSU can be downloaded [here](#):

For ICSU: <http://www.worldsocialscience.org/documents/issc-constitution-revised-by-the-xxviiiith-ga.pdf>

For ISSC: <http://www.icsu.org/publications/statutes-policies/statutes-procedure/statutes-and-rules-of-procedure>

The merger variables: Key issues, implications and associated recommendations

1. Strategy

a) Strategic planning:

Key issues and implications:

ICSU's current strategic plan runs until the end of 2017. Earlier in 2015, ICSU embarked on a strategic planning process, with the intention of preparing a new strategy for adoption by its members in October 2017. The ICSU Executive Board's response to the 2014 External Review of the organization provides important inputs into the new strategy development process (see <http://www.icsu.org/publications/reports-and-reviews/response-to-the-2014-external-review-of-icsu-2016>).

ISSC does not currently have plans to develop a longer-term strategy, and has not been recently reviewed.

Recommendations:

- ISSC and ICSU should not, at this stage, proceed with the development of separate strategic plans. Instead, the two organizations should work together on the development of a high-level strategy document, which would be submitted to ICSU and ISSC members for discussion and possible adoption during their second joint General Assembly in October 2017. The proposed joint strategy should:
 - articulate a vision and mission for a new, merged organization;
 - set out its key organizational values and working principles; and
 - present a framework of strategic activities – and associated partnerships – to be pursued for a period of up to five years from 2018 onwards.
- Should the in-principle decision about a merger, to be taken in October 2016, be positive, the development of the proposed strategy document would
 - be jointly guided by ICSU's Committee for Scientific Planning and Review (CSPR) and the ISSC Executive Committee;
 - build on the stakeholder interviews that both ICSU and ISSC have commissioned from a consulting firm called Firetail; and
 - include a joint membership survey, also to be supported by Firetail.

b). Activities:

Key issues and implications:

As indicated above, a new strategy for a merged organization will need to define a framework of strategic activities. A key decision to be taken in this regard will concern the continuation – or appropriate adjustment – of the various activities of each organization. With specific reference to the ISSC flagship series of regular World Social Science Forums and World Social Science Reports, the issue of linkages and potential overlap with UNESCO's series of World Science Forums (in which ICSU is a co-organizing partner) and World Science Reports would need to be addressed.

Recommendations:

- The imperative of promoting integrated science in order to better address global challenges underlies the recommendation to merge the ISSC and ICSU and would, therefore, guide the development of a new framework of strategic activities.
- The question of whether a new, merged organization should undertake to convene a new regular series of world fora and world reports – and whether or not these should have an integrated focus and format – should be decided on the basis of the membership survey to be conducted as part of the strategic planning process proposed in point 1(a) above.
- Considering that UNESCO will soon review all of its reports (including the World Social Science Report and World Science Report), ICSU and ISSC should discuss with UNESCO the possible role of a new, merged organization in producing a regular series of integrated global science reports.
- The ISSC should not, at this stage, initiate plans:
 - to organize a World Social Science Forum after the scheduled 2018 event, which is due to be hosted by Japan in September of that year;
 - for the preparation of a new World Social Science Report beyond the 2016 edition, on the topic of inequalities.
- Until a new strategy for a merged organization has been adopted, any plans for either ICSU or ISSC to respond to strategic opportunities by becoming involved in a new activity or partnership should be discussed by the Executives of both organizations.
- The ISSC and ICSU will seek to launch (with secured resources) at least one new integrated global initiative for a new, merged organization. This should be part of the new strategy to be prepared for October 2017. Examples of topics that could be considered for this purpose include big data / data science (building on the work of the 2015 Science International Open Data Accord), science education, outreach and public engagement (building on the focus of ICSU's redesigned grants programme).

c). Key partnerships:**Key issues and implications:**

ICSU and ISSC currently enjoy significant overlap in their partnership networks. There are, however, partnership relations that are specific to one or the other organization. For example, ISSC has a formal framework agreement with UNESCO (until 2021), whereas ICSU does not. ISSC and ICSU also maintain different partnerships via specific programme co-sponsorship and hosting arrangements; for example, the Urban Health and Wellbeing Programme is co-sponsored by ICSU, the United Nations University and the InterAcademy Medical Panel, whereas the ISSC and the University of Bergen co-sponsor the Comparative Research on Poverty Programme (CROP).

Recommendations:

- All existing partners of ICSU and ISSC, including programme co-sponsors and/or hosting institutions, should be informed about the proposed merger process, with a view to retaining and, where relevant, strengthening their partnership with a new, merged organization. Plans to review and update existing MoUs should be taken up in the detailed Transition Plans towards such an organization.
- Concrete recommendations about establishing new partnerships – particularly with the humanities (e.g. the International Council for Philosophy and Humanistic Studies

(CIPSH), as well as with the private sector – should be included in the proposed strategy to be developed for a new organization.

2. Membership and governance

a). Membership composition and structure

Key issues and implications:

ISSC and ICSU have a similar membership structure, comprising international scientific unions/associations and national member organizations, but there are important differences. Unlike ICSU:

- ISSC can and does have more than one national organization from a single country as members. In these cases country-based membership fees are shared between the organizations in question.
- ISSC has a membership category for individual universities, research institutes and foundations.

As part of its response to the 2014 external review, the ICSU Executive Board has undertaken to review its membership composition and structure. The purpose of this exercise was intended to explore the pros and cons of opening membership up to new disciplines or fields of science and creating new membership categories, e.g., for individual scientists, research institutes and/or the private sector.

Recommendations:

- ICSU should not, at this stage, proceed with a separate review of its membership composition and structure as these issues will be addressed in the development of detailed transition plans for a new, merged organization.
- All current members of ICSU and ISSC should automatically be welcomed as members of the new organization.
- The issue of multiple memberships per country should be addressed in the detailed transition plans to be developed for discussion during the October 2017 GA. Should the new organization aim, in the longer term, to operate with a system of one vote per country, this would mean that in cases where a country is represented by two or more organizations (e.g. a research council and an academy/institution), those organizations would be required to coordinate their positions, as well as national membership dues, amongst themselves.

b). Membership fees

Key issues and implications:

The rate of dues paid to ISSC and ICSU differ significantly, particularly in the case of national member organizations. In addition, there are 14 organizations and 5 unions/associations that hold membership in, and thus pay fees to, both ICSU and ISSC.

Recommendations:

- A new fee structure, which will be based on a review of the pros and cons of the existing structures of ISSC and ICSU, will be developed and implemented at an appropriate time after the first General Assembly of a new, merged organization (to be held in October 2018 at the latest).
- Between now and October 2017, when detailed transition plans and a new fees structure are approved, all members of ICSU and ISSC should continue to pay dues

according to the organizations' current fees structures. As from 2018 and until a new fees structure for a merged organization is implemented, those who hold dual membership of ISSC and ICSU should pay the higher amount (ICSU fees) and 50% of the lower amount (ISSC fees).

c). Governance structures

Key issues and implications:

The ISSC's Executive Committee comprises 16 members, including a President, 2 Vice Presidents and a Treasurer. ICSU's Executive Board comprises 15 members, including a President, 2 Vice Presidents, a Treasurer and Secretary-General. ICSU's Executive Board also includes a President-Elect (due to become ICSU President in October 2017).

Following discussions at the 2014 ICSU General Assembly meeting, ICSU's Executive Board has been consulting ICSU members about changes to the current voting procedures. ISSC voting procedures were reviewed in 2010. Further changes to the ISSC Constitution have been halted; the ISSC Executive Committee has accordingly accepted that only minimal necessary changes will be considered at its October 2016 General Assembly.

Unlike ISSC, ICSU's governance structures include 2 Executive Board-appointed policy advisory committees, namely:

- Committee for Scientific Planning and Review (CSPR)
- Committee for the Freedoms and Responsibility in the Conduct of Science (CFRS)

Recommendations:

- A new, merged organization should have a single, elected Executive body with a single, elected President.
- The detailed Transition Plans to be developed in preparation for the second joint General Assembly of ISSC and ICSU members in October 2017 should include a proposal for a new Executive Board/Committee, including its balanced composition across regions and fields, terms of office, number of required meetings per annum, as well as Officer positions, roles and mandates. The proposed Officer roster should include the position of a Secretary-General.
- As a one-off transition measure aimed at securing balance between the domains of science currently represented by ICSU and ISSC, it is recommended that the first elected Executive body of the new organization (for the period from 2018 to 2021) should include:
 - Two Vice-Presidents, one from each of the domains represented by ISSC and ICSU, and
 - A minimum of 1/3 of executive body members [excluding president and vice-presidents] from the domain represented by ISSC.
- The terms of office of all members of the ISSC Executive Committee and ICSU Executive Board would terminate when the two organizations merge into a new organization. The TTF should address the question of the need for continuity in the election of a new Executive body for a new, merged organization.
- Voting procedures should also be addressed as part of the development of detailed Transition Plans. It is recommended that a new, merged organization should maintain parity in voting between national and union/association members.

- A new, merged organization should maintain a system of policy advisory committees. Their composition and terms of reference should be revised and addressed as part of the detailed Transition Plans.

3. Organizational structures and resources

a). Staffing

Key issues and implications:

The ICSU Secretariat based in Paris comprises 17 members of staff, all of whom have permanent contracts. The organization's budget makes provision for one additional position, which is currently vacant. ICSU has three Regional Offices: one for Africa (ROA), hosted by the Academy of Science of South Africa and comprising 5 members of staff; one for Asia and the Pacific (ROAP), hosted by the Academy of Sciences of Malaysia and comprising 3 members of staff; and one for Latin America and the Caribbean (ROLAC), to be hosted by the Government of El Salvador as from August 2016 and comprising up to 5 members of staff. The staff of all ICSU Regional Offices are employed by the organizations hosting those offices, subject to the labour laws of the hosting countries, and for terms stipulated in the agreements between ICSU and each of the hosting organizations. In legal terms, therefore, the terms and conditions of their employment would not be affected by the creation of a new, merged Secretariat in Paris.

The ISSC Paris-based Secretariat comprises 7 members of staff, 3 of whom have permanent contracts. The ISSC does not have Regional Offices (but it does have regional social science councils as paying members; see point 3(c) below).

ICSU's Executive Board has taken a decision that a potential merger with the ISSC and the creation of a new, merged Secretariat in Paris should not result in job losses for any of its existing employees. The ISSC Executive Committee has not yet given the same guarantee to its staff on short-term contracts but, in order to maintain delivery of activities, will have to renew the contracts of at least 2 staff members before 2018, offering them, in accordance with French law, permanent contracts.

Recommendations:

- The ambition for the Paris-based Secretariat of a new, merged organization should be to provide permanent positions for all current employees of ICSU and at least 5 of ISSC.
- The Executive Directors of ICSU and ISSC should be tasked to develop a proposal for the structure and configuration of a new, merged Paris-based Secretariat. This should be based on an analysis of the prospective financial position of a new, merged organization, as well as the outcomes of strategic planning processes (see point 1(a) above). The process of proposal development should be designed to be transparent and consultative, engaging with the concerns and ambitions of existing members of staff. In this regard, it is strongly recommended that ISSC and ICSU seek resources to commission the services of an external organizational development / change management consultant. The proposal for a future merged Secretariat should be part of the detailed Transition Plans to be approved by the joint ICSU and ISSC membership in October 2017.

b). Finances

Key issues and implications:

Whilst there are similarities in the sources of income (core and external) and type of activity expenditures between the two organizations, the current financial situation of ICSU reflects greater stability of core income and a healthier financial reserve. At the same time, the ISSC has had more experience with raising external, activity-based support to supplement its core income.

Recommendations:

- The detailed transition plans to be developed for the October 2017 joint General Assembly of ISSC and ICSU members should include a prospective outlook of the financial situation and fundraising needs of a new, merged organization. This analysis should be prepared by the ICSU and ISSC Executive Directors in cooperation with the Treasurers of both organizations. It should be accompanied by a business plan, the formulation of which will be guided by the development of a strategy for the new organization.
- The assets and liabilities of both organizations should be combined and held by the new, merged organization. Both organizations will undertake to operate with due diligence in determining such assets and liabilities.

c). Regional Offices and Councils

Key issues and implications:

As indicated in point 3(a) above, ICSU has three externally hosted Regional Offices whereas ISSC has regional members. As part of its response to the 2014 external review, and based on a recent review of all three of its Regional Offices, the ICSU Executive Board has undertaken to review its overall regional strategy. This was to be taken up in the preparation of a new ICSU strategic plan.

Recommendation:

- The regional strategy of a new, merged organization should be addressed in the development both of a strategy for a new, merged organization and the detailed Transition Plans for a possible merger. This issue will require consideration of whether and how the social science regional councils that are paying members of ISSC can collaborate with existing ICSU Regional Offices, and what their role (as voting members) should optimally be in a new, merged organization.

d). Location and French hosting arrangements

Key issues and implications:

Whereas ICSU is hosted by and receives free office accommodation from the French government, the ISSC rents office space from UNESCO. Since 2006 ICSU has received a core income of Euros 500 000 per annum from the French Ministry of Higher Education and Research. The ICSU's agreement with the Ministry ends at the end of 2016. A new agreement has been negotiated but has yet to be concluded.

Recommendation:

- The Paris-based Secretariat of a new, merged organization should ideally be located in the premises currently occupied by ICSU.

4. Name and legal mechanism of establishing a new organization

Key issues and implications:

Legally, the establishment of a new, merged organization can proceed via two means:

- the dissolution of both existing organizations and registration of a new organization or
- the dissolution of one and its integration with the other.

Recommendations:

- The detailed Transition Plans to be prepared for consideration by ISSC and ICSU members in October 2017 should include a recommendation for the most efficient legal mechanism to accomplish a merger. This recommendation should be based on external legal advice.
- The proposed name of the new, merged organization is the “International Science Council”.

Appendix 1: Proposed roadmap towards a merger as presented in the 5 May 2016 communiqué to ICSU and ISSC Members

The proposed roadmap and work plan

The proposed road map and work plan outlined in the table below comprise three phases, each of which culminates in a joint meeting of the members of both organizations. The first two of those meetings will coincide with currently scheduled General Assembly (GA) meetings, of the ISSC in October 2016 and of ICSU in October 2017. This means that ICSU will hold an extraordinary GA session in October 2016 and ISSC will similarly hold an extraordinary GA session in October 2017. The key actions/decisions to be taken at these meetings, as well as the supporting materials to be made available for each, are clearly specified. Phases Two and Three will proceed only if the combined ISSC and ICSU membership agree in principle to pursue a merger at the end of Phase One.

Phase One: Preparing for an in-principle decision to merge

May – June 2016	WG to prepare materials for a June 2016 joint meeting of the ICSU and ISSC Executives
28 June 2016	<p>Joint meeting of the ISSC Executive Committee and ICSU Executive Board, to be held in Paris, France</p> <p><i>Key Actions/Decisions:</i></p> <ul style="list-style-type: none"> • To review any feedback received in response to the April 2016 communiqué and, if necessary, to adjust the proposed roadmap and work plan • To discuss and finalise for submission to ICSU and ISSC members: <ul style="list-style-type: none"> - A background narrative report on the need for a unified, interdisciplinary voice for science at the global level - A planning framework that sets out the key parameters and implications of a merger for future strategic, governance and organizational (including financial and legal) arrangements of a new organization and that recommends preferred options • To agree on a joint planning process for the development of a high-level strategy (outlining a new vision, mission, priority activity profile and core working principles) for a new organization, for consideration and adoption by ICSU and ISSC members in October 2017.
By end July 2016	Submission of the background narrative report and planning framework to ISSC and ICSU members in preparation for a joint meeting in October 2016
24 October 2016	<p>One-day meeting of ISSC and ICSU members during the ISSC General Assembly (which runs from 24 to 26 October 2016), to be held in Oslo, Norway</p> <p><i>Key Actions/Decisions:</i></p> <ul style="list-style-type: none"> • To consider the recommendation to merge ICSU and ISSC and

	<p>agree – in principle – to pursue this</p> <ul style="list-style-type: none"> • To discuss and provide feedback on the planning framework • To agree on the appointment of a Transition Task Force (comprising representatives of both Executive bodies); and to mandate this group to develop detailed transition plans (including new statutes/rules of procedure) for accomplishing a merger .
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Phase Two: Transition planning

November 2016 – June 2017	<p>Transition Task Force to develop detailed transition plans</p> <ul style="list-style-type: none"> • ICSU and ISSC Executives to oversee the development of a high-level strategic plan for a new organization
July 2017	<p>Submission of detailed transition plans and high-level strategy to ISSC and ICSU members in preparation of a joint meeting in October 2017</p>
Between 24-27 October 2017 (Exact date tbc)	<p>One or two-day meeting of ICSU and ISSC members during the ICSU General Assembly (which runs from 24 to 27 October 2017), to be held in Taipei</p> <p><i>Key Actions/Decisions:</i></p> <ul style="list-style-type: none"> • To approve the transition plans (including new statutes/rules of procedure) • To adopt the high-level strategy for a new organization • To agree on the name of the new organization

Phase Three: Transition implementation

November 2017 – mid/end 2018	<p>Transition implementation to be overseen by the ISSC and ICSU Executives, co-chaired by the Presidents of each organization</p>
Before the end of October 2018	<p>Founding General Assembly of the new organization</p> <p><i>Key Actions/Decisions:</i></p> <ul style="list-style-type: none"> • Members of the new organization to elect an Executive governance body

The planning and review of ICSU's scientific activities are guided by the Committee on Scientific Planning and Review (CSPR). As per ICSU Statutes and Rules of Procedures¹, the CSPR coordinates the collection and development of proposals for major new scientific initiatives by ICSU and advises the ICSU Executive Board on priorities for such initiatives; and it reviews the activities carried out by the ICSU Scientific Interdisciplinary Bodies (namely, Programmes, Committees, Observing Systems and Networks) and advises the Executive Board on the future course of these activities.

1. International research coordination and collaboration

Working in collaboration with partner organizations, including UN agencies, ICSU promotes integrated, international research through a range of flagship research programmes, as well as international scientific committees, observing systems and networks. These include:

International research programmes

Future Earth

<http://www.futureearth.org/>

Established in 2012. Co-sponsored by the International Council for Science (ICSU), the International Social Science Council (ISSC), Belmont Forum, Sustainable Development Solutions Network (SDSN), Science and Technology in Society (STS) Forum, United Nations Organization for Education, Science and Culture (UNESCO), United Nations Environment Programme (UNEP), United Nations University (UNU), and the World Meteorological Organization (WMO).

Review: upcoming (2018).

World Climate Research Programme (WCRP)

<http://wcrp-climate.org/>

Established in 1980. Co-sponsored by ICSU, WMO, and the Intergovernmental Oceanographic Commission of UNESCO (IOC of UNESCO).

Review: upcoming (2017).

Integrated Research on Disaster Risk (IRDR)

<http://www.irdrinternational.org/>

Established in 2008. Co-sponsored by ICSU, ISSC, and the United Nations Office for Disaster Risk Reduction (UNISDR).

Review: ongoing (2016).

¹ <http://www.icsu.org/publications/statutes-policies/statutes-procedure/Statutes%20in%20English>

Health and Wellbeing in the Changing Urban Environment - a Systems Analysis Approach
<http://urbanhealth.cn>
Established in 2011. Co-sponsored by ICSU, UNU, and the InterAcademy Medical Panel (IAMP)².
Review: upcoming (2018).

International scientific committees, observing systems and networks

Committee on Space Research (COSPAR)
<https://cosparhq.cnes.fr/>
Established in 1958. Review: upcoming (2018).

Scientific Committee on Antarctic Research (SCAR)
<http://www.scar.org/>
Established in 1958. Review: ongoing (2016).

Scientific Committee on Oceanic Research (SCOR)
<http://www.scor-int.org/>
Established in 1957. Review: ongoing (2016).

Scientific Committee on Solar-Terrestrial Physics (SCOSTEP)
<http://www.yorku.ca/scostep/>
Established in 1966-1978. Review: upcoming (2018).

Scientific Committee on Frequency Allocations for Radio Astronomy and Space Science (IUCAF)
<http://www.iucaf.org/>
Established in 1960. Under the auspices of ICSU, IUCAF is sponsored by the International Astronomical Union (IAU), the International Union of Radio Science (URSI), and COSPAR.
Review: upcoming (2018).

Global Climate Observing System (GCOS)
<http://www.wmo.int/pages/prog/gcos/index.php>
Established in 1992. Co-sponsored by ICSU, WMO, IOC of UNESCO, and UNEP
Review: 2013 (<http://www.wmo.int/pages/prog/gcos/Publications/gcos-181.pdf>).

Global Ocean Observing System (GOOS)
<http://www.ioc-goos.org/>
Established in 1992. Co-sponsored by ICSU, IOC of UNESCO, WMO, and UNEP.
Review: upcoming (2017-2018).

Global Terrestrial Observing System (GTOS)
<http://www.fao.org/gtos/>
Established in 1996. Co-sponsored by FAO, ICSU, UNEP, UNESCO, and WMO.
Review: pending³.

² IAMP – now IAP for Health

³ GTOS is no longer active; but some of its activities/panels in partnership with other observing system (e.g., Terrestrial Observing Panel for Climate [TOPC] with GCOS) are very active. Discussion on

Committee on Data for Science and Technology (CODATA)

<http://www.codata.org/>

Established in 1966. Review: 2012-2013 (<http://www.icsu.org/publications/reports-and-reviews/codata-review-2013/codata-review-2013>).

World Data Systems (WDS)

<http://www.icsu-wds.org/>

Established in 2008. Review: upcoming (2017).

International Network for the Availability of Scientific Publications (INASP)

<http://www.inasp.info/en/>

Established in 1992. Review: upcoming (2017).

Membership/Participation in international networks/groups

- ICSU is an Associate Member of the Committee on Earth Observations Satellites (CEOS). <http://ceos.org/>
- ICSU is a Participating Organization in the Group of Earth Observations (GEO)/Global Earth Observing System of Systems (GEOSS). <https://www.earthobservations.org/pos.php>

Capacity-building/development initiatives and grants

ICSU Grants Programme

The ICSU Grants Programme serves to support international initiatives led by ICSU Unions. Its intent is to foster Membership engagement by addressing long-standing priorities for ICSU members in developing science education, outreach and public engagement activities, and to mobilise resources for international scientific collaboration. The Grants Programme is competitive and peer-reviewed. Proposals must be led jointly by at least two ICSU Scientific Unions. Grants are up to 300,000 € each (100,000 per annum for up to three years) due to be awarded in 2017.

<http://www.icsu.org/what-we-do/projects-activities/icsu-grants-programme/>

Leading Integrated Research for Agenda 2030 in Africa (LIRA2030)

ICSU has recently signed a 5-year agreement with the Swedish International Development Cooperation Agency (Sida) for a 5 million euro programme to strengthen research capacity for sustainability in Africa. The programme will be delivered by ICSU in conjunction with its Regional Office for Africa (ICSU ROA), the Network of African Science Academies (NASAC) and the ISSC, and will support integrated, solutions-oriented research on sustainable development in Africa. By providing grants for integrated research projects and organizing capacity building activities, the programme seeks to develop the potential of next-generation scientists in Africa in the production and communication of policy-relevant knowledge required to address complex sustainability challenges in the region. The first call for proposals will be launched in the second half of 2016 through ICSU and partners' websites. <http://www.icsu.org/what-we-do/projects-activities/leading-integrated-research-for-agenda-2030-in-africa>

the future of this observing system is being held within the context of the ICSU/CSPR also within the framework of a possible review.

International Science Events and International Years

World Science Forum (WSF)

ICSU is a founding organization of the WSF together with the Hungarian Academy of Sciences (MTA), UNESCO, the American Association for the Advancement of Science (AAAS); and is a Member of the Steering Committee, together with MTA, UNESCO, AAAS, The World Academy of Sciences for the advancement of science in developing countries (TWAS), the European Academies Science Advisory Council (EASAC), and chair or delegate of the organizer of the past and future non-Budapest World Science Fora. The next Forum will be held in 2017 in Jordan under the theme "Science for Peace". <http://www.sciforum.hu/>

Other events/conferences

ICSU regularly co-organizes other major scientific conferences on an *ad hoc* basis: a recent example is "Our Common Future Conference Under Climate Change" Conference held in Paris, France in July 2015, under the umbrella of ICSU, Future Earth, UNESCO, and major French research institutions, and with the support of the French Government. <http://www.commonfuture-paris2015.org/The-Conference.htm>

International Years

ICSU has been leading and/or partnering in supporting international years of science. ICSU is currently a partner in the International Year of Global Understanding (other partners include ISSC, the International Union of Geodesy and Geophysics [IUGG], and the International Geographical Union [IGU]). <http://www.global-understanding.info/people-behind/partner/>

2. Science for Policy and Policy for Science

UN Policy Domains and International Processes

As an NGO accredited to United Nations Economic and Social Council (ECOSOC), and as, *inter alia*, co-organizer (alongside ISSC and World Federation of Engineering Organization [WFEO]) of the Scientific and Technological Community (STC) Major Group within the context of post-2015/Agenda 2030 and as organizing partner of the STC Major Group to the Third UN World Conference on Disaster Risk Reduction, ICSU plays an active role in linking science to policy within the context of UN processes. This work is currently done primarily in the context of international policy frameworks, including those on sustainable development, disaster risk reduction, urbanisation and climate change.

Furthermore, ICSU (mainly through its Programmes, Committees, and Observing Systems) contributes to international assessments and global reports, such as the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), and the UN/DESA Global Sustainable Development Report (GSDR). *Ad hoc* reports and/or briefs (e.g., the 2015 ICSU/ISSC Report "Review of Targets for the Sustainable Development Goals: The Science Perspective") are also issued by ICSU within the framework of the above-mentioned processes.

International Network for Government Science Advice (INGSA)

ICSU has established a new global network of science advisors to national governments, which works under the leadership of the Chief Science Advisor to the Prime Minister of New Zealand. The network undertakes capacity-development activities and regularly convenes international events bringing together science advisors (e.g., upcoming 2nd meeting of the international network to be held in Brussels, Belgium, on 29-30 September 2016). <http://www.globalscienceadvice.org/>

Science International

Science International - launched in 2015 - is a series of regular meetings of four top-level representatives of international science (ICSU, the InterAcademy Partnership [IAP], TWAS, and ISSC) that are designed to represent the global scientific community in the international policy for science arena. The theme of first Science International Meeting, which took place from 7-9 December 2015 in Pretoria, South Africa, was 'Big Data/Open Data'. This resulted in an international accord on the values of open data in the emerging scientific culture of big data. A campaign for its endorsement has been launched and a data science capacity initiative will be launched in December 2016 under the leadership of ICSU-CODATA. <http://www.icsu.org/events/ICSU%20Events/science-international>

Fora of Funders

ICSU is an active partner in the Belmont Forum, an international forum of global change research funders. <http://belmontforum.org/>
In addition ICSU remains active in convening different types of funders – including donor aid agencies - to address issues of global concern.

3. Universality of Science

ICSU's Committee on Freedom and Responsibility in the Conduct of Science (CFRS) serves as the guardian of the Council's Principle of Universality of Science (Statutes 5⁴). Adherence to this principle is a condition of membership in the Council. The CFRS raises international awareness about a wide range of aspects related to the freedom and responsibility of science, and it also considers cases of individual scientists whose right to free movement, to freely associate and to communicate is infringed. The committee also organizes thematic workshops such as the 2016 workshop on gender issues in field research.
<http://www.icsu.org/freedom-responsibility>

⁴ <http://www.icsu.org/freedom-responsibility/cfrs/statute-5>

World Social Science Reports

Every three years the ISSC produces a World Social Science Report (WSSR), which addresses important societal and research challenges, taking stock of social science capacities and contributions, and making recommendations for future research, policy and practice. The reports are co-published with UNESCO and the OECD, with full editorial responsibility carried by the ISSC. Development of the Report is guided by a Scientific Advisory Committee of leading scholars, who are responsible for agreeing the Report's key messages and recommendations.

1. The 2010 WSS Report on *Knowledge Divides* reviewed social science knowledge production and use in different regions of the world.
2. The 2013 WSS Report on *Changing Global Environments* highlighted the need for a social re-framing of issues of global change and sustainability.
3. The 2016 WSS Report, *Challenging Inequalities: Pathways to a Just World*, developed in partnership with the Institute of Development Studies (IDS), Sussex, will set a global agenda for the next decade of research on inequalities. The Report aims to address critical knowledge gaps and identify the most promising and innovative areas of research that may inform strategies to reduce global inequalities. The Report draws on the results of a global social science survey, as well as key contributions from the ISSC's 2015 World Social Science Forum. It comprises contributions from 107 contributors, from across the social science disciplines and from 41 countries worldwide. The vast majority of authors are social scientists, but the Report also contains contributions from thought-leaders in other fields, including journalists and social activists.

The official launch of the 2016 WSS Report will take place in Stockholm, Sweden on September 22 2016, hosted by the Swedish International Development Cooperation Agency (Sida) and SSEESS (Swedish Secretariat for Environmental Earth System Sciences). Further launch events are planned for Paris, New York, New Delhi, and other locations worldwide. Pre-launch presentations will be held at the IDS 50th anniversary in July 2016 at Sussex University, UK, and at the 24th IPSA World Congress of Political Science in Poznan, Poland (23-28 July 2016). A communications strategy has been planned to disseminate the Report's findings via social and traditional media, maintaining momentum and interest in the Report around the various launch events.

Key results: 2013 WSS Report

- WSSR Financially supported by 7 agencies and co-published with UNESCO and OECD
- Summary translated into French and Spanish. Chinese translation underway.
- Articles from 151 authors (50 from low/middle income countries) representing 24 disciplines and 37 countries.
- 600 print copies and 3,500 print summaries of the report distributed
- Available online on the ISSC, UNESCO and OECD websites – free to download

- 14 launches to date in Canada, France, Brazil, South Africa, Ghana, Sweden, USA (UN, New York), Norway, China, Great Britain, Iceland, Sao Paulo Brazil, Uganda and Germany.
- A blog has been set up where authors, partners relevant network continue to dialogue
- The report has had some 32,000 unique page views online, and around 23,000 downloads since publication.

Key results: 2016 WSS Report

- 112 authors (53 women and 59 men) from 42 countries, including 6 lower-income countries (8 authors), 17 middle-income countries (34 authors)

World Social Science Forums

The ISSC regularly convenes a World Social Science Forum (WSSF). These events provide a platform for showcasing and debating the world's best, most creative social science contributions with a wide set of stakeholders and in areas of major scientific and societal interest. They aim to shape global research agendas, energise the further development of innovative research, and assist with its effective application to society.

1. The 2009 WSSF, hosted by the University of Bergen in Norway, focused on the theme *One Planet – Worlds Apart*.
2. In 2013 a consortium of Canadian partners hosted a forum on the theme, *Social Transformations and the Digital Age*.
3. The 2015 WSSF, on *Transforming Global Relations for a Just World*, was hosted in South Africa, by an African consortium led by South Africa's Human Sciences Research Council and the Council for the Development of Social Research in Africa. The 2015 WSS Forum signaled a new thematic direction on inequalities and social justice for the ISSC - one that has been taken up by the 2016 World Social Science Report.

The 2018 Forum is currently under discussion with our members from Japan. The host institution would be Kyushu University supported by Science Council of Japan (SCJ), Japan Science and Technology Agency (JST) with Consortium members.

Key results: 2015 WSS Forum

- The 2015 WSS Forum was organized by a consortium of 15 organizations, all from lower and middle income countries (LMIC)
- 1037 participants from 84 countries attended
- Broad participation of stakeholders, including Ministries and official ministers from 9 countries NGOs, media
- Grant programme which supported the participation of 150 early career scientists

Transformations to Sustainability

The Transformations to Sustainability (T2S) Programme⁵ is a major initiative of the ISSC building on its prior work in the areas of transformative research and global environmental change. The programme has three pillars of activity:

1. Shaping the field of research on social transformation for sustainability through engagement with science policy makers and funders;

⁵ www.worldsocialscience.org/transformations

2. Supporting research to advance the state of knowledge on social transformations to sustainability and contribute to securing effective, equitable and durable solutions to the most urgent problems of global change;
3. Informing and influencing policy by engaging decision-makers around critical policy opportunities.

To achieve its goals, the programme is pioneering a new approach to research for sustainability, combining several principles in an innovative way to complement other international initiatives:

- Mobilising a broad community of social scientists from diverse disciplinary backgrounds to get involved in solutions-oriented research for sustainability;
- Enabling social scientists to frame and lead interdisciplinary research with partners from the natural sciences.
- Building capacity research for international research collaboration by enabling researchers in low- and middle-income countries to lead international research projects and by promoting research career development;
- Encouraging researchers to take the global nature of sustainability challenges into account in internationally comparative research designs with international research teams;
- Supporting co-designed and co-produced (i.e., transdisciplinary) research involving academic and societal partners who operate at local to global levels, from beginning to end of the research and dissemination process.

The Transformations to Sustainability Programme is being supported by the Swedish International Development Cooperation Agency (Sida) for an initial period of 4 years (2014-2017).

Key results:

- The programme began in early 2014 with a seed-funding phase in which 38 interdisciplinary and transdisciplinary groups were supported with a total fund of more than €1.1M to co-design research proposals. The 38 seed grant teams involved partners and research sites in some 70 countries in all regions of the world, the majority in low- and middle-income countries. Ad hoc support from the ESRC/Newton Fund, the NRF, NWO and SSEESS allowed for 8 seed grants to be financed beyond the 30 originally planned. The seed grant experience will result in a special issue of the peer-reviewed journal COSUST (Current Opinion in Environmental Sustainability) focused on the 'how-to' of co-design in international, integrated research (forthcoming, autumn 2016)
- The second, main phase of the programme involved the selection and funding of three 'Transformative Knowledge Networks' (TKNs) which were launched in January 2016 with funding of up to 850,000 EUR each over a period of three years. The three TKNs involve 24 main partners, including more than half of whom are based in low- and middle-income countries, in a total of 17 countries.
- The call was implemented in partnership with the National Research Foundation of South Africa (NRF). The TKNs and the wider network of researchers who have already been involved in the programme (e.g. through the seed grants) are working together to create a Global Knowledge Trust on social transformations to sustainability, organized around knowledge exchange and knowledge synthesis activities. The first programme newsletter will be appearing shortly.
- The programme has attracted significant support from Belmont Forum members: the European Commission hosted a funder's conference and scoping meeting in May 2015 as a result of which the NORFACE network, various Belmont Forum members and the ISSC submitted a proposal for a Horizon2020 ERA-NET Cofund on

Transformations to Sustainability in March 2016 with a view to launching a call for research proposals in late 2016 with funding of at least 9m EUR.

The World Social Science Fellows Programme

The ISSC's WSS Fellows Programme was set up in mid-2012 to foster a new generation of globally networked social science leaders who will collaborate in inter- and transdisciplinary research focusing on global priority problems. The programme targets researchers at the post-doctoral level and topics that have a particular relevance for developing country contexts. Fellows' seminars, which last for up to 7 days, bring together competitively selected early career social scientists from all over the world to set new agendas, asking questions that matter and working with leading global thinkers on answering them. Depending on the focal topic and the source of support, seminars take an integrated approach by including participants from other fields of science. Engagement with societal decision makers, policy shapers and relevant civil society actors is also key to the seminar formula.

Coordinated and run by a core team within the ISSC Secretariat, individual seminars are implemented in collaboration with ISSC (co-) sponsored programmes and partner organizations. Seminar topics are negotiated between funders and interested partners willing to host an event.

Six WSS Fellows seminars have been held to date:

- 1-3) Series on Sustainable Urbanisation: Quito (2013), Taipei (2014), Durban (2015).
- 4) Risk Interpretation and Action: Dec 2013, Wellington & Christchurch.
- 5) Global Social Governance: Developing international social science research and impacting the policy process, August 2014, London.
- 6) Big Data in an Urban Context: Dec 2015, Xiamen

Three Future Earth Young Scientist International Networking Conferences developed in partnership with ICSU and Future Earth, sponsored by the German Research Foundation (DFG), involving natural and social scientists, and held at the Villa Vigoni, Italy: 1-3) Food Futures (2013); Ecosystems Services and the Green Economy (2014), and Future Sustainability – the role of science and the SDGs. Interactions between science, policy and the post-2015 sustainable development agenda (2015)

Beyond seminars, ISSC Fellows are consistently drawn into other ISSC flagship activities and, depending on available resources, supported in developing joint follow-up activities.

The Fellows programme was supported for the period 2012-2015 by the Swedish International Development Agency. Individual seminars are implemented in collaboration with partner organizations.

Key results:

- Fellows' Seminars to date 2013-2015: total of 217 Fellows selected from 1600 applications (52% women, 51% from lower and middle income countries)
- Outputs thus far include 25 published peer-reviewed papers (articles in submission not included), one book "Untamed Urbanisms) (open access via Routledge, 20 chpts), a Book of Blogs (74 reviewed and referenced blogs), university courses/teaching materials, collaborative research proposals and writing projects.
- Follow-up support provided: 4x grants for collaborative writing projects, 2x post-seminar writing workshops, attendance at international conferences to present papers from Fellows' research collaborations.

- Attendance of 56 Fellows at international meetings / conferences to present papers from new research collaborations.

Leading Integrated Science Research in Africa - Agenda 2030

The ISSC together with the Network of African Science Academies (NASAC) are implementing partners on a Sida-supported, ICSU programme, *“Leading Integrated Science Research in Africa - Agenda 2030.”* The overall goal of the Programme is to increase the generation and use of new, integrated, policy-relevant scientific knowledge needed to address complex sustainability challenges in Africa. This knowledge is expected to contribute to poverty reduction in the region.

The project targets early career scientists, provides them with training on transdisciplinary research methods, funds research projects and supports the early career scientists with opportunities for networking, knowledge exchange and international profiling. The ISSC is taking the lead for the organization of the transdisciplinary training components.

Transdisciplinary Research Trainings

In 2014, the ISSC brought together transdisciplinary researchers and practitioners in a workshop to design an initiative to support and sustain capacity development in transdisciplinary (TD) research and evaluation at national and international levels. This meeting was in response to calls from the Belmont Forum for strengthening capacity in the development, use and evaluation of TD approaches. The proposed initiative has been designed to support and sustain the efforts to develop / build TD capacity at national to global level, targeting researchers and their TD research partners, as well as research managers/funders.

Within a broader context, in response to the current planetary crises of the Anthropocene, TD has emerged not as a ‘new science’ per se, but rather as a new integrative methodology for doing science with society; using integrative methods for bringing together relevant science and societal actors / stakeholders with which to co-produce the necessary theoretical and practical knowledge for contributing to transformative social innovation required for transitioning to a more just and sustainable society at both the global and local levels. Meeting these challenges epitomizes the necessity of effective TD research specifically orientated to resolve ‘real-world’ (i.e. encompassing policy-driven research toward societal benefit) problems that are too complex and multidimensional to be answered by singular research disciplines.

The ISSC is currently working with various TD research partners and Future Earth to further develop capacity building resources and training courses.

Key results:

- The April 2014 TD design workshop produced outlines for (1) an introductory and, (2) an advanced TD Research Training Course.
- The TD Training courses developed were piloted and tested during two TD Trainings held in March 2016. The introductory training consisted of two back-to-back workshops organized as an International Social Sciences Council (ISSC) activity, convened by START and the Centre for Complex Systems in Transition at Stellenbosch University in partnership with the Transdisciplinary Lab at ETH Zurich, Switzerland. The trainings were supported by the National Research Foundation (NRF) of South Africa.

Scientific event at the 2016 ISSC General Assembly

The International Social Science Council (ISSC) together with the Comparative Research Programme on Poverty (CROP) and the Oslo and Akershus University College of Applied Sciences are organizing a scientific conference to take place following the 2016 ISSC GA: *On the Move – Global migrations, challenges and responses*, 26 October 2016, at the Oslo and Akershus University College of Applied Sciences, Oslo, Norway. The conference is sponsored by Research Council Norway, with support from the Norwegian UNESCO Committee. Thus far 18 speakers have accepted to present.

Science International

Science International is a new coalition of major international science bodies. Participating in the initiative are the International Council for Science, the International Social Science Council, The World Academy of Sciences and the InterAcademy Partnership. Science International was launched at the South African Open Science Forum, 7-9 December in Pretoria, South Africa.

Trans-Atlantic Platform

The ISSC is a founding member of the T-AP – an organization of funders from Europe and the Americas aimed at promoting high quality Trans-Atlantic co-operation in the Social Sciences and the Humanities and to promote multi-disciplinary SSH research on topics of medium and long-term interest, in particular to facilitate research networks and programmes related to Societal Challenge 6 and 7 in Horizon 2020 (related to the Inclusive, Innovative, Reflective and Secure Society).

Science and Technology Major Group

Together with ICSU and WFE0, the ISSC was appointed as co-organizing partner of the UN Scientific and Technological Community within the Open Working Group in charge of drafting the Sustainable Development Goals. The collaboration with ICSU led to the production of a joint *Review of Targets for the Sustainable Development Goals: the science perspective* (2015).

Co-Sponsored Research Programmes

IRDR

The new IRDR Executive director is set to start in June 2016. The interim measures put in place regarding the IRDR IPO leadership have been effective and a new team is in place, with the new Executive director, Prof. Rajib Shaw, taking up his new appointment in July.

CROP

Crop, the Comparative Research on Poverty programme, co-sponsored with the University of Bergen, is part of the working group planning the scientific event of the ISSC 2016 General Assembly, together with representatives from Oslo University College, as well as the Norwegian member of the ISSC Executive Committee, Professor Gudmund Hernes.



international social science council

Appendix 3 a: List of ISSC Members

ISSC Membership Fees paid in 2015

Member Associations		2015
		in EUR
ISA	International Sociological Association	1 500,00
IUPsyS	International Union of Psychological Science	1 500,00
IEA	International Economic Association	1 300,00
IPSA	International Political Science Association	1 312,56
IGU	International Geographical Union	1 500,00
IALS	International Association of Legal Science	600,00
IIAS	International Institute of Administrative Science	750,00
IPRA	International Peace Research Association	
IUAES	International Union of Anthropological & Ethnological Sciences	750,00
IUSSP	International Union for the Scientific Study of Population	750,00
4S	Society for Social Studies of Science	750,00
WAPOR	World Association for Public Opinion Research	750,00
ISEE	The International Society for Ecological Economics	-
IASSA	International Arctic Social Sciences Association	-
Member Organizations		
National Representatives		
AUSTRALIA	Academy of Social Sciences in Australia (ASSA)	-
ARAB	Arab Council for Social Sciences (ACSS)	980,05
BRAZIL	Associação Nacional de Pós-Graduação e Pesquisa em Ciências Sociais (ANPOCS)	299,84
CANADA	Social Sciences and Humanities Research council of Canada (SSHRC)	35 000,00
CHINA	Chinese Academy of Social Sciences (CASS)	4 965,00
CZECH REPUBLIC	Academy of Sciences of the Czech Republic (ASCR)	1 000,00
GERMANY	Deutsche Forschungsgemeinschaft (DFG)	35 000,00
HUNGARY	Hungarian Academy of Sciences (HAS)	-
INDIA	Indian Council of Social Science Research (ICSSR)	-
JAPAN	Science Council of Japan (SCJ)	5 000,00
KOREA	National Academy of Sciences (Republic of Korea)	15 000,00
MEXICO	Consejo Mexicano de Ciencias Sociales (COMECOS)	-
NETHERLANDS	Netherlands Organization for Scientific Research (NWO)	25 000,00
NEW ZEALAND	Royal society New Zealand (RSNZ)	5 000,00
NORWAY	Research Council of Norway (RCN)	25 000,00

OMAN	Research council of Oman	10 000,00
PHILIPPINES	Philippine Social Science Council (PSSC)	646,78
RUSSIA	Russian Academy of Sciences (RAS)	-
SLOVAK REPUBLIC	Slovak Academy of Sciences (SAS)	1 319,72
SOUTH AFRICA	Human Sciences Research Council of South Africa (HSRC)	5000,00
SWITZERLAND	Swiss Academy of Humanities and Social Sciences (SAHSS)	10 000,00
TURKEY	Turkish Academy of Science (TÜBA)	988,00
UNITED KINGDOM	Economic and Social Research Council (ESRC)	35 000,00

Additional National Representatives

NETHERLANDS	Royal Netherlands Academy of Arts and Sciences (KNAW)	5 000,00
UNITED KINGDOM	British Academy (BA)	5 000,00
SOUTH AFRICA	National Research Foundation (NRF)	4 991,00

Regional Bodies

ASSREC	Association of Asian Social Science Research Councils	-
CLACSO	Consejo Latino-Americano de Ciencias Sociales	-
CODESRIA	Council for the Dev. Of Soc. Sciece Research in Africa	975,00
IUA	International Union of Academies	1 000,00
FLACSO	Facultad Latino Americana de Ciencias Sociales	-
KOSSREC	The Korean Social Science Research Council (NEW)	1 500,00
OSSREA	Organization for Social Science Research in Eastern and Southern Africa	-

Associate Members

ACSS	Academy of Social Sciences, UK	-
EADI	European Association of Development Research and Training Institutes	-
ECPR	European Consortium for Political Research	500,00
IAAP	International Association of Applied Psychology	500,00
IFDO	International Federation of Data Organisations	-
ISIA	International Studies Association	458,85
SCA	Science Council of Asia	500,00
SSRC	Social Science Research Council	500,00
WCAA	World Council and Anthropological Association	-
SSEESS	Swedish Secretariat for Environmental Earth System Sciences	500,00

Member Institutions

NORWAY	University of Bergen (UiB) (AM)	5 000,00
NETHERLANDS	Transnational Institute (TNI) (MA)	500,00

253 586.80

National Members	Dues	Member type
	2016	
Albania	1 126	National Member
Angola	3 464	National Member
Argentina	14 969	National Member
Armenia	1 126	National Member
Australia	48 205	National Member
Austria	14 969	National Member
Azerbaijan	1 688	National Member
Bangladesh	1 000	National Member
Belgium	14 969	National Member
Bosnia H. Anurs	1 126	National Member
Bosnia H. Anubih	1 126	National Member
Brazil	96 746	National Member
Bulgaria	1 688	National Member
Canada	57 401	National Member
Cameroon	1 126	National Member
Chile	5 740	National Member
China Taipei	14 969	National Member
China CAST	215 060	National Member
Colombia	1 000	National Member
Costa Rica	1 688	National Member
Cuba	480	National Member
Czech Republic	5 740	National Member
Denmark	10 137	National Member
Dominican Rep.	1 688	National Member
Egypt	5 740	National Member
El Salvador	1 126	National Member
Estonia	1 126	National Member
Finland	5 740	National Member
France	169 139	National Member
Germany	206 530	National Member
Greece	5 740	National Member
Honduras	1 126	National Member
Hungary	5 740	National Member
India	57 401	National Member
Indonesia	27 356	National Member
Iran		National Member
Iraq	3 689	National Member
Ireland	5 740	National Member
Israel	5 740	National Member
Italy	137 763	National Member
Japan	206 530	National Member
Kenya	1 688	National Member
Korea Republic	40 180	National Member
Latvia	1 383	National Member
Lebanon	1 688	National Member

National Members	Dues	Member type
	2016	
Lesotho	1 126	National Member
Lithuania	1 688	National Member
Luxembourg	1 688	National Member
Macedonia	1 126	National Member
Malaysia	5 740	National Member
Malawi	1 126	National Member
Mauritius	1 126	National Member
Mexico	40 180	National Member
Moldova	1 126	National Member
Monaco	1 126	National Member
Mongolia	1 126	National Member
Montenegro	1 126	National Member
Namibia	1 126	National Member
Netherlands	40 180	National Member
New Zealand	5 740	National Member
Nigeria	4 384	National Member
Norway	14 969	National Member
Oman	1 688	National Member
Pakistan		National Member
Panama	1 126	National Member
Peru	5 740	National Member
Philippines	5 740	National Member
Poland	14 969	National Member
Portugal	5 740	National Member
Romania	5 740	National Member
Russia	57 401	National Member
Saudi Arabia	14 969	National Member
Serbia	1 688	National Member
Singapore	1 000	National Member
Slovak Republic	3 630	National Member
South Africa	14 969	National Member
South Pacific	1 126	National Member
Spain	57 401	National Member
Sri Lanka	1 688	National Member
Sweden	14 969	National Member
Switzerland	14 969	National Member
Tanzania	1 126	National Member
Thailand	10 271	National Member
Ukraine	5 740	National Member
United Kingdom	169 139	National Member
United States	431 904	National Member
Uruguay	1 688	National Member
Zimbabwe	1 126	National Member
	2.378.646	

Scientific Union Members	Dues	Member type
	2016	
IAU	21 834	Scientific Union
ICA Cartography	1 238	Scientific Union
IGU	3 602	Scientific Union
IMU	3 602	Scientific Union
INQUA	3 602	Scientific Union
ISA	3 602	Scientific Union
ISPRS	3 602	Scientific Union
IUBS	3 602	Scientific Union
IUCr	3 602	Scientific Union
IUFoST	1 238	Scientific Union
IUFRO	10 918	Scientific Union
IUGG	21 834	Scientific Union
IUGS	10 918	Scientific Union
IUHPST	1 238	Scientific Union
IUIS	1 238	Scientific Union
IUMRS	1 238	Scientific Union
IUMS	1 238	Scientific Union
IUNS	1 238	Scientific Union
IUPAB	3 602	Scientific Union
IUPAC	21 834	Scientific Union
IUPAP	21 834	Scientific Union
IUPESM	1 238	Scientific Union
IUPHAR	3 602	Scientific Union
IUPS	3 602	Scientific Union
IUPsyS	3 602	Scientific Union
IUSS	3 602	Scientific Union
IUTAM	3 602	Scientific Union
IUTOX	1 238	Scientific Union
URSI	3 602	Scientific Union
	170 742	
Scientific Associates	Dues	Invoice
	2016	
AAS	500	Scientific Associate
AASSA (FASAS)	500	Scientific Associate
CIE	500	Scientific Associate
FIG	500	Scientific Associate
IAHR	500	Scientific Associate
IASC	500	Scientific Associate
ICA Acoustics	500	Scientific Associate
ICIAM	500	Scientific Associate
ICLAS	500	Scientific Associate
ICO	500	Scientific Associate
ICSTI	500	Scientific Associate
IFIP	500	Scientific Associate
IFLA	500	Scientific Associate
IFS	500	Scientific Associate
IFSM	500	Scientific Associate
IIASA	500	Scientific Associate
IUVSTA	500	Scientific Associate
IWA	500	Scientific Associate
PSA	500	Scientific Associate
SCA	500	Scientific Associate
4S	500	Scientific Associate
TWAS	500	Scientific Associate
UIS	500	Scientific Associate
	11 500	



1. PRESIDENT	Professor Gordon Mc Bean Institute for Catastrophic Loss Reduction University of Western Ontario, Canada
2. VICE PRESIDENT – Scientific Planning and review	Professor Jinghai Li Chinese Academy of Sciences (CAS), China
3. VICE PRESIDENT – External Relations	Professor Michael Clegg University of California Irvine, United States
4. SECRETARY GENERAL	Professor David Black University of New South Wales, Australia
5. TREASURER	Professor Barbara Erazmus Centre National de la Recherche Scientifique (CNRS), France
6. PRESIDENT ELECT	Professor Daya Reddy University of Cape Town, South Africa
7. ORDINARY MEMBER	Professor Orhan Altan Istanbul technical University, Turkey
8. ORDINARY MEMBER	Professor John Ball Mathematical Institute, United Kingdom
9. ORDINARY MEMBER	Professor John Buckeridge RMIT University, Australia
10. ORDINARY MEMBER	Professor Cheryl de la Rey University of Pretoria, South Africa
11. ORDINARY MEMBER	Professor Manuel de Leon Instituto de Matematicas y Fisicas Fundamental CSIC, Spain
12. ORDINARY MEMBER	Professor Raghavendra Gadagkar Indian National Science Academy (INSA), India
13. ORDINARY MEMBER	Professor Nicole Moreau Secrétaire Général Comité National de la Chimie, France
14. ORDINARY MEMBER	Professor Kazuyuki Tatsumi Nagoya University, Japan
15. PAST PRESIDENT	Professor Yuan Tseh Lee Genomics Research Center, Academia Sinica, Taiwan



international social science council

Appendix 4 b: List of ISSC Executive Committee

1. PRESIDENT	Prof Alberto Martinelli University of Milan, ISA, Italy
2. VICE PRESIDENT – Communications	Dr Saths Cooper President, IUPsyS, South Africa
3. VICE PRESIDENT – Science	Professor Elisa Reis Federal University of Rio de Janeiro, ISA, Brazil
4. TREASURER	Professor Michel Sabourin Treasurer, IUPsyS, Canada
5. ORDINARY MEMBER	Professor Ruth Fincher IGU, University of Melbourne, Australia
6. ORDINARY MEMBER	Prof Yasuhiko Saito IUSSP, Japan
7. ORDINARY MEMBER	Prof Hanlin Li CASS, China
8. ORDINARY MEMBER	Gudmund Hernes FAFO-Institute for Applied Social Research, Norway
9. ORDINARY MEMBER	Dr Renee van Kessel-Hagesteijn Director Social Sciences, NWO, The Netherlands
10. ORDINARY MEMBER	Jose Alvaro Moises Universidade de São Paulo, IPSA, Brazil
11. ORDINARY MEMBER	Thomas Anton Reuter University of Melbourne, IUAES, Australia
12. ORDINARY MEMBER	Dr Ebrima Sall Executive Secretary, CODESRIA, South Africa
13. ORDINARY MEMBER	Dr. Wanda Elaine Ward National Science Foundation, USA
14. ORDINARY MEMBER	Dr Amaryllis Torres Executive Director, Philippine Social Science Council
15. PAST PRESIDENT	Dr Olive Shisana Chief Executive Officer, HSRC, South Africa
16. EX OFFICIO	Dr Mathieu Denis Executive Director, ISSC

ISSC Staffing Profile (14 June 2016)

Overview:

A staff component of 9:

1. Executive Director: Mathieu Denis: CDI (started Jan 11, 2012)
2. Senior Executive Manager: Vivi Stavrou: CDI (started May 2, 2013)
3. Account Assistant: Mayette Geronimo: CDI (started Dec 1, 2000)
4. T2S Programme Co-ordinator: Sarah Moore: CDD d'usage (ending Dec 31, 2017)
5. WSS Report Co-ordinator / Communications Officer: Lizzie Sayer: CDD (ending Nov 19, 2016)
6. Administrative Assistant: Josefin Hainsworth: CDD (ending October 3, 2017)
7. Admin Assistant: Shannon Jinadasa: CDD (ending Aug 31, 2016)
8. Special Advisor WSS Report: Francoise Caillods: consultant contract (ending Dec 31, 2016)
9. Transformations to Sustainability Programme: Susie Moser: consultant contract (ending 31 December 2017).

ICSU Staffing Profile (June 2016)

Management

- Heide Hackmann, Executive Director: CDI (March 2015)
- Charles Erkelens, Operations Director: CDI (March 2016)
- Lucilla Spini, Head of Science Programmes: CDI (January 2015)
- Denise Young, Head of Communications: CDI (March 2012)
- Clare Thirlway, Head of Human Resources: CDI (April 2009), works 4 days a week (32 hours)

Science Officers

- Charles Ebikeme, Science Officer: CDI (September 2015)
- Katsia Paulavets, Science Officer: CDI (September 2012)
- Anne-Sophie Stevance, Science Officer: CDI (January 2012)

Outreach

- Outreach/membership engagement Officer: CDI (vacant position)

IT & Communications

- Yun-Kang Ahn, IT Officer: CDI (June 2012)
- Johannes Mengel, Online Editor / Communications Officer: CDI (November 2012)

Administrative Officers

- Maureen Brennan, Administrative Officer: CDI (May 1986)
- Nora Papp, Administrative Officer: CDI (January 2014)
- Rohini Rao, Administrative Officer: CDI (April 1985)

Administration and Finance

- Alexandra Guennec, Payroll and HR Administration Officer: CDI (November 2013), works 4 days a week (28 hours)
- Arno de Marchi, Accounts / Administrative Assistant: CDI (March 2015), works 4 days a week (28 hours)
- Natacha de Marchi, Accountant: CDI (January 1997), works 4 days a week (28 hours)
- Eric Leparmentier, General Services: CDI (November 1999)

	INCOME	2015	2015	2016
		Budget	Realized	Budget
1	NON-EARMARKED (CORE)			
	Member Dues			
	National Members	2 395 774	2 382 097	2 451 045
	Union Members	191 776	188 279	171 980
	Associates	11 000	11 000	11 000
	French Ministry of Research	500 000	500 000	500 000
	Interest from ICSU bank accounts	15 000	8 421	10 000
2	EARMARKED			
	USA/NSF Contribution to WCRP	232 677	69 234	72 240
	NSF ICSU Grant	238 990	144 113	343 140
	IRDR (Academy of Science Taipei Centre of Excellence)	250 000	101 758	250 000
	IRDR / FORIN UNISDR	10 500		
	Future Earth Sponsors	532 758	253 169	300 853
	SIDA grant	52 000	53 745	649 353
	DFG (Managed by ISSC)	3 000	4 000	
	Stakeholder Forum for Sustainable Future	4 000	14 109	
	Other income		247	
	TOTAL INCOME	4 437 475	3 730 171	4 759 611
	EXPENDITURE	2015	2015	2016
		Budget	Realized	Budget
1	GOVERNANCE MEETINGS			
1.1	General Assemblies annual provision	60 000	62 088	60 000
1.2	Meetings: EB /Officers/CF	131 500	82 938	120 000
	Sub-Total	191 500	145 026	180 000
2	POLICY COMMITTEES			
2.1	CSPR meetings	90 000	71 639	72 100
2.2	CSPR Reviews & follow-up actions: Programmes			20 000
2.3	CSPR Reviews & follow-up actions: Interdisciplinary Bodies	45 295	7 270	25 000
2.4	CSPR Reviews & follow-up actions: Regional offices	50 000	33 255	
2.5	CSPR: Strategic Planning	-		30 000
2.6	CFRS meetings	79 500	70 486	70 000

2.7	CFRS events: ICSU representation			2 500
	Sub-Total	264 795	182 650	219 600
3	INTERNATIONAL PROGRAMME AND INTERDISCIPLINARY BODIES			
3.1	WCRP : Annual contribution	232 677	72 222	72 240
3.2	IRDR: SC meeting	35 700	96 775	39 270
3.3	IRDR	250 000		250 000
3.4	Future Earth: Support for regional activities	42 590	16 597	49 590
3.4	Future Earth	400 954	169 299	300 853
3.6	Urban Health: SC meeting	55 000	55 754	32 000
3.7	Urban Health: ED Health insurance	-		11 808
3.8	WDS: SC meeting	25 200	24 767	28 500
3.9	WDS / CODATA: World Data Conference			18 060
3.10	INGSA			22 500
3.11	General Scientific activities ICSU Representation	25 000		10 000
	Sub-Total	1 067 121	435 414	834 821
4	POLICY ACTIVITIES AND FORA			
4.1	Disaster Risk Reduction			10 000
4.2	Post-2015 Development Agenda	190 000	135 908	40 000
4.3	Climate change (incl. UNFCCC)			22 575
4.4	Biodiversity (IPBES/CBD)			15 000
4.5	ICSU representation in UN policy fora			25 000
4.6	Science International: Planning, annual meeting & dissemination activities			50 000
4.7	Belmont Forum			2 500
	Sub-Total	190 000	135 908	165 075
5	CAPACITY DEVELOPMENT AND EARLY CAREER SCIENCE ACTIVITIES			
5.1	ICSU-ISSC Villa Vigoni Conferences	3 000	-	-
5.2	SIDA capacity development grant activities(implemented by ICSU Paris)	-		144 406
5.3	SIDA capacity development grant: transfer to ROA			30 210
5.4	SIDA capacity development grant: transfer to ROLAC			
5.5	SIDA capacity development grant: Transfer to ISSC			163 789
5.6	SIDA capacity development grant: Transfer to IAI			
5.7	SIDA capacity development grant: Transfer to NASAC			294 300
5.8	Early Career Science Strategy implementation			10 000
	Sub-Total	3 000	-	642 705
6	INTERNATIONAL EVENTS			
6.1	World Science Forum: ICSU session support & representation	10 000	2 934	
6.2	Other: ICSU co-organization/ Staff & EB representation		26 501	20 000
	Sub-Total	10 000	29 435	20 000
7	OTHER REVIEW RESPONSE ACTIONS AND NEW INITIATIVES			
7.1	Fundraising working group			10 000

7.2	ICSU-ISSC working group			25 000
7.3	Private Sector working group			10 000
7.4	New Initiatives & Review follow-up	239 000	26 922	50 000
	Sub-Total	239 000	26 922	95 000
8	MEMBERSHIP			
8.1	Representation at Unions meetings & GAs.	25 000	18 056	20 000
8.2	Meetings of Unions	-	-	15 000
8.3	Grants Programme	111 000	111 000	300 000
	Sub-Total	136 000	129 056	335 000
9	REGIONAL OFFICES			
9.1	Direct support	225 000	225 000	225 000
9.2	ICSU Paris Travel to RO's & participation in RC's	10 000	1 130	15 000
	Sub-Total	235 000	226 130	240 000
10	OUTREACH			
10.1	Outreach & Public Engagement Strategy development	75 000	75 658	30 000
10.2	Communications: New Website & ICSU materials			25 000
10.3	Publications			65 000
10.4	Communications Staff travel			10 000
10.5	Informatics	71 000	68 029	72 000
	Sub-Total	146 000	143 688	202 000
11	HUMAN RESOURCES			
11.1	Salaries (including taxes & charges) ICSU Paris	1 842 000	1 762 024	2 310 000
11.2	Salaries Future Earth	180 000	165 674	-
11.3	External Consultancy	10 000		30 000
11.4	Internships	3 000		3 000
11.5	Staff development/training & annual staff retreat	35 000	10 669	35 000
11.6	Legal advice & subscription	7 000	6 724	8 000
11.7	Staff recruitment & relocation costs	15 000	11 243	20 000
11.8	Retirement indemnity provision	7 100	18 553	28 400
	Sub-Total	2 099 100	1 974 888	2 434 400
12	ADMINISTRATION / OVERHEADS			
12.1	Depreciation on fixed assets	26 000	25 742	15 000
12.2	Office expenses including building maintenance	157 200	131 049	160 344
12.3	Audit fees	32 500	21 760	30 000
12.4	Bank charges	15 000	14 380	15 000
	Sub-Total	230 700	192 931	220 344
13	CONTINGENCIES			
13.1	Unforeseen expenses	30 000		30 000
	TOTAL EXPENDITURE	4 842 216	3 622 048	5 618 945
	Ruentex foundation (part of General Fund)	275 000		96 000
	EXPECTED NET	- 129 741	108 123	- 763 334

PART II : OTHER OPERATIONS

	2015	2015	2016
	Budget	Realized	Latest budget
ICSU INVESTMENT			
Gain on Portfolio		39 981	
Loss on Portfolio		- 1 016	
Gain on Portfolio-net result		38 964	
Bank charges Portfolio		- 3 709	
Taxes on Portfolio		-	
Total charges Portfolio		- 3 709	
Provision for potential loss on Portfolio		- 20 547	
Cancellation of provision for potential loss		9 782	
Balance on Portfolio's provisions		- 10 765	
BALANCE ICSU INVESTMENT		24 490	
EXCHANGE DIFFERENCES			
Gain on exchange		20 793	
Loss on exchange		- 6 864	
BALANCE ON EXCHANGE		13 930	
FIXED ASSETS			
Sale of computers			
Equipment loss		-	
BALANCE ON FIXED ASSETS		-	
OTHER OPERATIONS			
Cancel. of provision for arrears on dues		612 679	
Cancel. Prov exchge loss			
Cancel other provision		-	
Provision for arrears on dues		- 450 290	
Other provision		-	
Gain on previous years		-	
Loss on previous years		- 18 225	
Loss on arrears		- 3 245	
BALANCE OTHER OPERATIONS		140 919	
BALANCE PART II		179 339	
FINAL RESULT	2015	2015	2016
	Budget	Realized	Latest budget
PART I : OPERATIONAL BUDGET	- 404 741	108 123	- 859 334
PART II : OTHER OPERATIONS		179 339	
USE OF GENERAL FUND	275 000		96 000
BALANCE	- 129 741	287 462	- 763 334

INTERNATIONAL SOCIAL SCIENCE COUNCIL	
CORE BUDGET 2016	
Income	
Membership fees	280 000
Other Income	48 974
Sida contribution to overhead (T2S)	38 163
Trans-Atlantic Platform (T-AP)	5 811
Stein Rokkan Prize (SRP)	5 000
Total Income	328 974
Expenditures	
Personnel	164 565
Governance Meetings	35 000
General Scientific Activities	20 811
Communications and Outreach	11 000
Overheads	88 125
Miscellaneous	3 125
Total Expenditures	322 626
2. TRANSFORMATIONS TO SUSTAINABILITY 2016	
Income	
Grant	
Swedish International Development Cooperation Agency - Sida	1 154 997
Other sources	29 629
Total Income	1 184 626
Expenditures	
Research and Networking	841 800
Personnel	273 935
Governance meetings	20 000

Strategic and management related costs	20 000
Communication and outreach	30 000
Miscellaneous	3 000
Overheads	34 693
Total Expenditures	1 223 428

3. TRANS-DISCIPLINARITY (TD)	
<i>Income</i>	
Grant from Sida/ICSU	163 789
Total Income	163 789
<i>Expenditures</i>	
Training/Workshop	100 000
Personnel	54 389
Annual Audit	2 400
Overheads	7 000
Total Expenditures	163 789

TOTAL WORKING BUDGET (<i>Core and Programmes</i>)	
<i>Income</i>	
Core	328 974
World Social Science Report	675 863
Transformations to Sustainability	1 184 626
Trans-disciplinarity	163 789
Total Income	2 353 252
<i>Expenditures</i>	
Core	322 626
World Social Science Report	635 940
Transformations to Sustainability	1 223 428
Trans-disciplinarity	163 789
Total Expenditures	2 345 783

History of ICSU-ISSC collaboration

Overview of key activities

The Ringberg Conference on International Science and the Role of ICSU: A Contemporary Agenda, 1985

The issue of seeking some linkages between ICSU and the social sciences was considered at this conference, and ISSC was mentioned as a possible organization through which it can be achieved

“The state of methodology in some social sciences and the strong cultural and political influences that prevail in the application of social sciences in different parts of the world demand special efforts for meaningful collaboration with the basic natural sciences”



Participants in the "Ringberg" Conference on International Science and the Role of ICSU: A Contemporary Agenda, Castle Ringberg, Tegernsee, FRG, 7-9 October, 1985

ICSU – ISSC International Research Coordination



IHDP

International Human Dimensions Programme
on Global Environmental Change

1990-2014

The International Human Dimensions Programme on Global Environmental Change (IHDP) was established in 1990 by ISSC and ICSU joined in 1996.

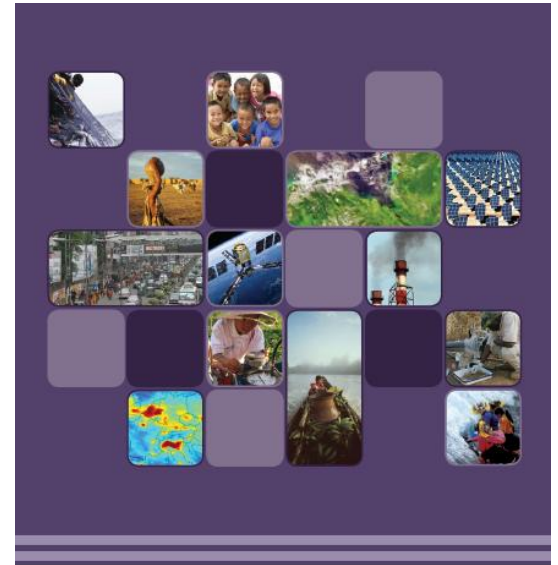
IHDP was an international, non-governmental, interdisciplinary research programme addressing the coupled human-natural system in the context of global environmental change.

Since 2008

- Integrated Research on Disaster Risk (IRDR)—is a decade-long inter-disciplinary research programme dealing with the challenges brought by natural disasters, mitigating their impacts, and improving related policy-making mechanisms.
- Both ICSU and ISSC are co-sponsors of the programme

The Visioning Process - Earth System Science for Global Sustainability: the Grand Challenges 2009-2011

ICSU and ISSC led the Visioning Process that came up with implementation steps for a holistic strategy on Earth system research, identified five grand challenges in Earth system science for global sustainability; and proposed the development of a new ten-year research initiative on Earth System Research for Global Sustainability.



Earth System Science for Global Sustainability
The Grand Challenges



- The Visioning Process eventually led to the establishment of **Future Earth**, which is a major international research platform providing the knowledge and support to accelerate transformations to a sustainable world.
- Both ICSU and ISSC are members of Governing Council of Future Earth and of the Science and Technology Alliance for Global Sustainability



Since 2015

Science International - is a series of regular meetings of four representatives of international science (ICSU, ISSC, the IAP and TWAS) that are designed to represent the global scientific community in the international policy for science arena.

The theme of *Science International* 2015 was 'Big Data/Open Data'



Since 2016

- ICSU in partnership with ISSC and NASAC is implementing a 5-year programme «Leading Integrated Research for Agenda 2030 in Africa»

ICSU-ISSC collaboration on Science for Policy

Participation in the Scientific and Technological Community (STC) Major Group

- ✓ **WSSD, 2002:** ICSU along with the WFEO was invited by the UN CSD to represent the STC and to examine the role of science since the Rio Conference (1992). ICSU created a «Consultative Group for the STC» and invited ISSC to join. As a result, **Series on Science for Sustainable Development** were developed.
- ✓ **Rio+20 Conference, 2012:** ICSU and ISSC collaborated on a number of activities for the conference, following which ISSC became a formal member of the STC Major Group (to check)

- ✓ **Contribution to the SDGs development:**
In 2013, ICSU and ISSC mobilised the **scientific community to inform the work of the intergovernmental Open Working Group on SDGs**

In 2015, ICSU in partnership with ISSC developed **"Review of Targets for the Sustainable Development Goals: The Science Perspective"**



- ✓ Since 2016, ICSU and ISSC involved in building the science-policy interface for the **High Level Political Forum**



Advancing science as a global public good

Draft

March 2017

In October 2016, members of the International Council for Science (ICSU) and the International Social Science Council (ISSC) met in Oslo, Norway, to consider a possible merger of these two organisations. The meeting participants agreed strongly that many of the key issues facing modern science require stronger collaboration between the natural and the social sciences. The consensus was that a merged organisation should be underpinned by a powerful and credible strategy for its work, as well as the organisational means to support it. It was agreed that the ambition should be to increase the value that the new body would bring to international science¹, and to the societies of which it is a part.

Following this in-principle agreement, and in line with the recommendations of the Oslo meeting, ISSC and ICSU Executives appointed a Transition Task Force (TTF) and a Strategy Working Group (SWG) to develop a joint vision and structure for the merged organisation². In October 2017, ICSU and ISSC members will meet to take a final decision for or against the merger.

The SWG was tasked with preparing a high-level strategy for the new body, referred to in this document as “the Council.” The strategy should provide a clear framework for the development of the organisation, while being flexible enough to allow the creativity of the Council’s members and leadership to identify particular projects that are imaginative, important, timely and deliverable.

The ideas for a proposed new strategy presented in this document reflect the outcomes of a consultative workshop on the purpose and priorities for the new Council, held in Paris on 30-31 January 2017, and the subsequent deliberations of the SWG.

¹ The word *science* is used here to mean the systematic organisation of knowledge that can be rationally explained and reliably applied. As in most languages except English, we use it to include all domains, including humanities and social sciences as well as the science, technology, engineering and medical disciplines.

² Information about the merger planning process, including the composition and work of the TTF and the SWG, is available at <https://www.gitbook.com/book/icsu-issc/documentation-on-the-icsu-issc-merger-process/details>

1. Enabling science for the future, shaping the future of science

Knowledge derived from scientific research is a staple of human understanding and creativity, and is fundamental to the evidence that should inform societal decision-making and public policy. The importance of deliberative scientific understanding to society has never been greater, as humanity grapples with the problems of living sustainably and equitably on planet Earth. The ways in which science responds to this perennial challenge must adapt to changing circumstances, which are increasingly shaped by two fundamental challenges:

- Scientists are increasingly expected not only to advance scientific understanding, but also to contribute solutions to pressing real-world problems, and to support transformative societal responses to them. As the range of global challenges embedded in the United Nations 2030 Agenda for Sustainable Development shows, these problems are often highly coupled and inherently complex.

The great achievements of science in recent centuries lie primarily in understanding uncoupled or weakly coupled systems. There is now a need for much deeper understanding of the nature and dynamics of complex systems through the integration of knowledge from disparate fields of the natural and social sciences. Exploiting the potential of “big data” and machine learning could contribute significantly to this end. But there is also a need for new ways of working, not only in the interdisciplinary mode, but also with approaches that integrate knowledge from academic and non-academic stakeholders in processes of mutual learning and problem-solving. Coupled with “open science”, this “transdisciplinary” mode could be an effective means of improving the infusion of scientific knowledge into policy and practice.

- A new digital world is providing unprecedented levels of global connectivity. This has powerful implications for the relationships between citizens, the media, elected representatives, interest groups and experts, and more broadly, between science and society. The ubiquitous use of software tools and social media means that the processes of generating and using knowledge and information are essentially democratised. For science, this digital world offers great opportunities to reach new audiences. But it also drives a “post-expert” dynamic in which people regard access to information as obviating the need for scientific interpretation. It enables the spread of misinformation and its growing use as an agent of political activism, strategy and policy-making.

Growing concerns about the irreproducibility of otherwise highly regarded scientific work, reduced trust in institutions, accusations of elitism, and broader trends towards populist politics all pose fundamental challenges to the value of deliberative scientific enquiry based on verifiable facts. Although scientists still enjoy high levels of public trust in many regions of the world, these developments change political dynamics in ways that make it harder for scientific input to be heard.

These are not temporary trends. Instead, they are enduring consequences of rapid, ongoing change, which is technological, social and cultural in nature. They create a setting in which there is a distinctive need to articulate the voice of science clearly, carefully and responsibly in relation to a wide range of contemporary issues. It is necessary to continue supporting the disciplinary engine rooms of scientific discovery and to maintain funding for fundamental science. But it is now also necessary to address the profound shifts in approach that are required for science to deliver knowledge with practical relevance to complex global problems that no one discipline and no one country can address on its own. These are shifts towards much stronger forms of interdisciplinary collaboration between and across different fields of science in both the framing and execution of

research; and towards the greater active engagement of scientists with a wide range of public and private stakeholders, including citizens, in the transdisciplinary co-production of knowledge for public policy and practical action.

The merger of ICSU and ISSC provides a powerful institutional basis for addressing these needs at the international level. It would amplify a voice for science that can represent and support the full range of the scientific enterprise, and build the enhanced capacities required for it to address major global challenges in ways that neither the natural nor the social sciences can realise on their own. A merger would build on ISSC and ICSU's longstanding commitments to work "for the benefit of society" (ICSU) and to "help solve global problems" (ISSC).

A unified, global voice for science

In recent decades, the landscape of international representative bodies for science has become increasingly fragmented and by implication, competitive. Within this landscape, and in the broader context described above, there is now an opportunity for a new Council to position itself as a unified global voice for science.

The new Council's founding members and primary stakeholders will be the current members of ISSC and ICSU, including 40 international scientific unions and associations, and over 140 national and regional organisations such as academies and research councils. These bodies represent approximately 70 per cent of the world's nations. They also encompass a substantial range of disciplines in the natural (including physical and life) and social (including behavioural and economic) sciences. In order to be a truly global voice for science, the Council would seek to expand its membership to include countries not currently represented by ICSU or ISSC, many of which are categorised as "least developed". It would also strengthen its standing as a unified voice for science by adding to its ranks unions and associations of key scientific or technological disciplines not represented by either organisation.

By convening the collective strength of its unique membership base, and developing effective, and complementary, partnerships with other major international scientific organisations, the Council will be well positioned to build a strong foundation for advancing science across the disciplines and in all parts of the world, and for protecting its vital role in shaping humanity's future on planet Earth.

2. A new vision and mission: Advancing science as a global public good

The essential purpose of a new Council, and the benefit it can bring to both science and society, are captured by the notion of a unified, global voice that speaks and stands for the value and authority of science – from fundamental to stakeholder-engaged science – and its continued advancement, throughout the world and for the benefit of all.

The Council would build on the experience and achievements of both ICSU and ISSC in order to:

- champion scientific research as the most effective means of acquiring robust and reliable knowledge;
- promote the need for evidence-informed understanding and decision-making and support international scientific research and scholarship that is relevant to major issues of global concern;
- support the continued and equal development of scientific creativity and relevance in all parts of the world;

- safeguard the freedom of scientific enquiry, movement, association, expression and communication, and protect scientific rigour, integrity and respect.

The Council would realise these goals by convening the international expertise and resources needed to provide leadership in catalysing, incubating and coordinating action aimed at ensuring that the global voice of science is heard on issues that affect both the scientific community³ and the society of which it is a part. The Council would therefore speak both inwards, to the scientific community itself, and outwards, to the world beyond that community.

The Council's work in external engagement would be mostly concerned with "science for policy" priorities. Inevitably, the scientific community's readiness to respond effectively to the needs for such engagement will require ongoing review of its own knowledge base, agendas, capacities, resources, and ways of working. External engagement thus creates "demand-led" imperatives for internal engagement in new "policy for science" priorities.

Instances that would motivate **external engagement** include:

- where scientific understanding is appropriate to the formulation of major policy frameworks (e.g. energy systems, antibiotic resistance, risk in complex systems);
- where existing policies have failed to take relevant scientific knowledge into account (e.g. health policies based on homeopathic solutions, implementation of the law of the sea that ignores scientific understanding of the oceans);
- ongoing issues that require perennial scientific input and advice (e.g. international strategies for disaster risk reduction, migration, climate change, environmental degradation, inequalities, infectious diseases, security, and sustainable development);
- where issues arising from new scientific understanding have major but unrecognised implications for society, which call for awareness-raising (e.g. artificial intelligence and the future of work, potential transformations of the human through implantation or genetic manipulation);
- issues related to the long-term conservation, availability and governance of the cumulative scientific record as a global asset and as the basis for the long-term management of planetary sustainability;
- where the freedom of scientists to express their scientific understanding and its implications is denied, where the free movement and association of scientists is restricted, or where scientists are being persecuted in the pursuit of their work.

Internal engagement would be motivated by the need to:

- mobilise support for new research, or the improvement of existing scientific understanding of contemporary challenges (e.g. causality in the climate system, the characterisation of complex systems, conflicts, cyber worlds);
- develop new models for coordinating and resourcing transnational science, and to represent the views of the scientific community about priorities for multilateral funding;
- address inequalities in science, critical capacity needs, and other barriers to effective international scientific collaboration (e.g. modern data science capabilities, strengthened support for the social sciences in developing countries, the promotion of opportunities for early career scientists, gender equality in science, indigenous knowledge);

³ The "scientific community" refers here to the diverse network of interacting individuals, groups and institutions that creates, scrutinises, tests and openly publishes scientific ideas, progressively weeds out error, and produces the cumulative knowledge base of science.

- develop more effective science policies and practices (e.g. expert systems for non-experts, scientific careers, peer review, the evaluation of excellence and societal impact of science);
- promote new ways of working, to adapt to changing social dynamics and ensure better interactions between science, the public and the policy community (e.g. the practice and evaluation of trans-disciplinarity, translational research, breaking the natural/social science barrier), or to exploit changing technologies (e.g. cross-disciplinary data integration, reproducibility, scientific publishing, scientific ethics and integrity).

3. Advancing science in the interests of Council members

The Council will respect the mandates and responsibilities of its members. The Council's union and association members are mainly disciplinary and international, while member organisations tend to be multi-disciplinary and national. A Council that brings them together is uniquely placed to advance science in the international, cross-disciplinary arena, thereby creating opportunities for the national and disciplinary priorities and interests of its members. These include opportunities for members to:

- contribute to scientific matters of global public concern;
- showcase the relevance of their scientific capacity at the international level;
- strengthen international awareness of and support for the disciplinary or national scientific communities they represent;
- enhance their own influence with the policy community, funders, national governments and international bodies.

The creation of mutual advantage for the Council and its members will require the Council to design effective processes and mechanisms whereby it can engage members' expertise in identifying and responding to priority issues for advancing the value and authority of science. Council members will be called upon to participate actively in such processes and mechanisms, and to exploit the opportunities that the Council would work to create.

4. Priorities for the new Council

The Council's effective promotion of the cause and value of science and its continued evolution will require a persuasive and focused agenda, clearly defined target audiences, and the means of engaging them with professionalism and impact.

The Council must identify efficient pathways to impact, and how these can best be exploited. It must have legitimacy in the scientific community that it claims to represent, and credibility with those it seeks to interact with and influence. It must have the competence and capacities to undertake these tasks.

4.1 Issues

The identification of central issues for the Council's future agenda will require access to high levels of scientific comprehension and farsighted strategic thinking, across a broad spectrum of scientific fields. The Council will have to establish transparent and accessible deliberative processes that allow it to benefit fully from the resources of its members and those of its wider networks within the international scientific community. It will also need well-defined selection criteria to determine which issues to include on the Council's agenda.

4.2 Targets

The Council's success will depend in large part on its access to decision-makers and those in a position to influence them, within a clearly defined set of target audiences.

Priority targets for external engagement would include:

- The United Nations and its specialised agencies, where important issues of international policy that depend on scientific input are debated. The Council could become a major conduit for strong, systemic interaction between the UN and the scientific community;
- Regional inter-governmental organisations and their respective scientific advisory structures (e.g. the European and African Unions, Association of Southeast Asian Nations, the G8/G20);
- National governments; while these tend to have science advice and foresight mechanisms that fit national priorities, the Council could have a vital role in promoting scientific freedom and responsibility;
- The international private sector, which plays an increasing (albeit informal) role in global governance, in managing global resources, and in the innovation and marketing of powerful new technologies;
- Civil society; a difficult target but arguably the most important. In the modern world the development of a scientific ethos, an understanding of the nature of scientific evidence, and access to knowledge and its potential uses, are all vital ingredients for a politically vigorous and aware population.

For internal engagement, priority targets would include:

- The international scientific community itself. This includes the Council's own constituent organisations, as well as the global networks of scientists and scientific organisations represented by other international scientific bodies. Examples include the InterAcademy Partnership (IAP), The World Academy of Sciences (TWAS), International Council for Philosophy and Human Sciences (CIPSH), World Federation of Engineering Organisations (WFEO), and the Global Young Academy (GYA);
- United Nations agencies and other inter-governmental organisations with a mandate for science (e.g. UNESCO, ECOSOC Commission on Science and Technology for Development, and the OECD), which convene ministers of science;
- Regional inter-governmental structures that promote international scientific collaboration (e.g. the European Commission, BRICS, and the Inter-American Institute for Global Change Research (IAI));
- International networks and forums of science policy makers and research funders (e.g. the Global Research Council (GRC), Belmont Forum and other networks of funding agencies and foundations).

4.3 Pathways to impact: Relationships, roles and activities

To be an effective global voice, the new Council will have to establish itself as a powerful international presence. It must become the principal node in a globally connected network of influential and trusted partners, which can help to deliver impact. The strength of the Council's relationships – first and foremost with its members – will be central to its success. ICSU and ISSC's existing partnerships will have to be reinforced, new partners will need to be identified, and appropriate terms of cooperation will have to be specified, for example with partners from the private sector.

The Council should focus on establishing its leadership reputation as a convenor, catalyst, incubator and coordinator of international science.

Translating these roles into action will involve a range of activities, and a focused set of flagship global projects, programmes or campaigns that are issue-driven, results-oriented and time-bound. Decisions on priority activities for the new Council should be based on a careful review of the existing activities of ICSU and ISSC. It will be essential to consider how far they support the new organisation's priorities, where resources and responsibilities need to be redirected, and whether there are areas where new types of action will be required.

Recommendations based on an initial assessment of the current portfolio of ICSU and ISSC activities are presented in Annex I.

4.4 Competencies and capacities

The success of the new Council will be critically dependent on it having three key attributes:

- **Legitimacy:** The Council must be the legitimate global voice of science, and must not elicit the response “not in my name” from its own community.
- **Credibility:** The Council must be recognised as an authoritative voice whose pronouncements are based on rigorously tested scientific work.
- **Convening power:** The Council must have the reputation and respect to attract the attention of members of the scientific community, the policy community, the private sector and civil society with whom it seeks to engage.

The essential first step towards achieving these crucial attributes will be to involve scientists of high achievement, experience and distinction as officers, board members, advisors, and contributors to the work of the Council. Their distinction must be recognised both by the scientific community and by the institutions and individuals that the Council seeks to influence. This will require the Council to agree on appropriate processes and criteria for the election and appointment of senior officers, board members and advisors.

For the new Council to have impact, it will need to be responsive and dynamic, able to rely on agile and empowered decision-making. It must also be able to cope with strong negative reactions from those with conflicting scientific views, from online campaigns, from politicians and from governments. The capacity for judicious boldness in such circumstances will rest on the good judgement of the Council's leadership, as well as the experience of its staff. For the secretariat, it would be important to include or have ready access to strong networking and organisational skills, journalistic skills, policy and legal expertise, and significantly enhanced media and communications capability.

5. Core values

The core values that the Council would commit to upholding in its work, its governance and its partnerships include:

- Excellence and professionalism: delivering outputs of the highest quality and professional standards.

- Universality: ensuring access to science and its benefits for all, rejecting discrimination in all its forms.
- Inclusivity and diversity: including perspectives and approaches from all parts of the world, and improving the participation of women and early career scientists in international science.
- Innovation: attracting and learning from new talent and new ideas, stimulating new approaches, putting forward new solutions.
- Sustainability: making ecologically responsible organisational decisions, pursuing environmentally friendly business practices

Annex I

Activities for a new Council: Synopsis of an initial assessment of current ISSC-ICSU instruments and initiatives

In line with the high-level statement of purpose for the Council outlined in this document, the SWG has carried out an initial review of the existing portfolio of ICSU and ISSC activities⁴. The purpose of this exercise was to assess the relevance of each type of activity currently undertaken by ISSC and/or ICSU (and listed in points 1 to 10 below) to the new Council's proposed role, and to identify in broad terms the adjustments that would be required to ensure effective support for that role. This review led to the following preliminary conclusions:

1. Establish international research programmes, scientific committees and networks

- Highly relevant; they are a valuable resource and should be mobilised as partners in delivering impact.
- Criteria for the establishment of new programmes, committees and networks need to be identified, and the Council's responsibility towards these initiatives needs careful review. In general terms:
 - New initiatives should not be established without secure resources for substantive activities, including collaborative research;
 - The Council's direct support, governance and management oversight of initiatives should be time-bound;
 - Once successfully established and operationally independent, initiatives would remain affiliated to the Council.
- The Council should facilitate synergistic collaboration between existing and new programmes, committees and networks. It should advise on the restructuring of initiatives that have overlapping missions, in order to reduce duplication and competition for resources.
- Any future involvement of the Council in reviewing these structures should be considered on the basis of discussions with those who fund them.
- The Council will need to identify more effective ways of promoting membership engagement in Council-affiliated programmes, committees and networks.

2. Convene and represent the international scientific community within the United Nations and other international policy frameworks, forums, and international assessments

- Of central importance to the new role.
- This work will need to be further strengthened, particularly through new partnerships with organisations in health, medicine, engineering and technology, and the humanities. It should be expanded over time to reach other international policy forums such as the G8/G20.
- The Council will need to find effective mechanisms for engaging members more centrally in this activity.

3. Participate in international funding consortia

- Relevant to the new role.
- Different funding communities (national agencies, international donor agencies, foundations) are important target audiences, as well as being partners for effective delivery (see also point 4 below).

⁴ A detailed activity overview is available at:

https://www.dropbox.com/s/vzxr55uc0svg6ny/ICSUISSC_activitydocument.pdf?dl=0

4. Establish and run research funding or grant programmes

- Direct programme management is not relevant to the new role.
- It would be relevant for the Council to identify specific funding priorities, and work with relevant funders on responding to them. However, the Council itself should not function as a funding agency.

5. Award international prizes and fellowships

- Potentially relevant if used in support of targeted activity on specific priority issues.
- The Council should only consider establishing (new) prizes and fellowships in response to available funding opportunities.
- It should consider ways of promoting the winners of prestigious prizes awarded by its members internationally.

6. Design and implement training schemes

- Potentially relevant to the new role.
- The Council's focus should be on convening and coordinating experts and partner organisations to identify priorities for training, design relevant programmes, and promote their roll-out.

7. Produce publications (e.g. advisory reports, policy briefs, statements)

- Relevant to the new role.
- Different types of targeted publication and a range of dissemination approaches would be needed as part of activities to support specific priority issues.
- The Council should give further consideration to the potential relevance and impact of a regular series of global science reports.

8. Organise, co-organise or co-sponsor international events

- Relevant to the new role.
- As for publications, targeting and impact should be key considerations in deciding on the Council's involvement as a co-organiser or co-sponsor.
- The Council should consider the potential relevance, impact and feasibility of an annual membership-based event (e.g. an International Science Summit).

9. Support public outreach and engagement with science

- Highly relevant to the new role.
- This important area for the Council involves numerous organisations and many activities, in many countries and regions of the world. The additional resources that the Council could commit in this area would be minor compared with those already expended internationally. Given this, the Council should not aim to develop new, stand-alone outreach and engagement activities. Rather, it should seek to add value through partnerships with relevant organisations and by actively supporting the work of its members.

10. Raise international awareness of scientists' rights, and take action to safeguard them

- Highly relevant to the new role.
- The Council would need to ensure that it has the relevant capacities and expertise to achieve impact in this work.



INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

Vice-President's Critical Assessment (Prof. Qi-Feng Zhou)

After the implementation of the strategic plan, bodies of IUPAC adjusted their activities accordingly to better concentrate on the most pressing and value-added works, thus keeping the Union functioning effectively and efficiently. The Union works productively in its traditional areas of nomenclature, terminology, symbols, standards, etc., and at the same time, addresses arising important issues acknowledged by the chemistry community world-wide, like the UN Sustainable Development Goals. In my Critical Assessment, I shall report on improvements and concerns regarding the Union's infrastructures and scientific priorities, giving special attention to issues of membership relations, green chemistry and UN Sustainable Development Goals, big data, collaboration with other organizations and the 100th anniversary of IUPAC.

I. Infrastructure.

1. The Secretariat. The Secretariat has been consolidated during the past few years. With considerations of the secretariat's role and resource, the Secretariat outsourced several functions and sought for cooperation with new experts, thus concentrating on and improving its central functions. There have been great improvements in its daily work, communication and service of members, meeting organizing, as well as in its assistance with financial management, project management, website and database building, publication, etc. Now the Secretariat is able to provide more accurate and up-to-date information on our financial position, status of projects and conferences, as well as feedbacks from all the Union bodies and our various members, which give us a better understanding of what the situation is at present and how to improve in the future.

2. Finance. The Union's financial position has improved since a new accounting system has been adopted and a better investing portfolio is providing more revenue than before. However the Union is still running in deficit. The National Subscription Task Group has been working on a new subscription calculation method. They have done comprehensive researches, providing both a more reasonable calculation method and a better understanding of chemical academic research as well as industrial developments in relative countries or areas. I hope the new method will get ratified in the GA, for it will add value to our service for members and may benefit membership relation in the long run. However, due to economic difficulties suffered by most countries, I would not expect the Union's financial position to improve significantly in

the near future. To keep an eye on potential revenue yielding areas and to make better use of our limited resource would probably remain the main policy for the coming couple of years.

3. Membership Relation. Members, including NAOs, AMPs, CAs and individual volunteers, form the foundations of the Union. Though we endeavored to increase members, the present situation is not satisfactory as there are risks of losing NAOs, partly due to the global economic recess. We are also affected by change in ways of chemical-information acquirement, since scientists can have easy access to updated chemical information from other sources rather than IUPAC conferences and publications. To better understand our stakeholders' needs and priorities in order to improve relative communication and service, Membership Relation Committee is preparing a survey with the help of Dunlap Marketing Services. Also, COCI has been working on Company Associate Program, which we hope would attract more CAs and provide revenue stream.

For the issue of increasing individual volunteers, I pay more attention to programs about young people. Apart from changes in ways of chemical-information acquirement, academic evaluation system in some countries (e.g. China) may also hamper young chemists' motivation of volunteering, since the local evaluation system may not give priority to voluntary works for non-governmental organizations. How to get more young people involved and keep their active participation remains a challenge. Previously our YOs' participation is partly arranged within the framework of World Chemistry Leadership Meeting (WCLM). Now International Young Chemists Network (IYCN) is to become our AO. I hope collaboration with IYCN would develop and, collaboratively with WCLM's work, would successfully turn YOs' motivations into productive projects.

II. Scientific Priorities.

Vitality of IUPAC bodies has been demonstrated by various active projects, conferences, workshops, publications, database revision and awards. There are many things to highlight. Following the discovery and naming of new elements 113, 115, 117 and 118, period 7 of the Periodic Table of Chemical Elements has been completed. The new edition of Silver book has been published and some other color books are under revision. Newly released IUPAC recommendations include those for naming of constitutional units, use of atomic weights, comprehensive definition of oxidation state, and naming atoms in phosphates, polyphosphates, their Analogues, etc. Up to May, winners of 12 important awards have been announced in this biennium, e.g. the Thieme-IUPAC Prize, Distinguished Women in Chemistry or Chemical Engineering Awards, the PhosAgro/UNESCO/IUPAC grant, the IUPAC-Richter Prize, Polymer International-IUPAC award, IUPAC-Solvay International Award for Young Chemists. Some awards will be presented during the Congress. Congratulations to the winners! Apart from these, there are some directions I would like to stress.

1. Green Chemistry and the UN Sustainable Development Goals. A large amount of the Union's activities are relevant to UN Sustainable Development Goals, of which green chemistry is a basic element. Thanks to the enthusiastic work and well

management of Division III, its successful Subcommittee on Green Chemistry grows into a new Interdivisional Committee on Green Chemistry for Sustainable Development. Interdivisional cooperation related to green chemistry has been fruitful. The establishment of a new committee would require certain kinds of reorganization within the Union. I hope after its establishment, previously separate activities would have more synergies and gain a whole new momentum.

2. Challenge of the digital era/big data era. Few experts from different bodies of the Union have pointed out that our adaptation to this profound change will have significant impact on our future. Relative activities are already underway. Several divisions have fruitful co-operations with Wikipedia. A new version of InChI software has been released. CPCDS's newly-formed Subcommittee on Cheminformatics Data Standards, liaising with the Research Data Alliance (RDA), has been organizing workshops and meetings to identify and explore possible approaches to relative problems. More mature proposals are expected to come out. Apart from these discussions addressing our traditional areas, bodies of the Union also need to take into consideration possible impact on the management of the Union.

3. Collaborations with other international organizations including UNESCO, ICSU, IUPAP, OPCW, etc., have taken various forms. Good examples include the ICSU/IMU-IUPAC project about Gender Gap, the signing of a Memorandum of Understanding with OPCW, and the UNESCO/PhosAgro/IUPAC Green Chemistry for Life Program. It's also encouraging to learn that there are many successful projects of applied chemistry under the framework of the Strategic Approach to International Chemical Management (SAICM). Such activities provide platforms to participate in dialogue with parallel organizations as well as with other sectors to act collaboratively to achieve our goals. Apart from this, the merger of ICSU and ISSU worth attention, which will call for modification of our present work and provide new opportunities.

4. The 100th Anniversary of IUPAC. The IUPAC100 Management Committee has been working vigorously on all kinds of preparations for the anniversary. Geographically diversified committee members have contributed lot of ideas for relevant activities, though specific contents and forms of which still need further consideration in order to bring in more NAOs or regional participants and other members of various categories. Besides, fund raising remains a challenging issue. The Fund-raising Subcommittee would continue to explore all the possibilities. Supports from the union members of all the categories are highly welcome!

III. Other Recommendations:

1. IUPAC bodies need to further implement the strategic plan and readjust activities in accordance with the clarified vision, mission, goals and objectives. The Evaluation Committee has done a comprehensive survey on present project system, which has helped officers of all the union bodies form a clearer picture of features and weak points of their projects management respectively. It would be helpful if the Evaluation Committee, while assessing relevance and vitality of present and upcoming projects, would also develop a format to take the operation of existing union bodies into consideration as well, to evaluate performance of divisions and committees toward their terms

of reference. In this way we would be able to focus (with our limited budget) on the most value-added works that demonstrate our unique competence and that benefit our brand building as a whole.

2. The Union needs to pay attention to political factors that have already affected our operations, e.g. our host country, U.S.'s policy changes and threats of terrorist attack in some areas. Officers of the union bodies may assess the impacts and think about possible ways to cope with these new situations, and if the situation deteriorates to a certain extent, may even take into consideration other options of secretariat location with inexpensive facilities and easier visa permissions. Diversities and inclusiveness in all forms is one of our core values. It is in difficult times that values get tested. Though scientists have never been and will not be isolated from the outside world, the Union needs to minimize relevant negative impacts in order to help our members cooperate better to advance chemistry worldwide, for the betterment of mankind.

Memorandum of Understanding

Between

**the International Union of Pure and Applied Chemistry
and
the Organisation for the Prohibition of Chemical Weapons**

WHEREAS the International Union of Pure and Applied Chemistry (hereinafter "IUPAC") is a nongovernmental, nonprofit global organisation that provides objective scientific expertise and develops the essential tools for the application and communication of chemical knowledge for the benefit of humankind. IUPAC accomplishes its mission by fostering sustainable development, providing a common language for chemistry, and advocating the free exchange of scientific information. IUPAC's core values and goals encompass provision of scientific information to address critical world needs through scientific excellence, objectivity, and the highest standards of transparent, responsible, and ethical behaviour;

WHEREAS the Organisation for the Prohibition of Chemical Weapons (hereinafter "OPCW") implements the provisions of the Chemical Weapons Convention (hereinafter "CWC") in order to achieve the OPCW's vision of a world that is free of chemical weapons and of the threat of their use, and in which cooperation in chemistry for peaceful purposes for all is fostered. In doing this, its ultimate aim is to contribute to international security and stability, general and complete disarmament, and global economic development. To achieve this mission, the OPCW develops and delivers programmes to verify the destruction of chemical weapons and to prevent their re-emergence, to provide protection and assistance against chemical weapons, to encourage international cooperation in peaceful uses of chemistry, and to bring about universal membership of the OPCW by facilitating international cooperation and national capacity building;

WHEREAS IUPAC and the OPCW (hereinafter "the Parties") regard each other as partners in the fulfilment of their goals;

WHEREAS, in order to build upon their experience in their respective areas, the Parties intend, within the scope of their mandates, to cooperate more closely to achieve their common goals in promoting chemistry for peaceful purposes, and facilitating the exchange of scientific and technical information in support of their work.

NOW, THEREFORE, the Parties hereby agree to the following:

ARTICLE I

Purpose

1.1 The purpose of this Memorandum of Understanding (hereinafter "MoU") is to outline a framework for co-operation between IUPAC and the OPCW with a view towards achieving their common objectives and to providing benefits to their respective programmes and areas of work.

ARTICLE II

Modalities of cooperation

In order to achieve their common objectives, IUPAC and the OPCW will cooperate in the following areas:

2.1 Science: at the request of the OPCW Technical Secretariat or the OPCW Scientific Advisory Board (hereinafter "SAB"), IUPAC will provide its assistance and collaboration to the SAB and/or its working groups for the organisation of workshops on science and engineering advances with potential relevance to the CWC, and for reporting on these workshops' findings; and act as a liaison to the broader chemistry and engineering communities to provide information relevant to the work of the OPCW.

2.2 Education and outreach: the Parties will provide each other with assistance and collaboration which is intended to focus on efforts such as public understanding and education of students about the CWC, producing educational materials related to the science of the CWC, education on multiple uses of chemicals, and similar initiatives. To this end, representatives of each Party may attend as observers the meetings of the advisory bodies of the other Party, including the OPCW Advisory Board on Education and Outreach and the IUPAC Committee on Chemistry Education and/or the meetings of such advisory bodies' working groups, subject to the rules and regulations applying to the conduct of such meetings.

2.3 Ethics: the Parties will cooperate in the promulgation of The Hague Ethical Guidelines and initiatives arising from them, as appropriate.

2.4 Peaceful uses of chemistry: the Parties will cooperate to promote knowledge sharing, dissemination of best practices, and capacity building for the peaceful, green and sustainable uses of chemistry.

2.5 Other Areas: the Parties may cooperate in other areas where the OPCW has determined that the highest standards of expertise in chemistry and related sciences and engineering advance the goals of the CWC. Such cooperation may entail co-sponsoring activities which contribute to the implementation of the programmes of both Parties.

ARTICLE III
Use of name, emblem, and official seal of the Parties

3.1 Unless authorised in writing by the OPCW, IUPAC will not use the name, emblem, or official seal of the OPCW or any abbreviation of the names of the OPCW for advertising or for any other promotional purpose.

3.2 Unless authorised in writing by IUPAC, the OPCW will not use the name, logo, or official seal of IUPAC or any abbreviation of the name of IUPAC for advertising or any other promotional purpose.

ARTICLE IV
General Provisions

4.1 The implementation of this MoU will be in compliance with the respective mandates of the Parties and in accordance with their own institutional frameworks, administrative rules, regulations, and procedures.

4.2 This MoU shall take effect upon signature by the duly authorised representatives of each Party. If there is more than one date of signature, the latest date shall be the date from which this MoU will become effective.

4.3 At the request of either Party, this MoU may be amended or complemented by addenda addressing selected issues of co-operation between IUPAC and the OPCW. Any such amendments or addenda will come into effect upon signature by the duly authorised representatives of each Party.

4.4 This MoU will be valid for five years from the date of signing and will be automatically renewed for five years, and then renewable for five-year periods thereafter, unless terminated by either party. The MoU may be terminated by either Party by giving no less than three months written notice to the other Party.

4.5 Nothing in or related to this MoU will be deemed to constitute any waiver, express or implied, of the privileges and immunities of the OPCW pursuant to the Chemical Weapons Convention and any agreement to which the OPCW is a party, or which it otherwise enjoys.

4.6 Nothing in this MoU requires either IUPAC or the OPCW to furnish any material, data, or information whose disclosure could, in the sole judgement of IUPAC or the OPCW, require either Party to violate its own rules or policies on confidentiality.

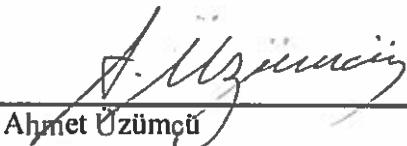
4.7 The Parties may enter into such separate arrangements and develop such practical measures for the implementation of this MoU as may be found desirable.

4.8 This MoU does not create or imply any financial obligations for the Parties. Any

commitment undertaken by either Party within the scope of this MoU will be subject to the availability of financial resources.


4.9 Any dispute arising out of or relating to the interpretation or implementation of this MoU will be settled amicably by consultation between the the OPCW and IUPAC.

For the Organisation for the Prohibition
of Chemical Weapons


Ahmet Üzümcü
Director-General

Date:

For the International Union of Pure
and Applied Chemistry


Natalia Tarasova
President

Date: December 1, 2016

Memorandum of Understanding

IUPAC and IYCN, 2017

This Memorandum of Understanding (MoU) is an agreement made between the following parties:

Party A

Organisation Name	International Union of Pure and Applied Chemistry
Address	79 T.W. Alexander Drive, Research Commons Building 4501, Suite 190 Research Triangle Park, NC 27709, USA
Telephone	+1 919 485 8701

Party B

Organisation Name	International Younger Chemists Network
Address	505 S. Mason St. Apt 507 Fort Collins, CO 80521, USA
Telephone	+1 215 384 4788

1. SUBJECT

- 1.1. The purpose of this MoU is to establish an agreement between the International Union of Pure and Applied Chemistry (IUPAC) with the International Younger Chemists Network (IYCN).
- 1.2. This MoU will be in effect for five years.
- 1.3. This MoU has been created to support the establishment phase and growth of IYCN as a global network helping to advance the voice and concerns of younger chemists worldwide.
- 1.4. This MoU has also been created to facilitate the participation of younger chemists in IUPAC through the active integration of IYCN members into IUPAC activities such as conferences, committee activities, divisions, and projects.
- 1.5. This MoU provides a framework for mentorship, administrative support, collaboration, and relevant advisory input from IUPAC to IYCN in support of the development of IYCN.
- 1.6. This MoU is ultimately designed to benefit younger chemists worldwide through provision of increased resources and opportunities for professional development, networking, and open access to scientific information; and to benefit IUPAC through involvement of IYCN scientists in IUPAC activities and events.

2. COMMITMENTS

IUPAC commits to:

- 2.1. Accept IYCN as an Associated Organization (AO) of IUPAC.
- 2.2. Waive Associated Organization (AO) fees for IYCN for five years.
- 2.3. Cooperate and coordinate with IYCN to promote IYCN-sponsored programming and activities at the World Chemistry Congress and other relevant conferences.
- 2.4. Provide limited administrative support via the Secretariat, (i.e. receiving funds on behalf of IYCN and reimburse costs from those funds).
- 2.5. Cooperate with IYCN to support growth of their organization and to improve outreach to younger chemists.
- 2.6. Provide consultation, mentorship, and advice on governance, membership, and organizational issues to facilitate a successful launch for IYCN.
- 2.7. Develop new programs to more rapidly and seamlessly integrate younger chemists into IUPAC activities.

IYCN commits to:

- 2.8. Participate in IUPAC as an AO.
- 2.9. Provide the IUPAC Secretariat with a current contact list for the IYCN Executive Board.
- 2.10. Develop IYCN programming in cooperation with IUPAC for the IUPAC World Chemistry Congresses.
- 2.11. Promote participation in IUPAC activities, conferences, and projects with IYCN members, including, but not limited to: IUPAC World Chemistry Congress, IUPAC General Assembly, and World Chemistry Leadership Meeting.
- 2.12. Cooperate with IUPAC on improving programs for younger chemists (such as the Young Observer program).
- 2.13. Coordinate development of new IUPAC projects; encourage IYCN members to join the IUPAC Affiliate Membership Program, especially if they are from a country that is not an IUPAC member.
- 2.14. Serve as a voice for younger chemists within IUPAC.
- 2.15. Openly communicate and work with IUPAC to provide support to young chemists and develop a fully represented international network without discrimination.

3. POLICIES

- 3.1. Requests for administrative support from the IUPAC Secretariat should be made via e-mail to the Executive Director of IUPAC 3 months prior to any planned activities with a cc to the Secretary General and President of IUPAC.
- 3.2. Designated representatives of both parties agree to communicate via e-mail with needed updates and information.
- 3.3. Representatives of both parties agree to meet via conference call or in person on a regular (at least annual) basis for planning and reporting on activities and relevant events, for at least the first three years.

4. AMENDMENTS

4.1. The MoU can be amended, updated, or extended at any time upon agreement by both parties.

5. BREACHES

5.1. Either party can withdraw from the agreement upon 1 year written notice to the other party, but any existing financial commitments/agreements must be fulfilled even if the agreement is dissolved.

The parties affirm to know, understand and agree to all articles of this MoU as negotiated together.

IUPAC REPRESENTATIVE

IYCN REPRESENTATIVE

Signature: _____

Signature: _____

Name: Natalia Tarasova

Name: _____

Position: President

Position: _____

Email: ntarasova@iupac.org

Email: _____

Phone no. _____

Phone no. _____

Date: _____

Date: _____



INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

DIVISION OF PHYSICAL AND BIOPHYSICAL CHEMISTRY

**Report to the 49th IUPAC Council
for the 2016-2017 biennium
São Paulo, 12-13 July, 2017**

Professor R. Marquardt
Past-President

31st May, 2017

Contents

- I. Highlights
- II. Division I activities
- III. Specific information
- IV. Project details and publications
- V. Activities of Commission I.1

I. Highlights of divisional activities in the biennium 2016-2017

The 2016 off year-meeting was held in Lansing, Michigan, USA, from August 26 to 28, 2016. As in the 2012 and 2014 off-year meetings, the business part was preceded by a scientific day, when committee members were given the opportunity to explain their work in short oral presentations. This genuinely scientific part of the meeting has again proven very useful, as it helps to bring members closer one to the other by the mutual discovery of the colleagues' scientific work, thus making the common work for the Union easier to accomplish.

As one major ongoing activity, the Division has participated in the project referring to a critical assessment of opinions within and outside the Union about the proposed new definition of the mole, the SI unit of amount of substance, and other units or physical quantities (Project No. 2013-048-1-100, see below). A Technical Report from this project was published in the current biennium, and a recommendation regarding the exact wording to be used in the new definition of the unit mole is currently in public review process.

II. Division I activities

The objectives of the Physical and Biophysical Chemistry Division have not changed since the last report. They are stated on the Division web page and read as follows:

“The Objectives of the Physical and Biophysical Chemistry Division are to promote international collaboration between scientists in physical and biophysical chemistry and related fields in order to:

- Recognize new developments in physical and biophysical chemistry and its fields of applications;
- Promote future oriented activities in physical and biophysical chemistry important for the needs of the world community;
- Encourage the compilation and documentation of critically evaluated physical and biophysical chemical data;
- Address problems and formulate recommendations on terminology, symbols, units and conventions in physical and biophysical chemistry, disseminate the recommendations, encourage their translation as well as monitor their acceptance by the chemical community;
- Establish and stimulate the use of methodologies, standards and reference materials in physical and biophysical chemistry.”

The composition of the Division Committee given below is designed to cover all major areas of physical and biophysical chemistry and to enable identification of topics in which the Division can make new contributions.

The Subcommittee on Symbols, Terminology and Units (Commission I.1) listed below is essentially responsible for the Green Book and its revisions.

The Division is currently still supported by an Advisory Subcommittee of about 40 members, whose role is to advise on project proposals and evaluations. It is formed of former Division members and is periodically renewed. At the last off-year meeting, the dissolution of the Advisory Subcommittee was discussed.

The composition of the Committee for the biennium 2016-2017 was the following, at the beginning of the biennium:

President: A. K. Wilson (USA)

Vice -President: K. Bartik (Belgium)

Secretary: A. Friedler (Israel)

Past President: R. Marquardt (France)

Chair of Subcommittee on Symbols, Terminology and Units: J. Stohner (Switzerland)

Titular Members: A. Császár (Hungary), P. Metrangolo (Italy), Y. H. Taufiq-Yap (Malaysia), F. van Veggel (Canada), T. Wallington (USA), B. Weckhuysen (Netherlands)

Associate Members: J. L. B. M. de Faria (Portugal), M. Korenko (Slovakia), T.C. Kurten (Finland), V. Tomisic (Croatia), X. S. Zhao (China)

National Representatives: H.R. Corti (Argentina), L. Gonzalez (Austria), F.P. Malik (Pakistan), C.- C. J. Chen (Taiwan), L.A. Montero-Cabrera (Cuba), S.-J. Jeon (Korea), M. Fall (Senegal)

The composition of the Commission on Physicochemical Symbols, Terminology, and Units is as follows:

Chair: J. Stohner (Switzerland)

Secretary: R. Hinde (USA)

Titular Members: Y. Kuroda (Japan), A. J. McQuillan (New Zealand)

National Representatives: M. Choudhary (Pakistan), J. G. Frey (UK), Y. K. Ha (Korea), A. A. Milchev (Bulgaria), F. Pavese (Italy), M. Quack (Switzerland), D. Schomburg (Germany), S. Smith (Australia)

The main points addressed in the 2016 off year meeting were the adoption of a general policy about book projects, the preparation of the São Paulo World Congress and the role played by

the Division, formal aspects of project progress reports, and the discussion of future projects of the Division. Specific results ensuing the off-year meeting will be addressed below in the chapter “Specific Information”.

Elections of Titular Committee Members (TM) for the next biennium 2018-2019 were held successfully in May, resulting in four new TM elected, whose election has to be validated by the Council. The nomination commission, chaired by Prof. Jim McQuillan, former Division President, set up an equilibrated list of candidates. Geographical and in particular gender diversity could be satisfied by the results of the ballot. Unfortunately, the current Vice-President and Secretary, due to important responsibilities in their respective universities, have decided not to continue with the Division beyond the current term. The new officers for the next biennium, including the President, will be selected from the confirmed and elected titular members at the forthcoming Division Committee meeting in São Paulo. Prof. Angela Wilson will become divisional Past President.

III. Specific information

The division committee decided to continue using the new project reporting form initiated this year and have a regular due date for reports (July 15 is suggested). The Division has also agreed to go to once-per-year due dates project submission and the IUPAC management will be consulted to see whether and how this is possible.

In reference to the general discussion on the policy regarding to book projects, the Division Committee raises a question about a general IUPAC policy about books. Two issues are remaining to be solved: 1) Quality control and 2) how the money is used since as opposed to standard projects, the money here is not intended to bring a task group together. It was decided that Division I does not approve book projects for the time being and will review book projects only if the two above issues are resolved.

IV. Project details and publications

The following 4 projects were approved and funded or co-funded in the 2016-2017 biennium:

Project No. 2016-038-1-100: Quantities, Units and Symbols in Physical Chemistry - Portuguese translation of IUPAC's Green Book (Rocha). This project aims at filling final financial needs for the task group to finish the Portuguese translation of the Green Book of IUPAC on Quantities, Units and Symbols in Physical Chemistry, in due time for the 46th IUPAC World Congress in Brazil.

Project No. 2016-001-2-300: Categorizing Chalcogen, Pnictogen, and Tetrel Bonds, and Other Interactions Involving Groups 14-16 Elements (Resnati). This project has the potential of producing highly cited IUPAC outputs, such as the hydrogen (project 2004-026-2-100) or halogen projects (2009-032-1-100) before.

Project No. 2016-032-2-020: IUPAC's role in developing interdisciplinary/ collaborative work in the Chemistry community and beyond - the focus for the 2017 WCLM (Ober)

Project No. 2016-031-2-100: Notations and Conventions in Molecular Spectroscopy: Rotation-Vibration Spectroscopy (McDowell). This project is a continuation work of two previous, very important projects on nomenclature in molecular spectroscopy (154-5-97 and 154-6-97).

Other current projects highlighted in this report are:

Project No. 2013-048-1-100: A critical review of the proposed definitions of fundamental chemical quantities and their impact on chemical communities (Stohner). This project aims primarily at providing a technical report containing a critical review of proposed new definitions of the physical quantity amount of substance, and its unit, mole, as well as of its related unit for the quantity mass. This report should strengthen IUPAC's position in the ongoing discussion about the new definition of the aforementioned units. It is an interdisciplinary project supported conjointly by Divisions I, II and V, as well as by the Committee on Chemical Education and ICTNS. The Technical Report has been published in Pure and Applied Chemistry with the DOI:10.1515/pac-2016-0808. A recommendation regarding the exact definition of the unit mole, which may potentially be called the IUPAC definition of the mole in the future, is currently undergoing public review under the PAC index PAC-REC-17-01-06. Both the Technical Report and the preliminary Recommendation will be considered by the decision taking organizations within the International Committee of Weights and Measures at their meetings in the current year in view of finalizing the current draft of the SI brochure, which will define the mole in 2018.

Project No. 2013-035-1-100: Evaluated kinetic data for atmospheric chemistry (Wallington). This project is a continuation of a successful series of projects on kinetic data for atmospheric chemistry, carried out by essentially the same task group. The outcome will be a review of new data published in 2013/2014 and a compilation of recommended data for $\geq C_4$ organic and aromatic compounds of atmospheric interest, important for chemistry-climate models in Earth system analyses for global and regional applications. Work from the previous project received a highlighting science feature article in issue 51 (February 2014) of the International Global Atmospheric Chemistry (IGAC) Newsletter.

V. Activities of Commission I.1

The core activity of the Subcommittee “Commission on Physicochemical Symbols, Terminology, and Units (Commission I.1)”, is the publication and updating of the book “Quantities, Units and Symbols in Physical Chemistry” (the Green Book). Its 3rd edition was published in 2007 by R. Cohen, T. Cvitas, J.G. Frey, B. Holmström, K. Kuchitsu, R. Marquardt, I. Mills, F. Pavese, M. Quack, J. Stohner, H.L. Strauss, M. Takami, and A.J Thor.

The last printing (third printing) was prepared by the Royal Society of Chemistry (RSC) Publishing in 2011 and is already sold out.

A subgroup of the Commission met on November 12 and 13, 2016, in Zurich. The minutes of the meeting are public. Briefly, the Commission discussed matters related to the new definition of the mole, the current status of the Green Book and its Abridged Version (IUPAC project 2007-032-1-100). The next (4th) printing will be the 4th edition. All current authors will stay.

The Green Book is being translated into several languages. The Japanese and French translation of the 3rd edition have been published recently. There is a Spanish translation of the 2nd edition. A Turkish and Portuguese translation are in preparation (see above). The Italian translation is finished, but a suitable publishing company has not yet been identified.

The abridged version of the Green Book is technically finished. The missing piece of work is related to the lay out.



INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

Division II Report to Council 2017

Biennial Report to the IUPAC Council in Sao Paulo 12-13 July 2017 INORGANIC CHEMISTRY

Ongoing and planned activities in the current biennium and some strategic outlooks

I. Highlights and Executive Summary

Division II deals primarily with three subfields, considered as part of the “Inorganic Chemistry” area, and with the name-giving process of newly discovered elements. These are summarized first, followed by a section on new elements. Later parts of this report will deal with details, project status and plans for the future.

I.1 *Atom: Isotopic Abundances and Atomic Weights:*

The “Atom” members in our Division have continued to be highly active and productive both inside and outside of IUPAC. These members are closely associated with the Commission on Isotopic Abundances and Atomic Weights, and the Subcommittee on Isotopic Abundance Measurements, and most of them are involved in IUPAC projects. This Commission has a primary role to evaluate and publish isotopic compositions of the elements and their atomic weights and to provide technical opinion on related matters. Steady improvements in isotopic measurement technologies and techniques have resulted in increasing numbers of publications of higher resolution isotopic composition data. Atomic Weights tables, as most recently published in 2013 and 2015 (*Atomic weight of Ytterbium*), will continue to be published for general educational and commercial use. Commission chair Meija recently published an account in *Chemistry World* (J. Meija, *Weighty decisions*, in *Chemistry World*, 22 January 2016). The Commission’s website is frequently updated to disseminate the IUPAC work. Jointly with ICTNS and other divisions, a IUPAC project on redefinition of the mole has been completed and the IUPAC Provisional Recommendation is currently in public review. A new project, following a discussion in *Nature*, has started on group 3 of the Periodic Table, dealing with the question whether or not La/Lu and Am/Lr belong to this group. See also CI, March 2016, 22-3.

I.2 *Molecular Inorganic Chemistry:*

A significant fraction of Division members belongs to the “molecules” area, including coordination chemistry, organometallic chemistry, bioinorganic chemistry, transition metal catalysis and main group chemistry. Nomenclature of inorganic chemistry is primarily covered in Division VIII, although terminology of new classes of compounds has a particular interest from our Division, as illustrated by some recent projects. Important and highly cited recommendations and technical reports have been published, like on Coordination Polymers/Metal-Organic Frameworks; the paper by Öhrström et al. *Pure and Applied Chemistry* (2013) **85**, 1715-1724 has been already cited well over 150 times by May 2017. Another well cited report, dealing with a project on oxidation state definition. To generate responses and prepare for the three focused write-ups, the project convener Pavel Karen published an Essay entitled “Oxidation State, A Long-Standing Issue” *Angew. Chem. Int. Ed.*, 2015, **54**, 4716 – 4726. The final project report manuscript on this topic has appeared in 2016: “Comprehensive definition of oxidation state” (IUPAC Recommendations 2016), P. Karen, P. McArdle, J. Takats, *Pure and Applied Chemistry*(2016), **88**. 831-839

I.3 *Solid State Inorganic and Materials Chemistry:*

The members of this group are associated with the activity of Interdivisional Subcommittee on Materials Chemistry, and with contributions from Solid State High-temperature Materials Chemistry. The Subcommittee on Materials Chemistry is exploring together with Division I ways of expanding the significance of Materials Chemistry with IUPAC and increasing the interaction between IUPAC and the Materials Chemistry user communities. A project to develop pedagogic material to teach technical material sciences is in preparation.

I.4 *New Chemical Elements Discovery and Name Giving News*

After the publication of the final report of the Joint Working Party (IUPAP/IUPAC) dealing with the verification and ratification of 4 new elements, i.e. 113, 115, 117 and 118, in January 2016, following a public announcement on December 30, 2015 using an IUPAC Press Release, the discoverer laboratories were invited to propose names and symbols for the 4 new elements, using the most recent (2016) IUPAC guidelines (PAC, (2016), 88, 401-405). These revisions of the rules for naming new chemical elements were spearheaded by Div II. Details are below in III.9.

The proposed names and symbols were confidentially shared with the Bureau in April 2016, and were subsequently discussed within Division II, and during a 5-month public review of the text available on the IUPAC website. As a sign of the relevance: this procedure involved, among other things, evaluation of a >150 000 signature petition. After ending this public review, subsequently Division II, followed by ICTNS and finally the Bureau – acting by mandate of the Council – decided on acceptance by November 28, 2016. The final manuscript has appeared in PAC, dated December 2016; PAC (2016), **88**, 1225-1229. The Council is to ratify these names and symbols at its Brazil 2017 meeting. Many articles in magazines have appeared describing the discoveries and also presenting speculation on new elements beyond 118. Details are given below and also an article with Chem. Int. (April 2016 issue, pages 30-32) deals with an overview.

Even though IUPAC has stated many years ago that it does not impose rules for the translation of names in each language, Division II has been collecting the names used in several other languages. A file, still being updated, is available for interested persons and organizations.

II. Plans and priorities for the remainder of this biennium and beyond.

Till the end of 2017 (end of the biennium), the Division will give attention to:

- a. The election process of new members in all categories; a Nomination Committee chaired by DVP Lars Öhrström had taken place, and the outcomes have been reported separately during Council.
- b. For the Division meeting in Brazil attendance of new young observers, as well as cross-divisional activities has taken place.
- c. Stimulating the process of name-giving of the new elements in non-English languages (see above).
- d. Participation with the formation of the Green Chemistry Interdivisional Committee.
- e. Some **new projects and follow-up projects** on topics, including:
 1. The role of IUPAC in Isotope Sciences Terminology will remain very important. Any terminology for the isotopic sciences should be managed by, or have a very significant input from Division II, where the primary IUPAC expertise in this field resides. A project on Global dissemination of an interactive isotopic periodic table has been launched (isotopesmatter.com). In addition, IUPAC Molecular Weight Calculator is currently being developed by the CIAAW (ciaaw.org).
 2. Survey of Definitions and Use of Common Solid-State Chemistry Terminology.
 3. Some other new projects submitted or under consideration for submission are:
 - A Periodic Table of Life and other periodic tables, like a Periodic Table of allotropy of elements. These are planned to be ready at the centennial Paris 2019 meeting.
 - A project by a new joint working group, joint with IUPAP, to evaluate - and if needed update - the criteria to be used in validation of discovery of new elements.
 - Terminology of Nanomaterials:
 - Definition of Valence, follow-up processes from the Oxidation State project
 - Spotting errors in Wikipedia related to inorganic chemistry and nomenclature and submit corrections to Wikipedia.
 4. The Oxidation State Project that had been extended till June 2017, in order to deal with one more follow-up task, i.e. the revision of the Wikipedia entry Oxidation State and its actual editing into Wikipedia (two different things) which will be possible after the two relevant Gold-Book entries will have been updated.
 5. The CIAAW has also projects in its planning, which include modernizing the data storage (online database), statistical evaluation (work done jointly with JCGM-WG1) and reporting. One of the main CIAAW goals for the upcoming biennium is to increase the transparency of its work and to focus on the terminology regarding isotope delta measurements.

III. Overall Report of Division II activities and achievements during 2016-2017 (addressing also the Goals and Objectives laid out in the current IUPAC Strategic Plan)

III.1 Projects (Summary; details are in section IV). As of summer 2016, the Division has 26 active projects on its project list, 7 of which are new since Busan. Some of the project activities have been mentioned above, or will be referred to below. An updated list is presented in section IV.

III.2. Division Newsletter. The Inorganic Division has developed a regularly appearing Newsletter since 2008 (one or two times a year; the most recent one was published in December 2016). In addition to the members of Division II, this Newsletter has been sent to all IUPAC Division Presidents and the Executive Committee. This meanwhile popular and informative newsletter has also been used by some National Chemical Societies for subsequent redistribution. All

previous ones are and will remain available at the IUPAC Website.

III.3. Welcome pack for new Division members: The division continues to provide its new members with a welcome package dealing with the Division and IUPAC structure and protocols for e.g. project handling. This introduction to the Division and its work is highly appreciated, especially by the newest members, entering the Division for the first time, such as NRs. The package has also been made (and still is) available to other Divisions.

III.4. IUPAC visibility in the outside world: Just a few examples of successful projects: 1) The output of the completed project (2009-012-2-200) on the terminology of coordination polymers and MOFs, see item I.2, has been highlighted in Chem. Eng. News, a weekly magazine of the ACS (over 135000 subscribers). See details at: <http://cen.acs.org/articles/92/i6/Confusion-Over-Scientific-Nomenclature-Par.html>. This article makes a general plea for the need of proper terminology and nomenclature, recognizing the role of IUPAC. 2) The most recent, and very strong visibility of IUPAC and Division II has been realized through the press release and follow-ups around the four newly validated chemical elements, and most recently their name giving. A detailed description has appeared in CI, summer 2017.

III.5 Revised Atomic Weights Projects

The most recent biennial review of atomic-weight determinations and other cognate data by the Commission on Isotopic Abundances and Atomic Weights (CIAAW) has resulted in changes for the standard atomic weight of ytterbium. The IUPAC Press Release of 24 Aug 2015 resulted in media enquiries and resulted in wide spread of articles in the global media, including the Chemical and Engineering News and Chemistry World, to name a few. Work continues in this area in collaboration with the International Bureau of Weights and Measures (BIPM) in projects related to explaining the significance of, and how to work with these atomic weight intervals to the wider chemical community. Recently, CIAAW members have developed modern statistical methods for obtaining standard values of atomic weights, isotopic abundances and isotope ratio values. This might have a large-scale impact on all chemical elements in upcoming years.

III.6 Membership and activities of the Division Members

The Division will remain eager to continuously renew its membership and also recruit new members from the pool of young observers to the council meetings. Since some years within the Division we have a scheme available for each of the members and their duties within the division. The Division considers it of great importance that member have chances to become and remain active e.g. in projects. Therefore annual meetings of TMs, and if possible more members (AM. NR) have been and will be organized. The 2016 meeting, had a very good attendance (see below).

III.7. Off year Meetings –2016&2018

Brest off-year meeting (2016): The division's off-year meeting took place during 1½ day at the University in Brest, kindly hosted with the aid of prof. Lahcène Ouahab. Among notable items were a number of reports from IUPAC committees and affiliated organizations, discussions on sponsorship of conferences and the generation of new projects. The minutes have been distributed to the members. A main item was a long discussion on the newly proposed names for 4 new chemical elements. The Secretary General attended part of the meeting as an observer.

For 2018 an off-year meeting is scheduled, but a location has not yet been decided.

III.8 Interdivisional Subcommittee on Materials Chemistry

The Division has substantial representation on the Interdivisional Subcommittee on Materials Chemistry (Current chair is C. Ober, also PP of Polymer Division) which together with Divisions I and IV is exploring ways of expanding the significance of Materials Chemistry with IUPAC and increasing the interaction between IUPAC and the Materials Chemistry user communities. Several ideas for projects were developed including a new project on development of a Materials Chemistry Education Website, now: 2013-037-1-200.

III.9 Four new elements recognized and named

During 2016 and early 2017 the Division was heavily involved in the recognition, publication, planning of name-giving and final publication of the new of four new chemical elements, meanwhile known as nihonium(113), moscovium(115), tennessine(117) and oganesson(118). In early 2016 the recognition papers were accepted by IUPAC and IUPAP, published in PAC, P. J. Karol, R. C. Barber, B. M. Sherrill, E. Vardaci, T. Yamazaki. Pure Appl. Chem. **88**, 139 (2016) and P. J. Karol, R. C. Barber, B. M. Sherrill, E. Vardaci, T. Yamazaki. Pure Appl. Chem. **88**, 155 (2016). At that stage the discoverers were invited to propose names and symbols for these four elements, based on the latest

recommendation published by Division II, resulting from a 2015 project: W. H. Koppenol, J. Corish, J. Garcia-Martinez, J. Meija, J. Reedijk. *Pure Appl. Chem.* **88**, 401 (2016). The names and symbols by the discoverers were discussed within Division II, and as a result of that consultation in 2 cases the initially proposed symbols were modified. In early June the four names and symbols were made public at the IUPAC website and comments from the general audience were invited during a period of 5 months. These comments were subsequently discussed by Division II in the off-year meeting and by e-mail exchanges, till early November. After the formal agreement of Division II, the Bureau also formally decided on acceptance (by mandate of the Council), on November 28. On November 30, 2016 the names became official and were formally announced in the PAC Paper, L. Öhrström, J. Reedijk. *Pure Appl. Chem.* **89**, 1225-1229 (2017). DOI: 10.1515/pac-2016-0501. A more detailed description of the whole process, including a presentation of received comments, will appear in the April 2017 issue of *Chemistry International*.

The recognitions and name-givings have been celebrated in Moscow (March 2, 2017) for Mc, Ts and Og in a special colloquium at the Russian Academy of Sciences, including a formal presentation of President Tarasova. Also former treasurer John Corish, past president Mark Cesa and Division II president Jan Reedijk, attended this colloquium as well as a subsequent excursion to the Dubna laboratories (JINR). In Tokyo a special meeting was held on March 14, 2017 to celebrate the recognition and name of Nh, where president Tarasova addressed the audience.

A summary of the complete process was presented in *Chem. Intern.* April 2017, pages 30-32.

III.10 Operations of the Division from the perspective of the 6 IUPAC long-range term goals and Strategic Plan 2015

1. IUPAC will provide leadership as a worldwide scientific organization that objectively addresses global issues involving the chemical sciences.

The Division's operations are in the areas of Inorganic Chemistry covering the broad areas of Atoms, Molecules and Materials with the former being effectively subsets of the latter. "Atoms" covers areas such as the name giving process of new elements, and atomic weights and isotopes of the elements. Molecules cover that broad area of inorganic chemistry between atoms and materials chemistry, while Materials Chemistry deals with any inorganic material. In practice the boundary between organic and inorganic materials can be difficult to determine, and therefore the existence of the interdivisional Subcommittee on Materials chemistry, which includes members of both Division II and Division V (Polymers) can be motivated. All three areas do address global chemical community needs, as will also be clear from the following sections.

2. IUPAC will facilitate the advancement of research in the chemical sciences through the tools that it provides for international standardization and scientific discussion.

The Division supports fundamental data evaluation projects that are vital to long term research in the chemical and other sciences. An ongoing major effort in this regard is the work done on Atomic Weights and increasingly also on Isotopic Abundances, both of which comprise fundamental data used by the entire chemical community. These data are also critical in international commerce and trade of chemicals and chemical products. Projects 2009-027-1-200 and 2013-032-1-200 are examples of successful IUPAC efforts towards international standardization of chemical measurements in this area. Project 2009-027-1-200 has been set out to establish a list of primary international standards in isotope ratio measurements. The resulting IUPAC Technical Report remains the most downloaded article from *Pure and Applied Chemistry* and its recommendations were officially endorsed by the International Committee of Weights and Measures in March 2015. The Division believes that IUPAC plays an important role in this ever-increasing need from the chemical community. The danger of this not being taken up by an international organization like IUPAC, is a burgeoning number of in-house standards for isotope ratio measurements that - as well as creating additional expense for the chemical community - also reduces standardization and unnecessarily complicates communication and chemical understanding. More effort is needed to address outstanding issues regarding the nomenclature of isotope delta measurements.

Uncertainty of measurements plays an important role in the way chemists interpret and disseminate their results. Evaluation of uncertainty is a complex task and international guidelines such as the "Guide to the Expression of Uncertainty in Measurement", which is co-authored by IUPAC (IUPAC is represented by a Div II member), go a long way to ensure uniform scientific discussion. Although atomic weights form the basis for nearly all chemical measurements, the atomic weight uncertainties still lack uniform interpretation. Project 2013-032-1-200 is an example of international collaboration between IUPAC and the Joint Committee for Guides in Metrology to establish a set of coherent guidelines on formal interpretation of standard atomic weight uncertainties.

3. IUPAC will assist chemistry-related industry in its contribution to sustainable development, wealth creation, and improvement in the quality of life.

The same fundamental data that the Division provides for international standardization is also used by commerce and industry. The most significant examples of this are the above-mentioned latest atomic weights and isotope abundances. Isotopic abundances, which are becoming increasingly important in areas, in particular for legal and

provenance cases and also in medicinal chemistry.

4. IUPAC will foster communication among individual chemists and scientific organizations, with special emphasis on the needs of chemists in developing countries.

The Division reviews relevant IUPAC sponsored international conferences on the chemical sciences. Through the IUPAC project system the Division strongly supports the inclusion of chemists from as wide a range of countries as possible on project task groups. The Division also publishes an annual newsletter of its activities, which are also distributed to all member country societies and are readily available on the IUPAC website. For the most recent one, see: https://www.iupac.org/cms/wp-content/uploads/2016/12/Div_II_newsletter2016.pdf

5. IUPAC will utilize its global perspective and network to contribute to the enhancement of chemistry education, the career development of young chemical scientists, and the public appreciation of chemistry.

The Division has reported earlier on a project with CCE on the extension of a major project involving the Period Table of the Isotopes for the educational community. (Project number 2007-038-3-200) This project was very successful, and explored also ways to present this critical chemical representation of real world chemistry and the resulting wealth of applications it provides to many areas of chemistry. A follow-up project, i.e. 2014-024-1-200 is to result in the creation an interactive, electronic version of the IUPAC Periodic Table of the Isotopes (see: isotopesmatter.com). In 2013, Division's Commission on Isotopic Abundances and Atomic Weights launched a redesigned website (see: <http://ciaaw.org>) featuring a wealth of information of its products and activities. This site functions as the authoritative online platform for the Commission's products. This website is frequently accessed from over 100 countries worldwide.

Wikipedia: On the suggestion of Profs. Wieser and Öhrström all division members have been stimulated to read and also edit relevant pages in Wikipedia, in English or other languages. Currently entries such as the following may be interesting to refer to: <https://en.wikipedia.org/wiki/IUPAC>

https://en.wikipedia.org/wiki/IUPAC_Inorganic_Chemistry_Division The division wiki article had 1,453 page views (4/day) 2016 and the CIAAW mention had 17,439 pageviews (48/day) with a peak of 2800 at 30th March https://en.wikipedia.org/wiki/Commission_on_Isotopic_Abundances_and_Atomic_Weights

6. IUPAC will broaden its national membership base and will seek the maximum feasible diversity in membership of IUPAC bodies in terms of geography, gender, and age.

The Division actively pursues new members to participate in divisional elections based on merit and diversity, through existing membership and connections, young observer program, and through their national adhering organizations. Divisional projects are also reviewed for general diversity of the project task group.

IV. State of Projects – as of March 1, 2017

The Division currently has 26 items on its active Project List, including projects co-funded with other divisions, marked in blue in the Table below. Since 2015, five new projects have been funded, as evident by their project code number (starting with 2015-)..

Some proposed projects are in the pipeline and close to submission, under evaluation or under revision, such as a project on a Periodic Table of Life, the project on Valence and a project to showcase how to use Wikipedia to promote IUPAC activities and to inform the outside world about our division activities.

List of Division II-related active projects as of March 1, 2017

2008-040-1-200	Towards a Comprehensive Definition of Oxidation State; will be complete in 2017
2009-023-1-200	Evaluation of Radiogenic Abundance Variations in Selected Elements
2009-026-2-200	Online Evaluated Isotope Ratio Database for User Communities
2009-027-1-200	Assessment of Stable Isotopic Reference and Inter-Comparison Materials
2009-045-1-200	Guidelines for Measurement of Luminescence Spectra and Quantum Yields of Inorganic Compounds, Metal Complexes and Materials
2009-046-2-200	Terminology and Definition of Quantities Related to the Isotope Distribution in Elements with More than Two Stable Isotopes

2011-026-1-200	Full Calibration of a New Molybdenum Isotopic Reference Material
2011-027-1-200	Evaluated Published Isotope Ratio Data (2011-2013)
2011-028-1-200	Evaluation of Published Lead Isotopic Data (1950-2013) for a New Standard Atomic Weight of Lead
2011-040-2-200	Developing of a Procedure for Using Intervals Instead of Fixed Values for Atomic Weights
2011-035-1-800	Terminology and Nomenclature of Inorganic and Coordination Polymers
2012-036-2-200	Recommendations for Isotope Data in the Geosciences II
2012-045-1-800	Nomenclature for Polyhedral Boranes and Related Compounds
2012-046-2-800	Handling of Inorganic compounds for InChI V2
2013-030-1-800	Nomenclature for Metallacycles containing Transition Metals
2013-032-1-200	Guidelines for the Derivation of Values and Uncertainties from Standard Atomic Weight Intervals
2013-037-1-200	Creating an Educational Website for Materials Chemistry
2014-001-2-200	Terminology Guidelines and Database Issues for Topology Representations in Coordination Networks, Metal-Organic Frameworks and Other Crystalline Materials
2014-002-1-200	Assessment of Stable Isotopic Reference Materials [Follow-up to project 2009-027-1-200 (TGC: Willi Brand, CIAAW)].
2014-016-2-200	Compilation of the Variation of the Isotopic Composition of the Elements via Crowd sourcing
2014-024-1-200	Development and Global Dissemination of an IUPAC Interactive Electronic Isotopic Periodic Table and Supporting Resources for the Education Community
2015-030-2-200	Development and Global Dissemination of an IUPAC Interactive Electronic Isotopic Periodic Table and Supporting Resources for the Education Community
2015-037-2-200	IUPAC Molecular Weight Calculator
2015-053-1-200	Survey of Definitions and Use of Common Solid-State Chemistry Terminology
2015-031-1-200	Revision of PAC 2002 paper: "How to name New elements"; completed early 2016
2015-039-2-200	The constitution of group 3 of the Periodic Table.
2017-014-1	IUPAC/IUPAP Joint Working Group to Examine the 1991 Criteria used to Verify Claims for the Discovery of New Elements
2017-017-1	Evaluated Published Isotope Ratio Data (2013-2018)

Background Information: Memberhips Division II (2016-7)

- President: J. Reedijk (The Netherlands); Vice President: L. Öhrström (Sweden),
- Secretary: M. Leskela (Finland),
- Titular Members: [L. Armelao \(Italy\)](#), T. Ding (China), P. Karen (Norway), R. D. Loss (Australia), D. Rabinovich (USA), T. Walczyk (Singapore/Switzerland), M. Wieser (Canada)
- Associate Members: [Y. Abdul Aziz \(Malaysia\)](#), J. Colon (Puerto Rico), M. Drabik (Slovakia), [L. Meesuk \(Thailand\)](#), K. Sakai (Japan), [N. Trendafilova \(Bulgaria\)](#).

- National Representatives: J. Darkwa (South Africa), M. Diop (Senegal), L. Galamba-Correia (Portugal), [M. Hasekawa \(Japan\)](#), S. Kalmyakov (Russia), A. Kiliç (Turkey), P. Knauth (France), G. J. Leigh (UK), S. Mathur (Germany), B.B. Yoon (South Korea).

Female Division members are marked in [blue print](#).

During the GA in Busan, the presence of again a number of young observers was very much enjoyed and appreciated. Some of them, including the previous GA, have been elected as new members (2016-2017 and 2018-2019). The Division was happy with the faster election processes for Division Members 2016-2017 and 2018-2019.

Division and Interdivision (sub)committees:

- * Commission on Isotopic Abundances and Atomic Weights (II.1), Chairman: J. Meija
- * Subcommittee on Isotopic Abundance Measurements, Chairperson: J. Irrgeher (female)
- * Subcommittee on Stable Isotope Reference Material Assessment, Chairman W. Brand
- * Subcommittee on Natural Assessment of Fundamental Understanding of Isotopes: Chairperson: N. Holden
- * Interdivisional Subcommittee on Materials Chemistry, Chairman: C. Ober.



IUPAC Organic and Biomolecular Division III

Report to IUPAC Bureau Meeting
Sao Paulo, July 8-14, 2017

INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

Margaret Brimble

I. Executive Summary

The mission of the Division of Organic and Biomolecular Chemistry is to oversee activity in the field of organic and biomolecular chemistry in the broadest sense. Division III consists of a Division Committee (comprising 10 Titular members, 6 Associate Members and 10 National Representatives) and 5 Sub-committees. The Sub-committee on Green Chemistry no longer exists given the newly constituted Interdivisional Committee on Green Chemistry (ICGC). The ICGC encompasses all the members of the former Division III Sub-committee on Green Chemistry.

Major activities comprise conference organization and projects (both evaluation and involvement). The Division oversees the awarding of two IUPAC prizes, the CHEMRAWN prize for Green and/or Atmospheric Chemistry and the Thieme-IUPAC Prize for Organic Synthesis.

Highlights of the 2016-2017 biennium include the hosting of nine international conferences that are part of a longstanding series and the funding of four new projects, as detailed below.

II. Plans and Priorities for the Remainder of this Biennium and Beyond

The scientific interests of Division III cover the fundamental and applied aspects of organic chemistry. Central to the Division is the topic of organic synthesis, an enabling science, covering topics as diverse as new reactions and reagents, the asymmetric synthesis of natural products, transition metal catalysts, organocatalysis, organometallic chemistry, enzyme aided synthesis and methods for green synthesis. In the biomolecular area, key topics include chemical biology, notably glycomics, linking across to the more applied topic of biotechnology. The Division has always had strong links into physical chemistry through spectroscopy and/or organic analysis. The Division also has close association with inorganic chemistry especially in the area of catalysis. The discipline of green chemistry first emerged within Division III and has been very successful resulting in the formation of the new Interdivisional Committee on Green Chemistry (ICGC). Division III acknowledges the enthusiasm and stellar leadership of Pietro Tundo who chaired the former Sub-committee on Green Chemistry.

The main program of activities is conducted in two forms: firstly via a series of well-established international conferences, and secondly through the IUPAC project system. This Division coordinates these scientific topics through five sub committees as well as by involvement in interdivisional activities. Rotation of leadership and succession planning within the five sub committees is actively encouraged. The five sub-committees and their elected Chairs are:

Sub-Committee on Organic Synthesis (Chair: Nikolay Nifantiev, Russia)

Sub-Committee on Biomolecular Chemistry (Chair: Zhen Xi, China)

Sub-Committee on Biotechnology (Chair: Fengwu Bai, China)

Sub-Committee on Photochemistry (Silvia Braslavsky, Germany, retiring)

Sub-Committee on Structural and Mechanistic Chemistry (Chair: Ian Williams, UK)

These sub-committees meet annually, either at the most relevant scientific conference or at the biannual General Assembly.

To date, the Division has approved two project proposals during the 2016-2017 biennium:

- *A Critical Review of Reporting and Storage of NMR Data for Spin-half Nuclei in Small Molecules* (2016-023-2-300) Garson

- *Categorizing Chalcogen, Pnictogen, and Tetrel Bonds, and Other Interactions Involving Groups XIV-XVI Elements* (2016-001-2-300) Resnati

Additionally Division III has supported the following three projects in the 2016-2017 biennium:

- *4th International Workshop on the Impact of Scientific Developments on the Chemical Weapons Convention* (2017-001-020) Forman
- *Developing Database on Molecular Compositions of Natural Organic Matter and Humic Substances as Measured by High Resolution Mass Spectrometry* (2016-015-2-600) Perminova
- *IUPAC's Role in Developing Interdisciplinary/ Collaborative Work in the Chemistry Community and Beyond. The focus for the 2017 World Chemistry leadership Meeting (WCLM) in Sao Paulo, Brazil* (2016-032-2-020) Ober

The following two projects approved during the 2014-2015 biennium remain current:

- *Strategic Planning for a Network for Heterocyclic Chemistry among Countries of the Mediterranean, including Europe and North America* (2015-027-1-300) Florio - continuation of project (2011-006-2-300 see below)
- *Nomenclature of Homodectic Cyclic Peptides Produced from Ribosomal Precursors* (2015-003-2-300) Reaney

The following four projects approved during the 2012-2013 biennium remain current:

- *Healthy Life and Active Ageing: the Contributions of Functional Food Ingredients* (2013-054-2-300) Rauter
- *Green Chemistry in Higher Education: Towards a Green Chemistry Curriculum for Latin American and African Universities* (2013-041-3-300) Zuin
- *Photoluminescence Quantum Yields* (2013-040-1-300) Brouer – joint with Division I; this project was chaired by Enrique San Roman and Fred Brouwer and resulted in the publication of several very valuable documents on fluorescence standards and related matters.
- *Glossary of Renewable Chemistry* (2013-036-2-300) Vaz

Additionally Division III has supported the following two projects in the 2012-2013 biennium:

- *Nomenclature of Phosphoryl Transition States* (2013-039-2-300) Blackburn - A manuscript titled 'How to Name Atoms in Phosphates, Polyphosphates, their Analogues, and Transition State Analogues for Enzyme-catalysed Phosphoryl Transfer Reactions' is available as provisional recommendations.
- *Carbohydrate Nomenclature* (2012-039-2-800) Vliegthart – joint with Division VIII and continued as project 2015-035-2-800.

The following four projects approved also remain current:

- *Abbreviations for protecting groups* (2011-044-1-300) Brimble
- *Update of IUPAC Glossary of Physical Organic Chemistry* (2009-002-1-300) Perrin
- *Standard Photochemical Processes* (2008-037-2-300) Griesbeck
- *Biomass burning in Sub-Saharan Africa* (2007-025-1-300) Mammino

III. An Overall Report of Division/Committee Activities and Achievements during 2016-2017 Biennium

Scientific Discussion

During 2016, the Division oversaw arrangements for **six** international conference series, many of which are meetings of long-standing within the IUPAC conference calendar. These meetings were:

6th International Conference on Green Chemistry (ICGC, September 2016, Venice, Italy);

9th International Conference on Biodiversity and 29th International Symposium on the Chemistry of Natural Products/ (ICOB/ISCNP September 2016, Izmir, Turkey);

21st International Conference on Organic Synthesis (ICOS, December 2016, Mumbai, India);

17th International Symposium on Biotechnology (IBS, October 2016, Melbourne, Australia);
26th IUPAC Symposium on Photochemistry (April 2016, Osaka, Japan);
23rd International Conference on Physical Organic Chemistry (ICPOC, July 2016, Sydney, Australia).

The following conferences which are part of a long-standing series will also take place in 2017:

11th International Conference on Biomolecular Chemistry (September 2017, Konstanz, Germany);
19th International Symposium on Organometallic Chemistry directed towards Organic Synthesis (OMCOS, June 2017, Jeju Island, Korea);
12th International Conference on Heteroatom Chemistry (ICHAC, June 2017, Vancouver, Canada).

Members of Division III also supported the following conferences that have received endorsement by IUPAC:

21st International Conference on Phosphorus Chemistry (ICPC, June 2016, Kazan, Russia);
80th Prague Macromolecular Meeting Self-assembly in the World of Polymers (PMM, July 2016, Prague, Czech Republic);
28th International Carbohydrate Symposium (ICS, July 2016, New Orleans, USA);
20th Mendeleev Congress (September, 2016, Ekaterinburg, Russia);
3rd International Conference on Bioinspired and Biobased Chemistry & Materials (October 2016, Nice, France);
25th Meeting of Croatian Chemists and Chemical Engineers (April 2017, Poreč, Croatia);
Solutions for Drug-Resistant Infections (SDRI, April 2017, Brisbane, Australia);
Polymers and Organic Chemistry (POC, June 2018, Montpellier, France);
18th International Symposium on Novel Aromatic Compounds (ISNA, July 2019, Sapporo, Japan);
Chemistry Conference for Young Scientists (February 2018, Blankenberge, Belgium).

Full details of Division III conferences are provided at the end of this report.

The Division oversees the awarding of several prizes to outstanding young chemists. The Thieme-IUPAC prize in Synthetic Organic Chemistry, which is generously supported by the scientific publisher Thieme, is awarded to a chemist under the age of 40 whose research has had a major impact on the field of synthetic organic chemistry. The 2016 prize was awarded to Professor Neil Garg (USA) for the development of synthetic strategies and methods that enable the synthesis of complex bioactive molecules. The prize was due to be presented at ICOS21 (India) however, Professor Garg was unable to travel to India hence the award will be made at an appropriate venue in the USA in 2017. The IUPAC-CHEMRAWN VII Prize for Atmospheric and Green Chemistry is presented biannually to a chemist under the age of 40 and from a developing country for research in green and/or atmospheric chemistry. The 2016 prize was awarded at the 6th International Conference on Green Chemistry (Venice) to Dr. Ali Maleki, from the Iran University of Science and Technology. The six winners of the 3rd edition of the PhosAgro/UNESCO/IUPAC “Green Chemistry for life” awards were: A. Akhmetshina (Russia), I. Carrera (Uruguay), M. Ismail (Pakistan), E. Ravera (Italy), A. S. Elsayed Sayed (Egypt) and W.C. Wanyonyi (Kenya).

Engagement of Young Chemists

Division conferences are traditionally well supported by younger chemists, and several activities within these meetings target this age group. The majority of these meetings provide poster prizes to student delegates, and some host workshops designed for young researchers to meet with plenary speakers. Several projects, notably those coordinated through the Sub-Committee on Green Chemistry, seek to engage young people; for example, project 2013-036-2-300 *Glossary on Renewable Chemistry* (led by Silvio Vaz) is developing content related to biomass chemistry and green chemistry, and is aimed at students as well as at researchers. An earlier project, 2013-041-3-300 *Green Chemistry in Higher Education: towards a Green Chemistry Curriculum for Latin*

American and African Universities (led by Vania Zuin) has considered the development of general modules for up-to-date university Green curricula within Chemistry courses (Bachelor and Teacher Training), and also has an emphasis on public awareness of green chemistry principles. Finally project 2013-057-3-300 *Chemistry beyond Chlorine* led by Pietro Tundo seeks to improve the perception of chemistry.

Providing Scientific Expertise to Address Critical World Needs

The Sub-Committee on Green Chemistry has provided project activity connecting to the economical growth and activity of the chemical industry, particularly in developing countries. In other activities, Division III conferences, particularly the International Biotechnology symposia and the various Green Chemistry meetings, provide an opportunity to link industry-based chemists with those from universities and the government sector. A project funded in 2015 (*Healthy Life and Active Ageing: the Contributions of Functional Food Ingredients*, 2013-054-2-300, Rauter) seeks to bring chemistry to the general public, demonstrating through the implementation of an interactive website, how chemistry offers unique solutions for society needs in terms of a healthy living and a better ageing.

Supporting Chemistry Education, Particularly in Developing Countries

The 6th International IUPAC Conference on Green Chemistry (6th ICGC) was held in Venice 4-9 September 2016. The conference was divided into 5 topics: Green Materials; Green Industrial Processes and Molecular Innovation; Green Bioprocesses; Green Energy; Green Policy and Education. The main objective of the conference was that of emphasizing the importance of green chemistry for sustainable development. Two symposia of international relevance took place: one organized by UNESCO, PhosAgro and IUPAC while the other was sponsored by OPCW (Organisation for the Prohibition of Chemical Weapons), which looks at Green Chemistry as a principle and a means to oppose military usage of chemical compounds. A session on sustainability and security, conducted by the Organisation for the Prohibition of Chemical Weapons (OPCW) emphasized the links between scientific knowledge, education and policies with regard to the production and use of chemicals.

A number of Division III projects are strongly linked to chemistry in developing countries. Recent examples include the following geographic areas:

Africa - a workshop in computational chemistry for sub-Saharan chemists (2015-016-2-300, Whitehead); biomass burning in sub-Saharan Africa (2007-025-1-300, Mammino); network for heterocyclic chemistry in North Africa (2011-006-2-300, Florio); green chemistry in higher education (2013-041-3-300, Zuin);

Central/South America - green chemistry in higher education (2013-041-3-300, Zuin); glossary on renewable chemistry (2013-036-2-300, Vaz);

East and South East Asia - network for organic chemistry (2011-041-1-300, Isobe).

Diversity and Inclusion

In terms of geographical representation in the 2016-2017 biennium, the Division III committees for 2016-2017 comprises representatives from Oceania/Asia (4 x TM, 3 x NR), Africa (1 x NR), the Middle East (1 x NR), South America (1 x AM) in addition to the traditional bases of Europe and North America. Membership from the Latin and South American region was considered a high priority ahead of the IUPAC meetings in Brazil in 2017, therefore Associate Members were selected from Brazil and from Puerto Rico.

In diversity matters, the recent Division ballot for the 2016-17 biennium has resulted in election of Prof Amelia Rauter (Portugal) as Division Secretary, and Dr Janet Scott (UK) as a Titular Member, thereby increasing the number of women Titular Members to 4 out of the 10. Female Titular members currently serve as Division President, Division Vice-President and Secretary and there are

two female Associate Members and two female National Representatives. Women represent 27% of the Division committee.

The age profile within the Division still requires attention, although it should be noted that National Representative Dr Oleg Demchuk (Poland) has previously been a Young Observer at Division III meetings. Dr Demchuk has been retained on the Division committee as an Associate Member for the 2016-2017 biennium.

Focusing on Communication

The new initiative of the Istanbul General Assembly was the holding of inter-Divisional meetings. At the General Assembly in Busan (2015) Division III participated in a meeting with Division I, in which joint interests in the reporting and storage of NMR data were discussed. Pleasingly, the project: *A Critical Review of Reporting and Storage of NMR Data for Spin-half Nuclei in Small Molecules* (2016-023-2-300) chaired by Mary Garson was approved by Division III with considerable input from members of Division I. This project will be a priority for the 2016-2017 biennium.

Structure and Governance

The Division has an Executive Committee comprising the current President (Prof Margaret Brimble), the Past-President (Prof Mary Garson), the President-elect (Prof Francesco Nicotra) and the Secretary (Prof Amelia Rauter). The current Executive has sought to ensure that Division practices and decisions are clear to all members, and that all Division members are informed as well as active and involved in Division business. In particular, Division members seeking officer and/or Titular member status are reminded of the need to be involved in Divisional business, for example by suggesting new project initiatives or in project evaluation, or by acting as Chairs of Divisional Sub-Committees. Division minutes and reports are now archived on the Division website, and the process associated with the biannual Division election for President and new Titular members has been provided to the current Division membership.

The Division thanks the members who have served in Division Leadership roles during the 2016-2017 biennium, including outgoing Past President Mary Garson. Prof Garson has been a Titular Member of IUPAC since 2006, was Secretary of Division III in 2008-2011 and was the first female President of Division III. She is currently Division Vice President. Professor Garson will continue in an IUPAC leadership role as Chair of the Organizing Committee for the IUPAC Centenary Celebrations.

The recent Division III ballot has resulted in election of Prof Nikolay Nifantiev (Russia) as Division Vice-President and Prof Amelia Rauter (Portugal) will continue as Division Secretary. Prof Francesco Nicotra (Italy) will transition to Division President and Prof Margaret Brimble (New Zealand) will transition to Division Past-President. One new titular member Prof Andreas Marx (Germany) was elected alongside Pher Andersson (Sweden), Jon Clardy (USA), Ganesh Pandey (India), Janet Scott (UK) and Zhen Xi (China) who were all re-elected as titular members. Two national representatives Liliana Mammino and Injae Shin have been appointed as Associate Members. Fengwu Bai who is Chair of the Biotechnology Sub-committee has been appointed as an Associate Member. Einar Uggerud who was an Associate Member will remain as a National Representative. In the 2018-2019 biennium, women will represent 23% of the Division committee and the composition of the Division Committee is given below with female members highlighted in blue.

Finance

Historically, Division III has had considerable difficulty creating worthwhile projects, or allocating its entire project budget; in contrast, the Divisional operating funds that support attendance at

subcommittee meetings are under pressure every biennium. One view that is worthwhile considering is that Division III Sub-Committees effectively represent broader scale “project taskforces”, and as such merit a portion of the funds that might otherwise be earmarked solely for Division III project activity. The majority of Division business is put forward to the main Divisional meeting from individual Sub-Committee meetings; it is therefore essential that Sub-committee meetings are well attended.

IV. Tabular Material:

The following pages provide additional details of projects and conferences as well as the membership of Division III for the 2016-2017 biennium and the provisional membership of Division III for the 2018-2019 biennium.

Margaret Brimble

President of Division III (Organic and Biomolecular)

Summary of Organic and Biomolecular Division III Projects (May 2017)

CURRENTLY UNDER REVIEW

Project No: 2017-006-2 Tundo

Title: *Postgraduate Summer School on Green Chemistry*

Objective. 1) Teach post-graduate students and post-doctoral researchers in chemistry from all over the world, either from academia or industry how to approach pollution prevention from a chemical standpoint; 2) Indicate Green Chemistry as a fundamental tool to approach pollutant source reduction for cultural heritage area and operators; 3) Offer scholarships for young talented chemists either from academia or industry from underdeveloped countries not yet affiliated with IUPAC. This with the important aim of promoting the acquisition of new know-how within IUPAC, so giving fresh impetus to the Union, especially in occasion of its 100th Anniversary; 4) Give a view of the state-of-the-art research contributions on Green Chemistry reached in the last decades; 5) Provide the unique opportunity to bring together a number of experts in the field of Green Chemistry and young researchers interested in this topic. In particular, members from IUPAC Divisions and Committees interested in Green Chemistry. This synergy of competencies will certainly be a valuable occasion to promote diffusion of the knowledge in this emerging field. 6) Facilitate a profitable and continuous exchange of ideas and information among students, the instructors

and the different stakeholders for the establishment of long lasting scientific relationships. As an added value, it will give rise to new research projects and collaborations. These will be effectively carried out by the exchange of young researchers, particularly students coming from developing nations. All these students will be ambassadors of Green Chemistry in their institutions, in their countries, and to their peers.

Chair: Pietro Tundo, University of Milan, pietro.tundo@polimi.it

Members: Mehmet Mahramanlioglu, Supawan Tantayanon, Jan Labuda

Start Date: 1 September 2017

End Date: November 2018

Budget in USD: \$70,000 requested from IUPAC \$15,000 (CCE \$2,000; Div V offered from next biennium's budget)

Under review

Project No: 2017-002-1 Dunne

Title: *IUPACs 46th World Chemistry Congress Symposium Programming*

Objective. As young researchers enter the workforce in academia, industry, government, and various non-traditional positions their research and voices need to be heard on a global platform. In taking inspiration from Forbes' 30 under 30, this symposium aims to highlight the talent that early career chemists have brought to the table. During this coffee break, every young chemist organization partaking in the inaugural meeting of the International Younger Chemists Network (IYCN) will be in attendance.

Chair: Christine Dunne, Colorado State University, USA, Christine.dunne11@gmail.com **Members:** Paula Bueno, Jackie O'Neil

Start Date: 1 July 2016

End Date: July 2017

Budget in USD: \$5,322 requested from IUPAC Div III, V, VI; \$500 from Div III

Under review

Project No: 2016-024-1 Garson

Title: *Planning and coordination of global activities for the celebration of IUPAC100 in 2019*

Objective: In 2019, IUPAC will celebrate the centenary of its foundation. The IUPAC100 Management

Committee will work with the IUPAC Executive and with other stakeholders to plan and coordinate activities and fundraising for these worldwide celebrations.

Chair: Mary Garson

Members: Christopher Brett, Javier Garcia Martinez, Pietro Tundo, Mark Cesa, Laura McConnell, Christopher Ober, Ron Weir, Maarten van Sisseren, Nnanake Offiong, Representative of Committee on Chemistry Education (IUPAC) (tba), Representative of Committee on Chemistry and Industry of IUPAC (tba)

Start Date: September 2016

End Date: December 2019

Budget in USD: \$19,000 from Project Committee; from Divisions and Committees?

Under review

BIENNIUM 2016-2017

Project No: 2017-001-1 Forman

Title: *4th International Workshop on the Impact of Scientific Developments on the Chemical Weapons Convention*

Objective. To provide advice to the Scientific Advisory Board of the Organization for the Prohibition of Chemical Weapons (OPCW) on scientific developments that may have an impact on the Chemical Weapons Convention (CWC) and on the Review Conference for the CWC to be held by the States Parties in 2018. Specifically, the workshop will focus on emerging technologies, including remote sensing.

Chair: Jonathan Forman, Email: jonathan.forman@opcw.org (Science Policy Adviser and Secretary to the Scientific Advisory Board Office of Strategy and Policy Organisation for the Prohibition of Chemical Weapons, Johan de Wittlaan 32 2517 JR The Hague, The Netherlands)

Members: Mark Cesa, Jonathan Forman, Greg McCarty, Laura McConnell, Cheng Tang, Christopher Timperley, Bernard West, Aldo Jose Gorgatti Zarbin

Start Date: 1 November 2016

End Date: November 2017

Budget in USD: \$5,000 requested from IUPAC Div I, III, IV, V, VI, VII, Chemrawn for AV and tech support (Total budget \$292,612) **\$500 from Div III**

Project No: 2016-032-1 Ober

Title: *IUPAC's Role in Developing Interdisciplinary/ Collaborative Work in the Chemistry Community and Beyond. The focus for the 2017 World Chemistry leadership Meeting (WCLM) in Sao Paulo, Brazil*

Rationale and Objective. *Rationale:* Chemistry is increasingly becoming multidisciplinary and interdisciplinary as it also depends closely on other scientific disciplines (e.g. physics, biology) to tackle problems of socio-economic importance. This has been highlighted in the role that chemistry plays in contributing to the UN Sustainable Development Goals, which was the theme of WCLM2015. It is hoped that the multidisciplinary and interdisciplinary themes can now be developed in depth in the WCLM2017.

Objective: Organize the World Chemistry Leadership Meeting for the 49th General Assembly with a theme of addressing IUPAC's role in developing interdisciplinary/collaborative work in the Chemistry community and beyond.

Co-Chairs: Christopher Ober (Chair of Interdivisional Sub-committee on Materials Chemistry), Hemda Garelick (Div VI, Chemistry and Environment)

Members: Javier Garcia, Jan Apotheker, Vladimir Gubala, Danniebelle Haase, Johan Scheers, Maarten van Sisseren, Fabienne Meyers

Start Date: 1 August 2016

End Date: January 2018

Revised version submitted; should be funded centrally.

Budget in USD: \$21,000; \$15,000 from Project Committee; \$6000 from Divisions (**\$500 from Div III**) and Committees

Project No: 2016-015-1 Perminova

Title: *Developing Database on Molecular Compositions of Natural Organic Matter and Humic Substances as Measured by High Resolution Mass Spectrometry*

Objective. The long-term goal of the project is to set grounds for molecular systematics of non-living organic matter using comprehensive data base on molecular constituents of natural organic matter (NOM) and humic substances (HS) as identified by Fourier transform ion cyclotron resonance mass spectrometry (FTICR MS). The immediate goal of the project is to compile initial data on molecular compositions of NOM and HS from diverse environments (soil, river, marine, permafrost, peat, coal, and others) into professional user-friendly and publicly available database. This database can become an important tool for elaboration of evaluation criteria for data on molecular constituents of NOM/HS, which have grown exponentially over last decade.

Chair: Irina V. Perminova (Department of Chemistry, Lomonosov Moscow State University)

Members: Philippe Schmitt-Kopplin, Robert Spencer, Kirk Hatfield, Aron Stubbins, Sergey Berezin, Harald Klammler, Harald Klammler, Sunghwan Kim, Norbert Hertkorn, Rob Fatland, Eugene N. Nikolaev, Dmitry Kats, Alexander Zhrebker

Start Date: 1 November 2016

End Date: November 2018

Budget in USD: \$30,000 only \$6000 from IUPAC; \$5,000 from Div VI; **\$1000 from Div III**

Project No: 2016-023-1 Garson

Title: *A critical review of reporting and storage of NMR data for spin-half nuclei in small molecules*

Objective: An IUPAC (task group) project last made recommendations on nomenclature, nuclear spin properties and chemical shift conventions back in 2001. In view of ready access to (very) high field NMR spectrometers combined with the data storage capability now provided by the internet, the task group aims to update the existing recommendations and to provide a single agreed format for the presentation and storage of (spin-half) NMR data for solution spectra in the mainstream chemical literature.

Co-Chairs: Mary Garson and member of task group to be co-opted (Guido Pauli to be approached)

Members: Margaret Brimble, Kristin Bartik, Norman Lewis, Alan Kenwright, Jon Clardy, Guido Pauli, Jeremy Frey, Tamara Hanna, Giovanni Appendino, Robert Lancashire, Amy Freund, John Edwards

Start Date: October 2016

End Date: October 2018

Budget in USD: **\$13,500 from Div III**

Reviews mainly positive. Revised version submitted 16/9/16. Task group membership has been increased and now includes Dr Tamara Hanna, Senior Acquisitions Editor, ACS Publications, T_Hanna@acs.org; Professor Giovanni Appendino, (Editor-in-Chief Fitoerapia,(Elsevier), Department of Pharmaceutical Sciences, University of Novara, Italy, giovanni.appendino@uniupo.it;

Robert Lancashire, U. West Indies, robert.lancashire@uwimona.edu.jm; Dr Amy Freund, (Bruker Instruments USA), Amy.Freund@bruker.com; and Dr John Edwards, Manager, Process and Analytical NMR Services, Process NMR Associates (USA), john@processnmr.com. Furthermore, RSC, ACS, and Elsevier are represented, or acting in advisory capacities.

Project No: 2016-001-2-300 Resnati

Title: *Categorizing Chalcogen, Pnictogen, and Tetrel Bonds, and Other Interactions Involving Groups XIV-XVI Elements*

Objective: This Project extends the inspiring IUPAC Recommendations on halogen and hydrogen bonds

(Project No. 2009-032-1-100 and 2004-026-2-2 100) to the categorizing of interactions involving Groups XIV-XVI elements. Definition(s) will be proposed:

- enabling a consistent and unambiguous terminology for most interactions given by Groups XIV-XVI elements;
- registering the emerging consensus on proposals suggesting to use terms chalcogen bond, pnictogen bond, and tetrel bond exclusively for interactions wherein Groups XIV-XVI elements are the electrophile. Proposed definition(s) will balance wide applicability (i.e., generality) and robust descriptive power (i.e., specificity), and convey specific information on the interactions, e.g., polar characters, geometries.

Chairs: Giuseppe Resnati, Pierangelo Metrangolo, Anthony Legon, Jane Murray, Francesco Nicotra, Steve Scheiner

Members: David Bryce, Antonio Frontera,

Webpage: objectives are related to those of a successfully concluded IUPAC project (2009-032-1-100; <http://www.iupac.org/project/2009-032-1-100>).

Start Date: June 1st 2016

End Date: April 31st 2018

Budget in USD: \$14,000 - **\$5,000 Div III**, \$4,000 Div I, \$5,000 Project Committee

The Project Committee recognized that this proposal is a follow-up to previous successful projects (2009-032-1-100 and 2004-026-2-100) that concerned halogen and hydrogen bonding, now to be extended to the terminology of bonding and interactions of Groups 14-16 elements (the erroneous use of Roman numerals in the application is noted). There is a strong consensus that the project is worthwhile and that the outputs of the previous projects are of high value. The dissemination plan is ambitious, consisting of an IUPAC technical report and recommendation, conference proceedings, and establishment of a web page. The budget is for an initial workshop, intermediate meeting, and administrative costs, and is supplementary to that provided by the Politecnico di Milano.

BIENNIUM 2014-2015

Project No: 2015-027-1-300 Florio

Title: *Strategic Planning for a Network for Heterocyclic Chemistry among Countries of the Mediterranean, including Europe and North America*

Objective: The principal objective of this project is to continue and exploit the excellent results of the previous project which achieved resounding success in establishing a strong collaborative network involving countries, especially less developed countries of North Africa, in terms of collaborative stages for PhD work in research laboratories of more developed nations and participation to international meetings (Tramech VII at Rabat, Morocco, 27-30 November 2013, fifteen grants for young people and Tramech VIII, Antalya, Turkey, 12-15 November 2015, ten grants for young people). This will help to build and foster a sustainable program of high-quality heterocyclic chemistry research, education and chemistry-based applications in all the Network countries.

Chair: Saverio Florio

Members: Brancko Stanovik, Jose Elguero, Jean Louise Gras, Essassi El Mokhtar, Metin Balci, Hussein El-Kashef, Maamar Hamdi, Hassen Amri, George Varvounsis

Webpage: [http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pil\[project_nr\]=2015-027-1-300](http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pil[project_nr]=2015-027-1-300)

Start Date: January 2016

End Date: 31 December 2018

Budget in USD: 13,000 Division III

Progress update:

December 2015 - TRAMECH VIII, Antalya, Turkey 11-15 November 2015 (www.tramech8.org) was very successful. The program included 14 invited speakers, 26 oral communications and 161 posters, 224

participants from several countries. Ten participants were selected and received a IUPAC grant to facilitate their attendance. The next important event is the TRAMECH IX meeting to be held in Fez, Morocco, organized by the Mohamed Ben Abdellah University in the period 22-25 November 2017 (see: <http://tramech9.raidghost.com/>). A number of highly ranked speakers have accepted to participate and give lectures, including the Nobel Prize winner Prof. Ei-ichi Negishi, University of Purdue, USA. Part of the IUPAC grant of the above project will be used to facilitate the participation of young people from less developed countries as reported on the website.

Project No: 2015-003-2-300 Reaney

Title: *Nomenclature of Homodetic Cyclic Peptides Produced from Ribosomal Precursors*

Objective: to disseminate through the scientific community guidelines for nomenclature of homodetic cyclic peptides produced from ribosomal synthesis. Specifically this includes N-to-Clinked peptides belonging to the groups cyanobactins, cyclotides, orbitides, amatoxins, phallotoxins and circular bacteriocins. By selection of a narrow focus we are hoping to develop a template that can be applied to develop nomenclature systems for other groups of peptides. Although peer-reviewed journals have published nomenclature recommendations the objective is also to consolidate literature and provide a IUPAC supported nomenclature recommendation. The project will expand and elaborate on the prior "Nomenclature of Cyclic Peptides" (<http://www.iupac.org/project/2004-024-1-800>) in the naming of the homodetic peptides.

Chair: Martin Reaney

Members: David Craik, Ulf Göransson, Gerard Moss, Ninghua Tan

Webpage: [http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1\[project_nr\]=2015-003-2-300](http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1[project_nr]=2015-003-2-300)

Start Date: 01-06-2015

End Date: 01-06-2017

Budget in USD: \$10,000 - 7,500 from Div III, 2,500 from Div VIII

Progress update: not yet available

Project No: 2015-035-2-800 Vliegenthart/Rauter

Title: *Continuation of the Revision of IUPAC Recommendations on Carbohydrate Nomenclature*

Objective: IUPAC/IUBMB document of 1996 has served as an immense help for authors and editors to name the compounds unambiguously. Since 1996, the number of compounds that have been discovered and/or synthesized has grown enormously. The number of constituting monomers and substituents has increased, i.e. due to study of carbohydrates and glycoconjugates in a larger range of organisms in the animal and plant kingdoms, and to the progress in analytical and synthetic methods. The revision of the 1996 document by the IUPAC Task group was started in January 2013 and has led to a partial revision of the 2-Carb document. The current project is focused on completion of the revision and extension of the existing 2-Carb document in order to bring it up-to-date in the light of the enormous progress made in the areas of glycoscience, biotechnology and bio-informatics in the past 20 years.

Chair: Hans Vliegenthart

Members: Amelia Rauter, Gerald Moss, David Baker, Sandro Sonnino, Nuno Xavier, Martin Frank, Thomas Lutteke

Webpage: [http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1\[project_nr\]=2015-035-2-800](http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1[project_nr]=2015-035-2-800)

Start Date: tba

End Date: tba

Budget in USD: \$10,000 - \$2,500 Div III, \$7,500 Div VIII

Progress update: not yet available

BIENNIUM 2012-2013

Project No: 2013-054-2-300 Rauter

Title: *Healthy Life and Active Ageing: the Contributions of Functional Food Ingredients*

Objective: to bring Chemistry to the general public demonstrating, through the implementation of an interactive website, how chemistry offers unique solutions for society needs in terms of a healthy living and a better ageing.

Chair: Amelia Rauter

Members: Amal-al-Aboudi, Mary Garson, Melissa Fitzgerald, Francesco Nicotra, Livia Sardaki

Webpage: not yet accessible

Start Date: 21-11-2014

End Date: 21-11-2017

Budget in USD: 7,500 Div III

Progress update: filming of video clips undertaken in March 2015 (Rauter, Garson, Sardaki, Nicotra) and website clips/recipes in preparation (June 2015).

Project No: 2013-041-3-300 Zuin

Title: *Green Chemistry in Higher Education: Towards a Green Chemistry Curriculum for Latin American and African Universities*

Objective: 1) Proposing general modules for up-to-date university Green curricula in general and subareas of chemistry of Chemistry courses (Bachelor and Teacher Training), together with their responsible lecturers;

2) Development (generation and/or adaptation) of Green Chemistry contents in theoretical and experimental disciplines of the involved universities in Latin America and Africa, considering the specific context of each region;

3) Contributing to establish permanently Green Chemistry in the education of Chemistry professionals in their initial courses and facilitating the public understanding of Green Chemistry principles showing its involvement in most aspects of common life and current demands nowadays;

4) Putting together universities, industries and governmental/non-governmental sectors in order to approach relevant themes and contents in the Green Chemistry modules

Chair: Vania Gomez Zuin, Lilliana Mammino

Members: Moacir Rossi Forim, Peter Seidl, Claudia Moraes de Rezende, Claudio Jose de Arajo Mota, Fernando de Carvalho da Silva, Carlos Alberto Marques, Patrocoa Vasquez, Gustavo Romanelli, David Gonzalez, Patricia Morales Bueno, Andoni Garritz Ruiz, Neil Coville, Temechehn Engida, Geoffrey Kamau, Egid Mobofu, Pietro Tundo, James Clark

Webpage: See

Start Date: 26-09-13

End Date: 26-09-17

Budget in USD): \$5,000 Div III

Progress update: Project is complete and information is available on the website.

https://iupac.org/projects/project-details/?project_nr=2013-041-3-300

End date extended until 1 September 2017.

Project No: 2013-040-1-300 Brouwer

Title: *Measurement of Photoluminescence Quantum Yields*

Objective: The quantum yield (QY) is one of the most important quantitative properties of a luminescent sample, and robust ways to measure it are essential in the application of luminescence techniques. In the project we will perform an inter-laboratory comparison of the two main methods for QY measurements, the classical relative method based on standards, and the absolute method using integrating spheres which

recently gained popularity.

The outcomes will be: (i) insight into the reproducibility and inter-laboratory variability of QY measurements using the two methods; (ii) an extended set of standards and protocols for QY measurement.

Chair: Fred Brouwer

Members: Suzanne Fery-Fourges, Stephan Landgraf

Webpage: See [http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1\[project_nr\]=2013-040-1-300](http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1[project_nr]=2013-040-1-300)

Start Date: 26-09-13

End Date: 26-09-16

Budget in USD: \$4,500 Div III

Progress update: In October 2014, a decision has been made which samples to measure, and samples have been shared among the labs during November 2014. An announcement of this project was published in the Sep 2015 issue of Chemistry International, p. 31, <http://dx.doi.org/10.1515/ci-2015-0521>. By September 2015, most of the teams have delivered their results, and the task group expected to be able to start the analysis of the data. Website updated 19 Oct 2015.

Project No: 2013-036-2-300 Vaz

Title: *Glossary on Renewable Chemistry*

Objective: Construction and publication of a nomenclature guide – an IUPAC Glossary – related to biomass chemistry and green chemistry. Aimed at students (under graduation and graduation), professionals, and researchers from all countries.

Chair: Silvio Vaz Jr.

Members: Monica Damaso, Birgit Kamm, James Clark, Vincenza Faraco, Vitor Ferreira, Claudio Mota, Vania Zuin, Pietro Tundo.

Webpage: [http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1\[project_nr\]=2013-036-2-300](http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1[project_nr]=2013-036-2-300)

Start Date: 30-12-2013

End Date: 30-12-2015

Budget in USD: 5,000 Div III

Progress: website updated (Jan 2014) with additional details of methodology and timelines. A draft glossary was circulated to TCG members and to Division members (May 2015). A range of comments were received, and the revised glossary has been submitted. Janet Scott was approached as an advisor on this project. The project as it stands cannot be endorsed by IUPAC.

Project No: 2013-039-2-300 Blackburn

Title: *Nomenclature of Transition State Structures and their Analogs for Phosphoryl Transfer Reactions*

Objective: This Project seeks to establish a rational, logical, and practical system of nomenclature to identify discrete axial and equatorial ligands in both t_{bp} and octahedral transition states and their analogues for phosphoryl transfer reactions. In many cases, these will be chirally defined only as a result of coordination to components of the enzyme active site where they are located. It will apply to TSs for “in-line” and/or for (theoretical) “adjacent” attack systems and be independent of considerations about “associative” and “dissociative” TSs. It will link to established IUPAC nomenclature systems and usage, in particular to IUPAC Red Book (2005). It will aim to be directly comprehensible to and useable by stakeholders who may not be specialized inorganic chemists

Chair: Michael Blackburn

Members: Jacqueline Cherfils, Gerry Moss, Nigel Richards, Jon Waltho, Nick Williams, Alfred Wittinghoffer

Webpage: See [http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1\[project_nr\]=2011-044-1-300](http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1[project_nr]=2011-044-1-300)

Start Date: 26-09-13

End Date: 26-09-15

Budget in USD (Expenditure to July 2013): \$10,000

Progress: A manuscript titled 'How to Name Atoms in Phosphates, Polyphosphates, their Analogues, and Transition State Analogues for Enzyme-catalysed Phosphoryl Transfer Reactions' is available as provisional recommendations and was made available for public review until 30 June 2016.

Project No: 2012-039-2-800 Vliegthart/Rauter

Title: *Carbohydrate Nomenclature – revision and extension of IUPAC recommendations*

Objective: The aim of this revision and extension is to bring up-to-date the existing Carbohydrate document in the light of the enormous progress made in the areas of glycoscience, biotechnology and bio-informatics in the past 20 years. Furthermore, the explosion of data stemming from glycomics and glycoproteomics, necessitates the connection with databases for presenting adequately carbohydrate structure and sequence information. There exist a number of databases, each covering different collections of data. Developing guidelines for harmonizing these data are within the goals to be achieved. Another aspect deals with the correction of some names.

Chair: H. Vliegthart

Members: Jonathen Brecher, Frank Martin, Karl-Heinz Hellwich, Derek Horton, Thomas Lutteke, Gerard Moss, Stefan Oscarson, Amelia Rauter, Sandro Sonnino, Xavier Nuno

Webpage: See [http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1\[project_nr\]=2012-039-2-800](http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1[project_nr]=2012-039-2-800)

Start Date: 01-01-2013

End Date: not listed

Budget in USD: \$5,500 from Division III

Progress: *December 2013* –website updated.

OLDER PROJECTS STILL ON BOOKS

Project No: 2011-044-1-300 Brimble

Title: *Rules for abbreviation of protecting groups*

Objective: With the goal of presenting information in the scientific literature clearly and unambiguously, a set of rules for the abbreviation of protecting groups will be developed. It will be based on principles designed to be as descriptive and systematic as possible, but also being sufficiently pragmatic and flexible so as to accommodate the most important current abbreviations.

Chair: Margaret Brimble

Members: David Black, Alberto Brandi, Richard Hartshorn, Amelia Rauter

Webpage: See [http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1\[project_nr\]=2011-044-1-300](http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1[project_nr]=2011-044-1-300)

Start Date: 01-01-2012

End Date: 31-12-2014

Budget in USD (Expenditure to July 2013): 15k (1.71k)

Progress:

Jan 2013 “ Rules for abbreviation of protecting groups” (IUPAC Technical Report) published in *Pure Appl. Chem.*, 2013, Vol. 85, 307-313.

Aug 2013- Some minor corrections recommended by members of Division VIII.

March 2014 Initial Project completed.

Dec 2015 - A revised version of the technical report, and the corresponding erratum, has been sent to Division VIII members Gerry Moss, Karl Heinz Hellwich and Richard Hartshorn, for review in August 2013 and the corrections were received in 2013 and 2014. The revised manuscript was briefly discussed with some authors and members of Division III S/C Organic Synthesis that took place at ICOS 20 in

Hungary in 2014, and it was mentioned that it might be necessary to meet again. Mary Garson informed that claim forms from the Protecting Group project will support this Briefing and it was decided to update the final revision with Gerry Moss and Karl Heinz Hellwich and send the revised paper to all authors for comments. Finally the revised paper and Erratum should be sent to Ron Weir, with a copy to Fabienne.

Project No: 2009-002-1-300 Perrin

Title: *Update of IUPAC Glossary of Physical Organic Chemistry*

Objective: To update the Glossary of Terms Used in Physical Organic Chemistry, which was published in Pure Appl. Chem. 1994, 66, 1077 [doi:10.1351/pac199466051077] and as a Web version in 1997 (<http://www.chem.qmul.ac.uk/iupac/gtpoc/>)

Chair: Charles Perrin

Members: Israel Agranat, Alessandro Bagno, Silvia Braslavsky, Pedro Fernandes, Jean-François Gal, Guy Lloyd-Jones, Herbert Mayr, Joseph Murdoch, Norma Nudelman, Leo Radom, Zvi Rappaport, Marie-Françoise Ruass, Hans-Ullrich Siehl, Yoshito Takeuchi, Thomas Tidwell, Einar Uggerud

Webpage: See [http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1\[project_nr\]=2009-002-1-300](http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1[project_nr]=2009-002-1-300)

Start Date: 01-06-2009

End Date: 31-12-2014; Dec 2018 requested

Budget in USD: \$4,800 from Div III

Progress: project announcement published in Chem. Int. Nov-Dec 2009; Incorporation of the updated Glossary on the IUPAC website, as proposed. The entire working Glossary has been mounted at GoogleDrive for members of the Task Force to edit. Additions, comments, and revisions have been accumulated and the entirety awaits a thorough reconciliation.

Project No: 2008-037-2-300 Griesbeck

Title: *Standard Photochemical Processes*

Objective: To establish a series of well-defined and completely characterized photochemical reactions that serve as model processes for scaling and adopting light-induced transformations. The specification of process parameters, lamp properties, reactor geometries, reaction details as well as quantum yields and spectral properties of substrate and products from a series of model transformations.

Chair: Axel Griesbeck

Members: Jochen Mattay, Michael Oelgemöller

Webpage: See [http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1\[project_nr\]=2008-037-2-300](http://www.iupac.org/nc/home/projects/project-db/project-details.html?tx_wfqbe_pi1[project_nr]=2008-037-2-300) (NB: listed under Division I records not Division III records)

Start Date: 01-08-2010

End Date: 30-9-2014

Budget in USD: \$10,000 from Div III

Progress: No progress update available on project webpage

Project No: 2007-025-1-300 Mammino

Title: *Biomass burning in Sub-Saharan Africa*

Objective: To stimulate interactions, collaborations and networking on an issue that is of continental interest in Sub-Saharan Africa and that has environmental impact (including climate-related impact).
- To highlight the role of chemistry in environment-related issues.
- To serve as prototype for other projects/books focusing on issues of interest on a regional/continental scale.

Chair: Lilliana Mammino

Members: Geoffrey Kamou, Pietro Tundo

Webpage: See <http://www.iupac.org/nc/home/projects/project-db/project->

[details.html?tx_wfqbe_pi1\[project_nr\]=2007-025-1-300](#)

Start Date: 22-10-2007

End Date: 31-12-2013

Budget in USD: \$8,000 from Div III

Progress: A project announcement published in *Chem. Int.*, 2008, 30(2); updated project plan and call for contribution made in 2011 (deadline 15-02-2011). Manuscript submitted January 2017.

IUPAC Conferences Organized under Auspices of Division III

International Conference on Green Chemistry (ICGC) series

ICGC4 (Foz do Iguaçu, Brazil; co-chairs Arlene Gomea and Vania Gomez Zuin, August 2012; IUPAC representative: Pietro Tundo)

ICGC5 (Durban, South Africa) chair Lilliana Mammino (sasdestria@yahoo.com;), 17-21 August 2014; <http://www.saci.co.za/greenchem2014/>; IUPAC representative Pietro Tundo.

ICGC6 (Venice, Italy 4-9 September 2016 (Chair: Pietro Tundo).

Update on ICGC6: After Dresden, Moscow, Ottawa, Foz do Iguaçu and Durban the biennial Green Chemistry Conferences moved to Italy. The conference was divided into 5 topics: Green Materials;

Green Industrial Processes and Molecular Innovation; Green Bioprocesses; Green Energy; Green Policy and Education. Two symposia of international relevance took place: one organized by UNESCO, PhosAgro and IUPAC while the other was sponsored by OPCW (Organisation for the Prohibition of Chemical Weapons), which looks at Green Chemistry as a principle and a means to oppose military usage of chemical compounds. Two awards were presented: the ChemRawn Award for Green and Atmospheric Chemistry and six PhosAgro/UNESCO/IUPAC awards. The winner of the 2016 IUPAC – CHEMRAWN VII for Green Chemistry was Dr. Ali Maleki, from the Iran University of Science and Technology. The six winners of the 3rd edition of the PhosAgro/UNESCO/IUPAC “Green Chemistry for life” award were: A. Akhmetshina (Russia), I. Carrera (Uruguay), M. Ismail (Pakistan), E. Ravera (Italy), A. S. Elsayed Sayed (Egypt) and W.C. Wanyonyi (Kenya).

ICGC7 (Moscow, Russia, 2-5 October 2017, Chair: Anna S. Makarova (annmakarova@mail.ru)

ICGC8 Bangkok, Thailand in September 2018.

9th International Conference on Biodiversity and 29th International Symposium on the Chemistry of Natural Products (ICOB and ISCNP) series

ISCNP27/ICOB7 (Brisbane 2011); IUPAC representative David Black

ISCNP28/ICOB8 (Shanghai); Yang Ye (yey@mail.shcnc.ac.cn; yeyang@live.cn), October 20-25 2014; website address-<http://iupac.simm.ac.cn>; IUPAC representative Mary Garson.

ISCNP29/ICOB9 (Izmir, Turkey) chair Bilge Sener, September 24-27, 2016; IUPAC representative Mary Garson.

Greece has expressed an interest to host ISCNP30/ICOB30; Chair: Professor Leandros Skaltsounis Professor Vassilios Roussis; University of Athens, School of Pharmacy, Laboratory of Pharmacognosy and Natural Products Chemistry, Athens 15771, Greece, skaltsounis@pharm.uoa.gr.

International Conference on Organic Synthesis (ICOS) series

ICOS19 (Melbourne, 2012); IUPAC representative Krishna Ganesh

ICOS20 (Budapest, Hungary); chair Péter Mátyus (matyus.peter@pharma.semmelweis-univ.hu), Janos Wolfling; June 29-July 4 2014; <http://www.icos20.hu/>; IUPAC representative Mary Garson

ICOS21 (Mumbai, India) chair Krishna Kaliappan, December 2016.

ICOS22 16-21 September 2018, Florence, Italy (chair: Alberto Brandi).

International Conference on Biomolecular Chemistry (ISBOC) series

ISBOC9 (Beijing, 2012); IUPAC representative Krishna Ganesh

ISBOC10 (Pune, India, January 2015; Co-chairs Ganesh (ganesh1953@gmail.com) and Yamuna Krishnan (yamuna@ncbs.res.in). IUPAC representative: Mary Garson.

ISBOC11: September 27-29, 2017, Konstanz, Germany; Chair Andreas Marx (andreas.marx@uni-konstanz.de).

\$4,000 awarded from project committee to support 10 doctoral students from developing regions to attend ISBOC11.

ISBOC12 – suggestion of Ireland (Marie Migaud) presented to Biomolecular S/C.

International Biotechnology Symposium (IBS) series

IBS 14 (Rimini, Italy) September 2010

IBS15 (Daegu, Korea) 2012; IUPAC representative Francesco Nicotra

IBS16 (Fortaleza, Brazil) chair Osvaldo Carrioca (jkriok@gmail.com), September 14-19; website <http://ibs2014.org/>; IUPAC representative Francesco Nicotra

IBS17 (Melbourne) contact: Glenn Cross, Ausbiotech (gcross@ausbiotech.org), 24-27 October 2016; <http://www.ibs2016.org/>; IUPAC representative Margaret Brimble

IBS18 (Montreal); Chair: Nicolas Moitessier, Canadian Society for Chemistry and others.

Update on IBS16: The meeting was well supported by R&D Brazilian Scientific Agencies and Brazilian Federation of Industry-CNI, as well as by the Brazilian Association of Chemical and Pharmaceutical Industries. For the first time the IBS-Symposium held a Biobusiness Forum to promote innovation in the country, as well as, the construction of an International Research Platform to promote and engage young students, doctors and researchers into an international biotechnology network leading to collaboration with members of the European Federation of Biotechnology. For that initiative, CAPES- Brazilian Agency for Advanced Post-graduation Studies provided financial support. The participation is confirmed of a Nobel Prize in Chemistry (2004) plus four distinguished scientists as Plenary Lecturers; six experts on Bioeconomy and thirteen outstanding invited speakers for the six parallel scientific sessions.. Elsevier Publishers (Journal on Biotechnologies Advances) offered a Special Issue on Bioeconomy and Biotechnology containing selected works by indicated guest editors.

IUPAC Symposium on Photochemistry series

XXIV Symposium on Photochemistry, Coimbra, Portugal (15-20 July 2012); contact Hugh Burrows

XXV Symposium on Photochemistry, Bordeaux, July 13-18, 2014; chair: Dario Bassani (d.bassani@ism.u-bordeaux1.fr); website <http://www.photoiupac2014.fr/>. Contact: photoiupac2014@ism.u-bordeaux1.fr. IUPAC representative Silvia Braslavsky

XXVI Symposium on Photochemistry, Osaka, Japan. April 3-18, 2016. Conference chair: Tetsuro Majima. Website: <http://web.apollon.nta.co.jp/iupac2016/invitation.html>

Papers from the XXVI IUPAC Photochemistry Symposium will be published in PAC. Tetsuro Majima will be Conference Editor, invitations to authors have been sent out and we have some acceptances already.

XXVII Symposium on Photochemistry, Dublin, July 8-13, 2018. International Conference Chair: Professor Miguel Garcia-Garibay, UCLA.

XXVIII Symposium on Photochemistry, Amsterdam, The Netherlands, July 2020. International Conference Chair: Professor Fred Brouwer.

Related conference:

ICP 2017 – International Conference on Photochemistry;

After visiting Belgium in 2013 (Leuven) and South Korea in 2015 (Jeju Island), the next conference will take place in France in the city of Strasbourg from the 16th to the 21st of July 2017.

IUPAC Conference on Physical Organic Chemistry (ICPOC) series

ICPOC21 (Durham, UK) September 2012; RSC; IUPAC representative Krishna Ganesh

ICPOC22 (Ottawa, Canada) 10-15 August 2014; chair: Paul Meyer (pmmayer@uOttawa.ca); <http://events.science.uottawa.ca/icpoc22/commitee.html>; IUPAC representative Heidi Muchall (Concordia)

ICPOC23 (Sydney, Australia) July 3-8 2016; contact: Jason Harper. Website: <http://www.icpoc23.unsw.edu.au/>
For a report see: <https://www.iupac.org/cms/wp-content/uploads/2016/08/Report-of-23rd-IUPAC-Conference-on-Physical-Organic-Chemistry.pdf>

ICPOC24 (Faro, Portugal) July 2018; Chair: Maria de Lurdes Christiano – U. Algarve

ICPOC25 (Hiroshima, Japan) 2020; Chair: Manabe Abe

International Symposium on Organometallic Chemistry Directed Towards Organic Synthesis (OMCOS) series

OMCOS16 (Shanghai, 2011)

OMCOS17 (Fort Collins, July 28-August 1 2013); Chair: Peter Kundig (peter.kundig@unige.ch);

OMCOS18 (Barcelona, Spain) 28 June - 2 July 2015; Chair: Antonio M. Echavarren, Rubén Martín, Kilian Muñoz; website <http://www.omcos2015.com/>

OMCOS19 (Jeju Island, South Korea) 25-29 June 2017; Chair: Sukbok Chang (sbchang@kaist.ac.kr) contact: Antonio Echavarren

International Conference on Heteroatom Chemistry (ICHAC) series

ICHAC10 May 2012 (Kyoto, Japan); chair Norohiro Tokitoh (tokitoh@boc.kuicr.kyoto-u.ac.jp) <http://oec.kuicr.kyoto-u.ac.jp/~ichac10/>; Name of IUPAC representative – unknown.

ICHAC11 June 2015 (Caen, France); chair Annie-Claude Gaumont; website http://www.lcmt.ensicaen.fr/96621202/0/fiche_article/&RH=LCMT_FR.

ICHAC12 Vancouver, June 11-16, 2017. Chair: Derek P. (d gates@chem.ubc.ca) <http://www.ichac2017.com/>

Additional IUPAC Conferences Supported by Members of Division III

The 21st International Conference on Phosphorus Chemistry

ICPC21 (Kazan, Russia) 5-10 June 2016;

contact: Prof. Andrey Karasik, A.E. Arbuzov Institute of Organic and Physical Chemistry, Arbuzov str. 8, Kazan, 420088 Russian Federation, Email: karasik@iopc.ru

Website: <http://icpc2016.ru>

Thematic set of papers will be published in PAC. Paper dedicated to ICPC-2016 will be published in CI (Nov.).

ICPC-2018 will be held in 2018 in Budapest at University of Technology and Economics, Hungary, Chair - Prof. György Keglevich

80th Prague Macromolecular Meeting Self-assembly in the World of Polymers

PMM80 (Prague, Czech Republic) 10-14 July 2016;

contact: Dr. Petr Štěpánek, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic Heyrovsky Sq. 2, 162 06 Prague 6, Czech Republic, E-mail: stepanek@imc.cas.cz

Website: www.imc.cas.cz; <http://www.imc.cas.cz/sympo/80pmm/>

ICS-2016 – International Carbohydrate Symposium

New Orleans, USA 17-21 July 2016; IUPAC Representative: Nikolay Nifantiev

Chair: Alfred French

Website: <http://ics-2016.org/>

Thematic set of papers will be published in PAC.

XXIXth International Carbohydrate Symposium to be held in Lisbon, Portugal: July 15-19, 2018;

Chair - Professor A. Rauter, Lisbon

XXth Mendeleev Congress

Ekaterinburg, Russia 26-30 September 2016; IUPAC Representative: Nikolay Nifantiev

Chair: Prof Yulia Germanovna Gorbunova

Website: <http://www.mendeleev2016.uran.ru/>

Thematic set of papers to be published in PAC. Paper dedicated to Congress to be published in CI.

XXIst congress will be held in 2019 in Saint-Petersburg and will be dedicated to 150th anniversary of periodic law.

3rd International Conference on Bioinspired and Biobased Chemistry & Materials

NICE2016 (Nice, France) 16-19 October, 2016

contact: Prof. Elena Celia, Université de Nice Sophia Antipolis, IMREDD – MQM, 1-3 bd Maurice Slama, 06200 Nice, France, Email: elena.celia@unice.fr

Website: www.nice2016-conference.com

25th Meeting of Croatian Chemists and Chemical Engineers

Poreč, Croatia April 19-22, 2017.

Chairs: Marijana Đaković, Ana Santic, Email: mdjakovic@chem.pmf.hr; asantic@irb.hr; asantic@irb.hr; IUPAC representative Margaret Brimble

Funding of USD 2400 was approved by the IUPAC Project Committee. The funds were provided to support the attendance of young scientists participating from the region (e.g. Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Kosovo, FYROM, Albania and Bulgaria).

Solutions for Drug-Resistant Infections (SDRI 2017)

Brisbane, Australia. 03-05 April 2017

Chair: Mathilde Desselle, CO-ADD Community for Open Antimicrobial Drug Discovery

Institute for Molecular Bioscience, Centre for Superbug Solutions

Level 7 North | 306 Carmody Road (Building 80), The University of Queensland, Brisbane QLD 4072 Australia,

Email: m.desselle@imb.uq.edu.au

Polymers and Organic Chemistry (POC 2018)

Le Corum, Montpellier, France. 04-07 June 2018

Chair: Ghislain David, School of Chemistry of Montpellier

8 rue de l'Ecole Normale 34296 Montpellier Cedex 5

France, Email: ghislain.david@enscm.fr

Chemistry Conference for Young Scientists

Blankenberge, Belgium. 21-23 February 2018

Chair: Niels Van Herck, Department of Organic and Macromolecular Chemistry, Ghent University,

Krijgslaan 281, S4-bis, B-9000 Ghent, Belgium

Email: secretary@chemcys.be

18th International Symposium on Novel Aromatic Compounds (ISNA-18)

Sapporo City, Hokkaido Prefecture, Japan. 21-26 July 2019

Chair: Prof. Takanori Suzuki, Dept. of Chem., Fac. of Sci., Hokkaido Univ., Sapporo,

060-0810 Japan, Email: tak@sci.hokudai.ac.jp;

13th International Symposium on the Synthesis and Applications of Isotopes and Isotopically-Labelled Compounds

Prague, Czech Republic, 4-7 June 2018

Chair: Tomas Elbert, IOCB CAS, Prague, Czech Republic, Email: elbert@uochb.cas.cz

MEMBERSHIP OF IUPAC DIVISION III (2016-2017)

Name	Status	Proposed Term	NAO
Margaret Brimble	TM-President	2016-2017	New Zealand
Francesco Nicotra	TM-Vice President	2016-2017	Italy
Mary Garson	TM- Past President	2016-2017	Australia
Amelia P. Rauter	Secretary	2016-2017	<u>Portugal</u>
Pher G. Anderson	TM	2016-2017	<u>Sweden</u>
Jon Clardy	TM	2016-2017	<u>USA</u>
Nikolay E. Nifantiev	TM	2016-2017	Russia
Ganesh P. Pandey	TM	2016-2017	<u>India</u>
Janet L. Scott	TM	2016-2017	<u>United kingdom</u>
Zhen Xi	TM	2016-2017	China
Vanderlan Bolzani	AM	2016-2017	Brazil
Nestor Carballeira	AM	2016-2017	Puerto Rico
Thomas Carell	AM	2016-2017	Germany
Oleg Demchuk	AM	2016-2017	Poland
Bilge Sener	AM	2016-2017	Turkey
Einar Uggerud	AM	2016-2017	Norway
Amal Al-Aboudi	NR	2016-2017	Jordan
Koop Lammertsma	NR	2016-2017	Netherlands
Miroslav Ludwig	NR	2016-2017	Czech Republic
Lilliana Mammino	NR	2016-2017	South Africa
Sylvain Marque	NR	2016-2017	France
Ing Victor Milata	NR	2016-2017	Slovakia
Ali Munawar	NR	2016-2017	Pakistan
Emilia Naydenova	NR	2016-2017	Bulgaria
Injae Shin	NR	2016-2017	Korea
Ken-Tsung Wong	NR	2016-2017	China/Taipei
	10 TMs, 6 AMs, 10 NRs		

MEMBERSHIP OF IUPAC DIVISION III (2018-2019)

Provisional until approved at Divisional Meeting in Sao Paulo

		<i>Confirmed/election end date</i>	<i>Updated archive membership</i>
Titular Members			
Francesco Nicotra <i>President</i>	Italy	Transition from DVP to DP	AM300(02-05); TM300(12-15); DVP300(16-17); <i>DP(18-19)</i>
Margaret Brimble <i>Past President</i>	New Zealand	Transition from DP to DPP	TM300(10-13); SCC301(12-15); DR027_III_(12-15); DVP300(14-15); DP300(16-17); <i>DPP300(18-19)</i>
Nikolay Nifantiev <i>Vice President</i>	Italy	Transition from TM to DVP	AM300(08-11); TM300(14-17); <i>DVP(18-19)</i>
Amelia Rauter <i>Secretary</i>	Portugal	Continue as Secretary	NR300(02-05; 08-09); AM300(14-15); DS300(16-17); <i>DS300(18-19)</i>
Pher Andersson	Sweden	9 July 2017	TM300(16-17); <i>TM300(18-19)</i>
Jon Clardy	USA	9 July 2017	TM300(16-17); <i>TM300(18-19)</i>
Andreas Marx	Germany	9 July 2017	
Ganesh Pandey	India	9 July 2017	TM300(16-17); <i>TM300(18-19)</i>
Janet Scott	UK	9 July 2017	TM300(16-17); <i>TM300(18-19)</i>
Zhen Xi	China	9 July 2017	AM300(14-15); TM300(16-17); <i>TM300(18-19)</i>
Associate Members			
Fengwu Bai	China	9 July 2017	SCC(16-17)
Vanderlan Bolzani	Brazil	9 July 2017	AM300(16-17)
Thomas Carell	Germany	9 July 2017	TM300(12-15); TM300(16-17)
Jason Harper	Australia	9 July 2017	
Lilliana Mammino	South Africa	9 July 2017	NR300(16-17)
Inje Shin	Korea	9 July 2017	NR300(16-17)
National Representatives			
Mohammed Hegazy	Egypt	9 July 2017	
John Honek	Canada	9 July 2017	
Shang-Cheng Hung	China/Taipei	9 July 2017	
Slavomir Jarosz	Poland	9 July 2017	
Wahab Khan	Bangladesh	9 July 2017	
Hamdullah Kilic	Turkey	9 July 2017	
Koop Lammertsma	Netherlands	9 July 2017	NR300(16-17)
Priyani Paranagama	Sri Lanka	9 July 2017	
Einar Uggerud	Norway	9 July 2017	AM300(16-17)
Makato Yamashita	Japan	9 July 2017	

Eligibility – general guidelines

The number of Titular Members shall not exceed ten unless otherwise determined by the Bureau.

The term of service of a **Titular Member** shall be not more than **4 consecutive years**, but shall cease on election as an Officer. The Vice-President and the President of a Division shall not hold these respective offices for more than 4 consecutive years; the Secretary of a Division shall serve for 4 consecutive years and be eligible for reelection up to a maximum of a further 4 years. Exceptional circumstances must be established and special permission of the Bureau granted for Titular or Associate Membership of the same or more than one Division Committee beyond a total of **12 years of total Titular and Associate Membership**, whether the Memberships are consecutive or not.

Subject to this provision, the immediate Past-President of the Division shall be one of the Titular Members of the Division Committee for a period of 2 years.

Additionally, a Division Committee may elect Associate Members, who shall have full voting rights. The number of Associate Members shall not exceed six. The term of service of an Associate Member shall be 2 years, with the possibility of reelection consecutively for 2 more years only.

Additionally, a Division Committee may elect no more than ten National Representatives on the nomination of Adhering Organizations, with no more than one representative from a given Adhering Organization. The term of a National Representative shall be two years, with the possibility of renomination and re-election consecutively for only two more years. Exceptional circumstances must be established and special permission obtained from the Bureau for the election of a National Representative from a country already represented on the Committee by a Titular or Associate Member.

IUPAC POLYMER DIVISION (IV) – Report to Council 2017

By Greg Russell (Division President)

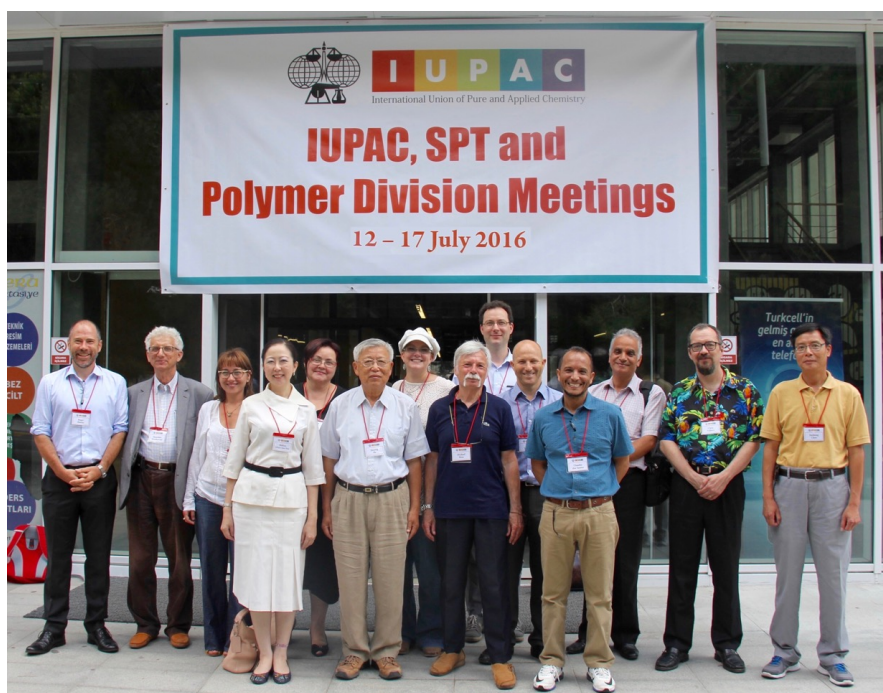
The Polymer Division continues to hum along. In 2016, new projects were started and old projects were finished. Mostly these yielded publishable outputs, and mostly such outputs were in quality journals. Where the journal was not *Pure Appl. Chem.*, it was because of the need to target an audience, e.g. via *Mac. Chem. Phys.* New members arrived, full of zest and armed with desired knowledge. Some old members faded away. Meetings took place and future meetings were planned. Conferences were approved for IUPAC endorsement, I believe to an extent – approx. 10 per year – greater than any other Division. Members continued to serve widely within IUPAC, something that I constantly review and seek to fine-tune. All this is documented in the Appendixes that follow. Yes, it makes for a long document, but where else do such minutiae belong if not in a report like this? I will try to counterbalance by keeping these words brief. Before I proceed, let me acknowledge and thank my subcommittee leaders (see Appendix titles) and their troops. Just look at the amount of work they churn out (see Appendixes), on a budget of slightly over US\$50k per biennium. It's a miracle, one of which IUPAC can be proud – whatever any critics may say, the “brand” is alive and well in the Polymer Division, where a real esprit de corps prevails.

Rather than a formulaic report about members, interdivisional activities, meetings, conferences, awards, publications, subcommittees, projects, and so on – besides, most of these details are available in the Appendixes or previous reports to Bureau – I would just like to raise a few issues and then make a few reflections on one particular matter. Here are some issues:

- **IUPAC-endorsed conferences:** We believe this is important, but how can it be made more valuable for IUPAC? The present situation seems to be that conferences receive the benefit of IUPAC branding, but IUPAC receives little in return. In the Polymer Division we are trying to do something about this in two ways: (1) Where possible (i.e., where we have a PD member attending), we insist on a registration waiver and we insist on that person being given time to speak about IUPAC. In the latter regard, the slides prepared by Lynn Soby are invaluable. Hopefully this leads to greater awareness of IUPAC's roles and also to more new members being attracted. (2) In return for IUPAC endorsement we are trying to encourage the publication of conference proceedings in *Macromolecular Symposia*, which returns a royalty of approx. US\$1k per such volume to the PD. In this way there is a financial return to IUPAC for endorsement.
- **Financial support of conferences:** There does not seem to be widespread awareness of the FSC scheme and we have noticed that all FSC applications we receive are for series of conferences that reach out to IUPAC year after year. This seems contrary to purpose, even if these applications are prima facie worthy. Could this situation be improved? Igor Lacik, our AIE/FSC guru (and functionary), has suggested making the scheme more competitive by promoting it within divisions, and effectively inviting applications. This would require receiving a batch of applications at the same time so that they could be compared in pursuit of a batch of funding.
- **Prizes for prizes:** The PD has awards that are externally funded by DSM, *Polymer International* and Hanwha-Total (formerly Samsung). It also has *IUPAC Poster Prizes*,

which are awarded for the best three student posters at every World Polymer Congress. Naturally these awards are prestigious. As well as a 1-year subscription to *Chemistry International*, the winners would previously receive an IUPAC color book. Unfortunately IUPAC has stopped donating the latter as prizes, which has made some PD members irate. Would it be possible to go back to the good old days in this regard? It's a much better look to present something to winners of these prizes.

- **Funding of extra-divisional projects:** Division and Committee Chairs are being asked to contribute funds to an increasing number of projects that do not fall within particular Divisions or Committees, e.g. recent ones regarding OPCW and ICGCSD. It feels like there is a moral pressure to acquiesce to these requests, but at the same time I would struggle to justify such "charity" to the members of my Division, who quite rightly would be annoyed that the money was not instead employed for polymer-related projects. Is there a better mechanism for dealing with such proposals? For example, could IUPAC set aside a budget for such "extra-divisional" projects? At the very least it would be good if there were uniformity across Divisions in financial pledges for such projects.
- **Staudinger's landmark paper turns 100:** The year 2020 will mark one hundred years since Hermann Staudinger published his "macromolecular hypothesis", which is that polymer molecules are large, covalently-bonded molecules rather than loosely bound aggregates of smaller molecules. So 2020 is essentially the centenary of the birth of polymer science. In view of this, the idea has arisen for UNESCO to declare an "International Year of Polymers" in 2020. Supported by the PD, efforts have commenced to this end. Admittedly the situation is a little complicated in that IUPAC is also making efforts for UNESCO to declare 2019 as "International Year of the Periodic Table", in recognition of it being the 150th anniversary of Dmitri Mendeleev presenting his epochal idea. We shall see what transpires! Hopefully there is room at this table for all.



I would like to offer some reflections inspired by the photo above. It shows a group of people meeting on the campus of Istanbul Technical University. The group is the Subcommittee on Polymer Technology, most of whom stayed on for a Polymer Division

meeting a few days later. We were all there because in the following week a World Polymer Congress (WPC) was to take place in Istanbul. WPCs are biennial and are the flagship events of the Polymer Division.

The record attendance at a WPC is 2.4×10^3 in Paris in 2004. When Istanbul was awarded the 2016 WPC, it was expected that this record would be broken, such are the attractions and location and affordability of the great city. In the end the attendance was 4.7×10^2 , close to an order of magnitude below expectation. What happened? It certainly was not down to the conference chair, Yusuf Yagci, who has charisma to burn, is an extremely well known and well-credentialed polymer chemist, and worked indefatigably to make the conference succeed. Nor was it down to the conference organizing company, for Cem Tuncel and his Brosgroup showed themselves to be extremely competent at their job.

What happened was terrorism and political intrigue. Starting at the end of 2015 there were several bombings in Istanbul, two of which were terrorist attacks designed to scare the western world, and one of which was an attack on Turkish police motivated by the Kurdish situation. With these attacks the emails would flood in. Americans showed no awareness that the numbers in Istanbul paled beside 30,000 gun-related deaths per year in the USA. People from everywhere showed no knowledge that even the very safest countries in the world have 30 deaths per million people per annum on their roads. This translates to 600 people per annum for Istanbul's population, which vastly exceeds the number of terrorist deaths. In other words, the roads in Istanbul are a far greater risk than the terrorists. One of my favorite emails was a person saying that terrorists would surely target the World Polymer Congress, as such an attack would make a huge statement on the world stage. This made me wonder whether Lionel Messi and FC Barcelona had been signed up as delegates without me knowing. Another person wrote that as the father of two young children, it was not conscionable for him to go. I wondered whether I should show this email to my own young children. Most people wrote of the need to stand up to terrorists even as they excused themselves.

As if all this was not enough, the Atatürk Airport attack occurred on 28 June 2016, three weeks before the start of the conference, killing 45 people; interestingly, not a single one of the dead was from a western country. Finally, a coup d'état attempt took place on 15 July 2016, just two days before the start of the conference. Comprehensively reported in the world media, these two banner events provided an excuse for anyone to stay away. But were they fatal to the conference? Truth be known it was already in deep trouble before the airport bombing, with registrations at only about 850. The damage had largely been done by the inconsequential events, with the grand happenings just being the icing on the cake.

In view of all this it is a miracle that the conference took place at all. That it did is because of IUPAC, which was already meeting before the coup, as evidenced by the photo above. We advised on the morning after the coup that the WPC should proceed, because to cancel at the last minute would not change the financial situation and would be to punish those who had made an effort against the odds. So the WPC and the remaining IUPAC meetings went ahead, and they were as successful as they could have been under the circumstances. There was no sense of danger, which is not a surprise given that we had dined through the coup attempt: on a beautiful Istanbul evening we could see a traffic jam on a bridge below us, and we experienced this traffic on our bus trip home: it was cars being held up by soldiers. When

we got back to our hotel rooms we watched CNN. If a jet flew overhead, we listened as reporters told of bombs being dropped, a blatant lie. I now understand sensationalism and what the media does to gain traction.

What is the point of this tale? I think it is as follows. I am a human being, and am prey to human forces. One of the reasons I am a scientist is so that I can hold the baser of these forces in check. I want to understand risk, so that I can use it to inform my actions. I want to be able to distinguish between hysteria and reality. I want to see my place in the world and I don't want to overrate my importance. I want to contribute to a cause that genuinely promotes the betterment of mankind, and I want to stand up to forces that seek to undermine this good. Unexpectedly, the World Polymer Congress and IUPAC Polymer Division meetings of mid-July 2016 presented me with an opportunity to test myself in these regards. To my surprise, I found the worldwide community of polymer scientists largely to be lacking. Pleasingly, IUPAC people by and large stood firm. We even smiled for the photo. It was easy, because it's what we felt. I cannot conceive of a better advertisement for the IUPAC spirit.

IUPAC POLYMER DIVISION (IV) – Appendix 1

Inter-Divisional Appointments for 2017

Polymer Division members are known to be involved in other arms of IUPAC as follows:

- Bureau: **Chris Ober** (elected), **Greg Russell** (DP)
- IUPAC Standing Committees:
 - Committee on Chemistry Education (CCE): **Chris Fellows** (AM), **Ram Adhikari** (NR), **Supawan Tantayon** (NR)
 - Chemical Research Applied to World Needs (CHEMRAWN): **Ram Adhikari** (NR), **Mario Malinconico**
 - Committee on Chemistry and Industry (COCI): **Robin Hutchinson** (division rep)
 - Committee on Publications and Cheminformatics Data Standards (CPCDS): **Cláudio dos Santos** (division rep), **Chris Fellows** (division rep)
 - Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS): **Graeme Moad** (division rep)
 - Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD): **Christine Luscombe** (Secretary and TM), **Supawan Tantayon** (AM)
 - Project Committee (PC): **Chris Ober** (member)
 - Evaluation Committee (EvC): not represented
- Other:
 - Div. VIII (Chemical Nomenclature and Structure Representation): **Karl-Heinz Hellwich** (TM-Pres), **Phil Hodge** (TM), **Jiří Vohlídal** (TM)
 - Joint Commission on Biochemical Nomenclature (JCBN): **Karl-Heinz Hellwich** (AM)
 - *Pure and Applied Chemistry* Editorial Advisory Board (PAC-EAB): **Jung-Il Jin** (IUPAC past pres), **Roger Hiorns** (division rep), **Graeme Moad** (ICTNS rep)
 - Committee on Chemical Research Funding (CCRF): **Chris Ober** (member)
 - IUPAC Solvay Award Committee: **Greg Russell** (member)
 - Interdivisional Subcommittee on Materials Chemistry (ISMC): **Chris Ober** (chair), **Natalie Stingelin** (member)
 - International Scientific Committee for the UNESCO-PhosAgro-IUPAC Programme: **Sabine Beuermann** (division rep)

IUPAC POLYMER DIVISION (IV) – Appendix 2

Report on Subcommittee on Polymer Terminology (SPT) for the Year to 2nd March 2017

By Roger Hiorns (Chair of SPT)

Highlights of activities in the leading year

The 2016 meeting of the Subcommittee on Polymer Terminology (SPT) was held in Istanbul, Turkey on the 12th to the 15th of July 2016. It should be said that this was under difficult circumstances, the meeting resembling in some senses a conference situation under siege. Preceding the meeting, there had been terrorist attacks in Istanbul, and during the last evening, just prior to the Division meetings, an attempted coup d'état took place. Prof. Yagci and his team, the organisers of the event, should be warmly thanked for the amazing organisational work they did under such difficult circumstances.

Many members being unable to come due to their employers not permitting travel to Turkey. That said, at least 18 persons attended and five were present by Skype. Electronic communications were found helpful to advance projects, although with the *provisos* that the connection was good and that there were no more than two persons communicating electronically per group, with at least more than equivalent number of persons in the same room. Importantly, projects were advanced very quickly and productively, and SPT, in that week, built a real sense of camaraderie so important to ensuring good communication around the difficult concepts dealt with.

Members attending were: in person, Prof. Rameshwar Adhikari (Nepal), Dr. Paola Carbone (UK), Prof. Melissa Chan (Malaysia), Dr. Jiazhong Chen (USA), Prof. Chris Fellows (New Zealand), Prof. Jiasong He (China), Prof. Michael Hess (Germany), Dr. Roger C. Hiorns (France - Chair), Prof. Stefano (Valdo) Meille (Italy), Dr. Jan Merna (Czech Republic), Prof. Olga Philippova (Russia), Prof. Guido Raos (Italy), Prof. Greg Russell (New Zealand), Prof. Cláudio dos Santos (Brazil), Prof. Stan Slomkowski (Poland), Prof. Natalie Stingelin (UK), Prof. Patrick Theato (Germany), Dr. Paul D. Topham (UK – Secretary), and via Skype, Prof. Christine Luscombe (USA), Prof. Richard G. Jones, Dr. Graeme Moad (Australia), Prof. Tamaki Nakano (Japan), Prof. Michel Vert (France), Prof. Michael Walter (USA). Apologies were received from Prof. Maximo Baron (Argentina), Dr. Ray Boucher (UK), Prof. Alain Fradet (France), Dr. Karl-Heinz Hellwich (Germany), Prof. Philip Hodge (UK), Prof. Richard Jones (UK), Prof. Pavel Kratochvil (Czech Republic), Prof. Christopher K. Ober (USA), Dr. Adriana Sturcova (Czech Republic), Dr. Ted Wilks (USA).

The observers to the meeting, namely Dr. Paola Carbone, Prof. Olga Philippova, Prof. Guido Raos and Prof. Patrick Theato, due to their excellent participation in the meeting, were accepted as members to SPT as of the meeting's closure.

In this short report, it should be stated how greatly the Division and SPT has felt the loss of one of the UK's greatest participants, that of Prof. Bob Stepto. Many members recounted memories recalling the joys of his company, and a minutes' silence was held.

In the period covered by this report, the Subcommittee worked on 23 projects. Of particular importance is the paper, 'Source-based nomenclature for single-strand

homopolymers and copolymers (IUPAC Recommendations 2016)' which has been brought to closure by the admirable and tireless work by Prof. Jones. SPT warmly thanks him and his team, and acknowledges their great contribution to IUPAC's output of recommendations. This document is expected to have a great impact on polymer nomenclature over the coming decades.

The closing of many projects was foreseen in the SPT meeting in 2014 and since then much has been done to ensure continuity by submitting new projects, particularly at the interface between polymer science and other scientific fields. This is because there is a need now in industrial, academic and educative spheres to terms and nomenclature for these areas. Section 5 in the list below gives details of the success of this effort. We now expect a slowing in project submissions, with an increase in time spent dealing with the meat of projects.

On a personal note

I would like to add that I salute the courage of the members of SPT and indeed the Division, for carrying on the meetings and ensuring continuity under what were difficult circumstances. During the night between SPT and Division meetings, gunfire could be heard from both southern and northern positions, while planes flew low overhead, a somewhat concerning proposition, but it was clear that the group held together and looked out for each other. An overriding sense of camaraderie and some exceptional displays of good will to others took place during the meetings and the evening social periods. While I had security advisors on the phone from Paris showing great concern, events on the ground were made more stable by the local team's wonderful hospitality, and folk sticking to their jobs, recreating normality and looking out for each other.

I would very much like to have it acknowledged that there was exceptional support from Prof. Yagci and his team to SPT, that the members of SPT, the leaders of the Division, Greg and Michael, along with division members, played extraordinary roles of good will to their colleagues and can be very proud of what they achieved in Istanbul. It was my honour to be there and take part with such great colleagues.

Output 2016 to March 2017

1. The following projects delivered the following publications:

- **2003-042-1-800 Source-based nomenclature – Jones**
Published as, 'Source-based nomenclature for single-strand homopolymers and copolymers (IUPAC Recommendations 2016)', R. G. Jones, T. Kitayama, K.-H. Hellwich, M. Hess, A. D. Jenkins, J. Kahovec, P. Kratochvíl, I. Mita, W. Mormann, C. K. Ober, S. Penczek, R. F. T. Stepto K. Thurlow, J. Vohlídal, E. S. Wilks, *Pure & Appl. Chem.*, **2016**, 88, 1073-1100.
- **2011-013-2-400 Updating Wikipedia – Hess**
Published through numerous Wikipedia pages now carrying IUPAC definitions.

2. These projects are currently in public review:

- **2008-015-1-400:** Preferred names for polymers
- **2001-081-1-800:** Terminology and structure-based nomenclature of dendritic and hyperbranched polymers

3. The following projects are expected to be sent to public review before the next meeting:

- **2008-020-1-400:** Revision of the web-based guide, IUPAC Recommendations on Macromolecular Nomenclature – Guide for Authors of Papers and Reports in Polymer Science and Technology

4. The following projects are still in preparation with expected end-dates after July 2017:

- **2006-028-1-400:** Terminology for conducting, electro-active and field-responsive polymers
- **2009-047-1-400:** Definitions and notations relating to stereochemical aspects in polymer science
- **2010-007-1-400:** Terminology for chain polymerization
- **2010-036-1-400:** Keywords in polymer science journals
- **2011-035-1-800:** Terminology and nomenclature of inorganic and coordination polymers (TINCOPS) – a extended revision of Nomenclature for regular single-strand and quasi-single-strand inorganic and coordination polymers (1984)
- **2012-001-1-400:** Terminology of nanomaterials and nanotechnology in polymer science
- **2012-048-3-400:** A Brief Guide to Polymer Terminology
- **2013-001-1-800:** Structure-based nomenclature for regular linear star, comb and brush polymers*
- **2014-034-2-400** (Project Committee): Nomenclature for polymeric carriers bearing chemical entities with specific activities and names – Vert
- **2014-033-1-400:** Nomenclature and terminology relevant to lactic acid-based polymers: synthesis, structure, properties, applications and degradation (Extension of 2012-042-1-400) – Vert

5. The following projects have recently been accorded funding or extension or both:

- **2016-050-3-400:** Definition of Terms Pertaining to Polymers in the Solid State: Molecular Arrangement from the Nano- to the Micrometer Scale – Stingelin
- **2015-013-1-400:** Brief Guide to Polymerization Terminology – Luscombe
- **2015-014-1-400:** Guide (and Brief Guide) to Polymer Semiconductors – Walter
- **2015-032-2-400:** (Project Committee) Synchronizing Wikipedia: Polymer Definitions and Terminology – Hess

* Division VIII project pursued under the auspices of SPT.

- **2015-050-1-400** Definition of Terms Relating to the Ultimate Mechanical Properties of Polymers - Adhikari

6. There is currently one project submitted to IUPAC review for funding:

- **2015-049-1-400** *Brief Guide to the Characterisation of Polymers* – Hess

7. The following application documents are in preparation for submission:

- Development of a multilingual glossary of polymer terminology with new languages (Project Committee) – dos Santos
- http of PB2 – Moad
- Polymers from renewable and recycled sources – Vairon
- Terminology for constitutionally-dynamic polymers

Recalling the Role of SPT

SPT works to produce documents that define terms in polymer science, and to make recommendations on the nomenclature of polymers on behalf of Division VIII. While its work is not often cited, it is greatly used throughout academia, secondary and tertiary educational institutes, and perhaps most importantly in industry. This was brought home at a meeting with a quote from a director of the Chemical Patents department of a large multinational company (turnover > 5 billion \$ pa) which stated, 'In the drafting, prosecution and litigation of chemistry patents we are grateful if we can rely on exact nomenclature and definitions as provided by IUPAC, as this helps us to define the claimed scope of protection more precisely. In patent law clear and concise claims are also an important requirement for a patent to be valid. So your work is much appreciated. While many projects have been progressed throughout the year by electronic exchanges using e-mail and Skype, the importance of the face-to-face meetings must be stressed as they allow projects to advance much more quickly than by electronic communications alone. The process of discussion and debate between the members and observers is intrinsic to developing viable, useful systems of terminology and nomenclature.

IUPAC POLYMER DIVISION (IV) – Appendix 3

Report on Subcommittee on Polymer Education (SPeD)

By Chris Fellows (Secretary of SPeD)

List of current SC members (together with country of affiliation for each):

Chair: Patrick Theato (Germany)

Secretary: Christopher Fellows (Australia)

Elected Members: Rigoberto Advincula (USA), Choon Do (ROK), Claudio dos Santos (Brazil), Chan Chin Han (Malaysia), Jiasong He (PRC), Michael Hess (Germany), Dhanjay Jhurry (Mauritius), Richard Jones (UK), Christine Luscombe (USA), Graeme Moad (Australia), Gregory Russell (NZ), Jiří Vohlídal (Czech), Michael Walter (USA)

List of activities and achievements during 2016-2017:

Support for an operation of half-day polymer education workshop in association with the MACRO 2016 conference (2016 July, Istanbul).

Organisation of 1-day workshop on polymer characterisation associated with the Polychar World Forum on Advanced Materials in 2017 (October, Kuala Lumpur, Malaysia).

Preparation of a project on developing a task-oriented global polymer syllabus.

Transfer of access rights to PT and CF to allow extension of the IUPAC Polymer Education website.

Incorporation of IUPAC-consistent material in Wikipedia articles related to polymer chemistry.

Outputs/publications over this period:

Chan, C. H., Fellows, C. M., Hess, M., Hiorns, R. C., Hoven, V., Russell, G. T., dos Santos, C. G., Šturcová, A., and Theato, P. The Contribution of IUPAC to Polymer Science Education, *J. Chem. Educ.*, in revision.

Meetings over this period:

July 14th 2016, Istanbul, MACRO-2016, 8 attendees.

IUPAC projects over this period, indicating which have been completed and which are still running:

2012-027-3-400, *Enhancing Educational Website for Polymer Chemistry*, C. Ober, ongoing

2015-032-2-400, *Synchronizing Wikipedia, Polymer Definitions and Terminology*, M. Hess, ongoing

2015-046-1-400, *Postgraduate Course in Polymer Science*, P. Kratochvil, ongoing

2015-057-1-400, *Educational Workshop in Polymer Sciences*, C. H. Chan and C. M. Fellows, ongoing

IUPAC POLYMER DIVISION (IV) – Appendix 4

Report on Subcommittee on Modeling of Polymerization Kinetics and Processes

By Sabine Beuermann (Co-Chair)

The Subcommittee remains active in critically evaluating kinetic parameters of polymerization processes and in establishing reliable methodologies for measurement of rate coefficients. Ongoing projects are:

- Critically Evaluated Propagation Rate Coefficients for Radical Polymerization: Vinyl Esters (Project 2013–045–1–400, R. A. Hutchinson). The following paper has been recently published, and discussion regarding further work is underway:
Barner-Kowollik, C., S. Beuermann, M. Buback, R. A. Hutchinson*, T. Junkers, H. Kattner, B. Manders, A. N. Nikitin, G. T. Russell, A. M. van Herk, "Critically Evaluated Rate Coefficients in Radical Polymerization – 8. Propagation Rate Coefficients for Vinyl Acetate in Bulk", *Macromol. Chem. Phys.*, **218**, 1600357 (2017).
- Critically Evaluated Dissociation Rate Coefficients for Alkoxyamines (Project 2010–027–2–400, Y. Guillemeuf). This project on nitroxide-mediated polymerization was restarted at the Pacifichem conference (Dec. 2015). Currently, the collected data are being discussed among the project members.
- Critically Evaluated Rate Parameters for Chain-Length-Dependent Termination Kinetics in Radical Polymerization of Styrene and Methyl Methacrylate (Project 2013–051–1–400, G. Russell). A task-group meeting took place at the Macro2016 conference in July (see above). As Buback is still publishing SP PLP EPR measurements from his laboratory, the collating of data has been deferred until this process is complete, which will be in March 2017.
- Critically Evaluated Rate Coefficients for Radical Polymerizations of Styrene (Project 2013–047–1–400, S. Beuermann). Due to personal matters the project was on hold throughout the year 2016. Currently, the project members discuss which reactions and associated rate coefficients need to be included. With respect to chain length dependent termination, most probably the data from project 2013-051-1-400 will be referred to and summarized.
- Critically Evaluated ESR (EPR) Spectra of Important Polymerization-Related Radicals (Project 2015–047–1–400, A. Kajiwarra). Following the kick-off meeting of the project at Pacifichem 2015, a comprehensive plan of action regarding the relevant radicals to be included was agreed upon at the task-group meeting at Macro2016 in July. Kajiwarra is currently carrying out these actions.

At the 2015 Pacifichem conference 2015 a large number of members attended resulting in very lively discussions. It appears to be a matter of priority to identify places and dates for common meetings. Due to the political situation there was no meeting at MACRO 2016. It is hoped that a significant number of members will be able to attend MACRO 2018.

IUPAC POLYMER DIVISION (IV) – Appendix 5**Report on Subcommittee on Structure and Properties of Commercial Polymers****By Jiasong He (Co-Chair)****Highlights of this Subcommittee**

Founded in 1963, this subcommittee works in a manner to ensure that the projects are structured in such a way as to accommodate value in application, need and scientific novelty within the broad field of structure and properties of commercial polymers. It now consists of 64 members from 10 countries with balanced membership base from industry (one third) and academy (two thirds). Among its 94 publications, 58 papers were published in *Pure Appl. Chem.* For three current officially running projects, two technical reports are to be submitted to *Pure Appl. Chem* on structure, processing and performance of ultra-high molecular weight polyethylene; and one draft to be submitted to *Physical Review* on elongational rheometry devices for shear rheometers. As an active platform for collaboration on a global basis, its has a long list of 14 feasibility studies in the pipeline, among which some are applying for IUPAC projects. Logistically this subcommittee is divided into a western (European) chapter and an eastern (Asian) chapter, with each holding an annual meeting. These are freestanding events that are financed mainly by industry. In 2016, two annual meetings were held in Greece and Japan, respectively, and in 2017 next two to be held in Poland and China, respectively.

IUPAC POLYMER DIVISION (IV) – Appendix 6

Report on IUPAC-Endorsed Conferences of the Polymer Division

By Igor Lacík (TM Responsible for Evaluation of AIEs)

Endorsed conferences that took place in the year 2016:

1. **POLYSOLVAT-11 - Polymer-solvent Complexes and Intercalates**, January 27 - 30, 2016, Kolkata, India (Chairman: Prof. Arun Kumar Nandi)
2. **Chemistry Conference for Young Scientists, ChemCYS 2016**, March 16-18, 2016, Blankenberge, Belgium (Chairman: Prof. Thomas Vranken)
3. **POLYCHAR 24 - World Forum on Advanced Materials and 24th Annual Tutorial on Polymer Characterization**, May 10 – 14, 2016, Poznan, Poland (Chairman: Prof. Tomasz Sterzynski)
4. **Polymers and Organic Chemistry 2016 (POC 2016)**, June 13 - 16 2016, Crete Maris Beach Resort, Hersonissos (near Heraklion), Crete, Greece (Chairman: Prof. Kostas Demadis)
5. **80th Prague Macromolecular Meeting, Self-assembly in the World of Polymers**, July 10 – 14 2016, Prague, Czech Republic (Chairman: Dr. Petr Štěpánek)
6. **MACRO 2016 - 46th IUPAC World Polymer Congress**, July 17 - 21 2016, Istanbul, Turkey (Chairman: Prof. Yusuf Yagci)
7. **The 15th International Conference on Molecule-Based Magnets (ICMM2016)**, September 4 - 8 2016, Sendai, Japan (Chairman: Prof. Masahiro Yamashita)
8. **IUPAC-PSK40 Conference on Advanced Polymeric Materials(IPC): Commemorating the 40th Anniversary of The Polymer Society of Korea**, October 5 - 7 2016, Jeju, South Korea (Chairman: Prof. Chulhee Kim)
9. **International Conference on Novel Materials and their Synthesis**, October 14 - 19 2016, Changsha, China (Chairman: Prof. Yuping Wu)
10. **36th Australasian Polymer Symposium**, November 20 – 23 2016, Lorne, Victoria, Australia (chairman: Prof Greg Qiao)

Conferences approved for endorsement in 2017:

1. **14th Annual UNESCO/IUPAC Workshop and Conference on Macromolecules & Materials**, April 10 – 13 2017, Stellenbosch, South Africa (Chairman: Prof B. Klumperman)
2. **APME 2017 - 12th International Conference on Advanced Polymers via Macromolecular Engineering**, May 21 – 25 2017, Ghent, Belgium (Chairman: Prof. Filip Du Prez)
3. **Macro- and supramolecular architectures and materials (MAM-17)**, “Multifunctional Materials and Structures”, June 6-10 2017, Sochi, Russia (Chairman: Prof. Eduard Karakhanov)

4. **9th International Symposium “Molecular Mobility and Order in Polymer Systems**, 19 – 23 June 2017, Saint-Petersburg, Russia (Chairman: DrS.A.A.Darinskii)
5. **European Polymer Congress 2017**, July 2 – 7 2017, Lyon, France (Chairman: Prof. Jean-Francois Gerard)
6. **17th IUPAC International Symposium on MacroMolecular Complexes (MMC-17)**, 28 - 31 August 2017, Tokyo, Japan (Chairman: Prof. Kenichi Oyaizu)
7. **The 12th International Symposium on Ionic Polymerization (IP 2017)**, September 17 - 22 2017, Durham, United Kingdom (Chairman: Professor Lian Hutchings)
8. **IUPAC-FAPS 2017 Polymer Congress on Smart Materials for Emerging Technology**, October 11 – 13 2017, Jeju, South Korea (Chairman: Prof. Kookheon Char)
9. **25th POLYCHAR 2017 World Forum on Advanced Materials** and 25th “Short Course on Polymer Characterization”, October 2 – 6 2017, Putra World Trade Centre, Kuala Lumpur, Malaysia (Chairman: D Dato’ Dr. Ong Eng Long)

Conferences so far approved for endorsement in 2018 and beyond:

1. **Polymers and Organic Chemistry 2018 (POC 2018)**, Le Corum, June 4 - 7 2018, Montpellier, France (Chairman: Dr Ghislain David)
2. **The 18th international symposium on novel aromatic compounds (ISNA-18)**, July 21 – 26 2019, Sapporo city, Japan (Chairman: Prof. T. Suzuki)
3. **Macro 2020, 48th World Polymer Congress**, June/July 2020, Jeju Island, Republic of Korea (South Korea) (Chairman: will be assigned)

International Union of Pure and Applied Chemistry

Division V _ Report to Bureau 2017

I. Highlights and/or Executive Summary

This should identify items for **discussion and/or decision by the Bureau** and list **Division/Committee priorities for the 2016-2017 biennium and the next one**. It should also cover the major points and **achievements that the Division President/Standing Committee Chair** wishes to convey to the Bureau and Council, since this and part II will most likely be read carefully.

Division priorities and achievements:

- Division Committee permanent activity particularly regarding the transfer of information from the Secretariat and DP to the Div members as well as via mutual contacts of the Div officers, Committee members and reps – 2 letters of the DP, relatively large number of email from DP, but with exceptions rather various activity of some TMs, AMs and NRs.
- Preparation of PAC Recommendations/TRs and the Orange Book revision under the title “Compendium of Terminology in Analytical Chemistry”, Brynn Hibbert, the Editor – at present most of the analytical methods are covered by submitted PAC Recommendations or Technical Reports (see below).
- Progress on individual IUPAC projects following their planned end dates – see list below.
- Participation of the Div reps on the work of other bodies, the Div members/projects chairs on workshops and conferences with information on IUPAC, projects dissemination, and the Div V goals and activities – see list below.
- Division ballot for the next biennium to ensure continuation in the active work.

Item for discussion and/or decision - IUPAC funds for travel in advance:

The Div V officers would like to ask at the Bureau and Council for a possibility to help TMs from developing countries and people who are not able to use an organizational support (e.g. retired people) to attend the GA and Division Committee meeting by covering the travel expenses in advance (as it was in the past). In the case of air tickets even the reimbursement will come long months after the payment.

II. Plans and priorities for the remainder of this biennium, and beyond

Provide some detail regarding your intentions for your Division/Committee and the context within which that work will be done. For example, you might want to describe **the overall strategy of your Division / Committee**, and to include a short section on the activities of **specific bodies** if that seems desirable. You may want to provide **a summary of the number and general types of projects**. You may wish to highlight some **interdisciplinary activities within IUPAC or with outside groups** if these were not covered in part II. You may want **to comment on particular organizational or operational aspects that you think should be brought to the attention of Council**. In short, part III is free-form; you can put into it whatever you wish, preferably without duplication of information from other parts.

The overall strategy is directed to visibility of the Division and SSED as well as quality of the Division products. It concerns:

- a) Finalization of the revision of the Orange Book. - At present, most of the chapters are in a reasonably advanced state when the chapters undergo through the PAC Recommendations/TRs publications. For details see below.
- b) IUPAC projects selection on issues recognized as emerging ones:
 - Finalization of quite long list of running projects, - in 2016 together 32 projects, 6 projects have been completed, 5 projects past the end date, remaining budget was less than 40 % (at present the lowest among the divisions).

- Selection of new projects within Analytical Chemistry and within the Subcommittee on Solubility and Equilibrium Data (SSED) – at present 3 project proposals under evaluation.
- c) SSED activity and products – for details see below.
- d) Work of the Div V reps in internal and external bodies, particularly:
 - Joint Committee for Guides in Metrology (JCGM) and its Working group 1 and 2.

ACD members on internal and external committees:

Body/ Committee/ Organisation	Membership
<u>Internal</u>	
Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS)	Attila Felinger
Committee on Chemical Education (CCE)	Maria Filomena Camoes
Committee on Chemical Industry (COCI)	Jan Labuda
Committee on Publications and Cheminformatics Data Standards (CPCDS)	Brynn Hibbert
Committee on Chemistry Research Funding (CCRF)	Jan Labuda
Pure and Applied Chemistry Editorial Advisory Board (PAC-EAB)	Zoltán Mester
<u>External</u>	
International Committee on Weights and Measures/Consultative Committee on the Amount of Substance (CIPM/CCQM)	Aleš Fajgelj
ISO-Committee on Reference Materials (ISO/REMCO)	Aleš Fajgelj
Joint Committee for Guides in Metrology (JCGM)	Zoltán Mester
Joint Committee for Guides in Metrology Working Group1 (JCGM WG1)	Steven Ellison, Juris Meija
Joint Committee for Guides in Metrology Working Group 2 (JCGM WG2)	Zoltán Mester, Gunnar Nordin
Inter-Agency Meeting (IAM)	Zoltán Mester
EUCHEMS	Slavica Razic, Jan Labuda
African Analytical Network	Nelson Torto
CITAC	Ilya Kuselman / Aleš Fajgelj
CODATA	Clara M. Magalhães
EURACHEM	M. F. Camoes

III. An overall report on Division activities and achievements during 2016-2017 biennium (IUPAC's Mission, Core Values, Goals, activities and Objectives).

This will provide more details in a format that is common to all Divisions and Operational Committees. It will permit interested Bureau members to see the **Division's work in the context of overall IUPAC strategy**. *Note that it is neither necessary nor desirable to include accomplishments under each Goal*, and there is no problem in referring to an activity under more than one Goal where appropriate, but that Bureau and Council should be able to assess the level of alignment with IUPAC's Mission, Core Values, Goals and Objectives.

Keeping the **IUPAC Strategic Plan as “living document”** - this has been discussed in details during the Div V Committee meeting on 19 to 21 March, 2016 in Bratislava, Slovakia.

- *A focus on those aspects of chemistry where global consensus is essential for progress in research, commerce and policy:*

This is performed via:

- a) Longtime and intensive participation of the Div V on all modern aspects of the chemical measurement as stated by the International Vocabulary on Metrology (VIM). This participation covers activities of both Div V directly and external cooperation within JCGM with the WG1 and WG2, and others.
- b) Intensive work the Orange Book re-edition and publication of PAC Recommendations on individual methods of the analytical chemistry.
- c) Div V projects and projects with interdivisional cooperation and participation.

- *Respect for its objectivity and scientific excellence, providing access to the highest levels in the scientific, industrial, and policy communities to represent global chemistry:*

This continues to be performed by Div V representatives at internal and external bodies, interdivisional interaction and collaboration including chemistry education.

- *A worldwide base of volunteers with the best skills and background, recruited by transparent and well-understood processes:*

This continues to be performed by checking the projects task group composition considering skill and geography.

Orange Book re-edition (B. Hibbert):

It represents the main division activity and product during the biennium. A contract with the Royal Society of Chemistry last year, for a submission date of 31 March 2018, expectation 1000 pages (@500 words per page).

Chapter # [3 rd edition #] (present working #)	Title	Editor	State
Chapter 1 [1] (1)	Fundamental concepts and terms (metrology)	Heiner Korte	Draft completed with discussion still ongoing.
Chapter 2 [-] (1a)	Chemometrics and statistics	Brynn Hibbert	Recommendation published. Hibbert, D. B., Vocabulary of concepts and terms in chemometrics (IUPAC Recommendations 2016). <i>Pure Appl. Chem.</i> 2016 , 88 (4), 407-443.
Chapter 3 [-] (2)	Sampling and sample preparation	Janusz Pawliszyn	TR and Recommendation published Poole, C.; Mester, Z.; Miró, M.; Pedersen-Bjergaard, S.; Pawliszyn, J., Extraction for analytical scale sample preparation (IUPAC Technical Report). <i>Pure Appl. Chem.</i> 2016 , 88 (7), 649-687.

			Poole, C.; Mester, Z.; Miró, M.; Pedersen-Bjergaard, S.; Pawliszyn, J., Glossary of terms used in extraction (IUPAC Recommendations 2016). <i>Pure Appl. Chem.</i> 2016 , 88 (5), 517-558.
Chapter 4 [4,6] (3)	Methods of analysis depending on measurements of mass and volume	Maria F. Camões	Nearly completed draft of a TR.
Chapter 5 [9] (4)	Separation	Tatyana Maryutina	Recommendation submitted 28/1/2017
Chapter 6 [10,11] (5)	Spectroscopic methods of analysis	Derek Craston	Suggestion to split into 3 chapters. No drafts as yet.
Chapter 7 [12] (6)	Mass spectrometry	Zoltán Mester	Recently published Recommendation can be used as basis for chapter. Chapter draft in Dropbox.
			Murray, K. K.; Boyd, R. K.; Eberlin, M. N.; Langley, G. J.; Li, L.; Naito, Y., Definitions of terms relating to mass spectrometry (IUPAC Recommendations 2013). <i>Pure Appl. Chem.</i> 2013 , 85 (7), 1515-1609.
Chapter 8 [8] (7)	Electrochemical methods of analysis	José M. Pingarrón	Substantial draft in Dropbox. Being worked on with view to early submission.
Chapter 9 [16] (8)	Radioanalytical methods	Peter Bode	Attempts to synthesize Chai and Bonardi texts. Some recent activity but main task yet to get underway.
Chapter 10 [17] (9)	Surface Analysis	Takae Takeuchi	Draft in preparation by new team. List of terms but which need completion.
Chapter 11 [5] (10)	Thermal methods of analysis	Carlos Castro?	
Chapter 12 (11)	Bioanalytical methods	Jan Labuda	Revision to Recommendation submitted 21/2/2017.
Chapter 13 [18]	Quality Assurance	Ulf Örnemark	Substantial draft in Dropbox. Close working with Chapter 1 team.

SSSED subcommittee activity report (D. Shaw):

The **17th International Symposium on Solubility Phenomena and Related Equilibrium Processes** occurred in the University of Geneva, Geneva, Switzerland from the 25th to the 29th July 2016. The conference was attended by around 110 people, and had 13 plenary lectures, 40 oral communications and 38 posters. Three IUPAC prizes for the best poster communications were given.

The 2016 Franzosini Award was given to David Fellhauer in recognition of his contribution to the IUPAC Solubility Data Project. He was honored at the 15th Annual Meeting of the IUPAC Subcommittee on Solubility and Equilibrium Data held in Geneva, Switzerland on the

24 July 2016 and which took place during the 17th International Symposium on Solubility Phenomena and Related Equilibrium Processes.

The 42nd Annual meeting of the former Solubility Committee and 15th of the SSED was held in conjunction with the 17th ISSP on the 24th July 2016 in Geneva, Switzerland. This meeting was attended by 22 members of SSED.

Subcommittee on pH - SpH report (M. F. Camoes):

In the frame of the activities and plans of SpH: Traceability of pH Measurements for Application in Fundamental and Applied Science, the milestones of ongoing Project N° 2013-013-1-500- pH Measurement in Seawater (M F Camões chair) were presented, starting from IUPAC Recommendations 2002: Measurement of pH. Definition, Standards, and Procedures. An account of publications, further research, and collaboration with relevant stakeholders is given. In 2016, the contribution “Metrological challenges for measurements of key climatological observables. Part 3: Seawater pH” has been published as the product to Global climate changes.

Report of the JCGM-WG1 (Juris Meija (NRC), Stephen Ellison (LGC)):

The Joint Committee for Guides in Metrology (JCGM) is tasked with maintaining and promoting the use of the “Guide to the Expression of Uncertainty in Measurement” (known as the GUM) and the “International Vocabulary of Metrology” (known as the VIM). The JCGM operates through two working groups: JCGM-WG1, with responsibility for the GUM, and JCGM-WG2, with responsibility for the VIM. JCGM has eight member organizations which include IUPAC. IUPAC is currently represented in the JCGM-WG1 by Stephen Ellison (LGC, UK) and Juris Meija (NRC, Canada).

The June 2016 meeting of WG1 focused primarily on two items of business; actions following member and NMI comment on the 2015 Committee Draft of a revision of the GUM, and steps towards a further JCGM Supplement covering the construction of a ‘measurement model’ suitable for evaluation of measurement uncertainty. The working group acknowledges that the proposed GUM2 has failed to adequately communicate the rationale for revision of the GUM.

Actualization of the Division Web page:

Division Vicepresident Zoltan Mester is currently working on a new Web page of the Division V.

SSED Web Page (David Shaw, February 2016):

Over the last several months the SSED web page has been brought up to date and reorganized to better reflect the full range of the subcommittee’s activities. Concise sections of the page now present our work in the following areas:

- Solubility Data Series with a full, current list of published volumes,
- Stability Constant Database,
- International Symposia on Solubility Phenomena with a list of all past symposia,
- The Franzosinni Award with a complete list of recipients.

A schedule of future meetings is now current and minutes of all meetings from 2001 through 2016 are posted. We are currently working to revise our list of participants and ensure that all contact information is current. We are also considering other activities which might be added to the page.

IV. Tabular material

This should include a list of publications. It might also include a list or summary of conferences and symposia organized by the Division or its component bodies. It should include a list of all current Division projects. Again, this part is open-ended.

List of publications:

Hibbert, D. B., Vocabulary of concepts and terms in chemometrics (IUPAC Recommendations 2016). Pure Appl. Chem. 2016, 88 (4), 407-443.

Poole, C.; Mester, Z.; Miró, M.; Pedersen-Bjergaard, S.; Pawliszyn, J., Glossary of terms used in extraction (IUPAC Recommendations 2016). Pure Appl. Chem. 2016, 88 (5), 517-558.

Poole, C.; Mester, Z.; Miró, M.; Pedersen-Bjergaard, S.; Pawliszyn, J., Extraction for analytical scale sample preparation (IUPAC Technical Report). Pure Appl. Chem. 2016, 88 (7), 649-687.

Labuda, J.; Bowater, R.P.; Fojta, M.; Gauglitz, G.; et al., Terminology of bioanalytical methods (IUPAC Recommendations 201x). Pure Appl. Chem. Revision to Recommendations submitted 21/2/2017.

Dickson, AG.; Camoes, MF.; Spitzer, P.; Fisicaro, P.; Stoica, D.; Pawlowicz, R.; Feistel, R., Metrological challenges for measurements of key climatological observables. Part 3: Seawater pH. Metrologia 2016, 53, R26-R39.

Oracz, P., Góral M., Wiśniewska-Gocłowska B., Shaw DG., Maczyński A., IUPAC-NIST Solubility Data Series. 101. Alcohol + Hydrocarbons + Water. Part 2. C₁-C₃ Alcohols + Aliphatic Hydrocarbons, J. Phys. Chem. Ref. Data 2016, 45, 033102

Oracz, P., Góral M., Wiśniewska-Gocłowska B., Shaw DG., Maczyński A., IUPAC-NIST Solubility Data Series. 101. Alcohol + Hydrocarbons + Water. Part 3. C₁-C₃ Alcohols + Aromatic Hydrocarbons, J. Phys. Chem. Ref. Data 2016, 45, 033103

Critical Evaluation of Equilibrium Constants of 4f Metal Mixed Complexes with Acidic (Chelating) Ligands in Combination with Various Organophosphorus O-donor Molecules Chem. Internatl. 2016, 38, 24.

Kuselman, I.; Pennechi, F. Human Errors in a Routine Analytical Laboratory—Classification, Modeling and Quantification: Overview of the IUPAC/CITAC Guide, Chem. Internatl. 2016, 38, 27.

International Vocabulary of Metrology, Chem. Internatl. 2016, 38, 25.

Summary of conferences and symposia:

Workshop “Advances in Analytical Chemistry” (Jan Labuda chair) was held on 21 March, 2016, in Bratislava, Slovakia, just after the Division V Committee meeting. The scope of the workshop was to provide state-of-the-art of specific topics of modern Analytical Chemistry, its concepts and associated terms together with identification of its future tasks. The lectures by nine Div V Committee members have presented the situation in current development of both Analytical Chemistry as the science and analytical methods, an experiences of scientists and researchers in different areas of analytical chemical measurement at universities and

research laboratories, and also a way for further education particularly university teachers, research staff and young chemists in Slovakia and the Mid-Europe region.

9th International Symposium on New Trends in Chemistry: Analytical Chemistry for Better Life was held on January 02-05, 2017 at the Cairo University, Cairo, Egypt (Chair: Dr. Mothaza Khater, Support: Egyptian Society of Analytical Chemistry Egyptian Society). Division V was represented by Érico M. M. Flores - Associate Member (Brazil) and Medhat Al-Ghobashy - National Representative (Egypt). Many scientists have attended this conference, including the editors or editorial board members of Analyst (RSC), J. Anal. At. Spectrom. (RSC), Arabian J. Chem. (Elsevier) and TrAC (Elsevier).

The 3-rd biannual international IUPAC/CITAC Workshop on Quality and Metrology of Chemical Analytical Results (planned as a milestone of IUPAC project 2016-007-1-500, Ilya Kuselman chair), was organized with participation of the Israel Analytical Chemistry Society (IACS) and the Israel Laboratory Accreditation Authority (ISRAC) on 23 January 2017 in Kfar Maccabiah, Israel. The event was sponsored by Sigma-Aldrich Corporation (a part of Merck today) and arranged by Bioforum Ltd.

The discussion included the following topics:

- use of results of human error study at validation of an analytical method;
- evaluation of measurement uncertainty of the test (analytical) results as a part of the method validation task;
- evaluation of probabilities of false decisions at conformity assessment of test results obtained by the method under validation.

The round-table discussion was held “How can validation be planned to provide a method user with maximum information?” More details about the workshop and presentations are available from <http://bioforumconf.com/satellite-event2017/workshop-program2017>.

4th FUE International Conference on Pharmaceutical Sciences – January 30 – February 02, 2017, Future University in Egypt, Cairo, Egypt (Chair: Dr. Seham ElKhesheh, Support: FUE and IUPAC). Division V was represented by Érico M. M. Flores - Associate Member (Brazil) and Medhat Al-Ghobashy - National Representative (Egypt). It was a big conference with the attendance of scientists of many countries, including representatives of pharmacopoeias, health authorities and industrial pharmaceutical suppliers.

Proposed-tentative meeting for IUPAC Advertising in Brazil after the IUPAC 2017 GA in São Paulo at Federal University of Santa Maria, UFSM, Brazil. Organizer: Érico M. M. Flores - Div. V Associate Member (Brazil). The goal is to join some of the division meeting and GA participants during a one-day meeting in Santa Maria, RS to disclose IUPAC activities for young researchers in Santa Maria.

List of all current division projects:

Project Numbers	Planned End Date
2001-063-1-500 Smith	30-Jun-2017
2002-044-1-500 Scharlin	31-Dec-2017
2005-035-2-500 Belli	31-Dec-2017
2008-025-1-500 Filella	31-Dec-2017
2009-006-1-500 Ellison	31-Dec-2017
2010-030-1-500 Chai	30-Jun-2013

2010-052-1-500 Pingarron	31-Dec-2017
2011-031-1-500 Voigt	30-Jun-2017
2011-046-1-500 Maryutina	31-Dec-2017
2011-047-1-500 Labuda	31-Dec-2017
2011-065-3-500 Bendova	1-Aug-2014
2012-004-1-500 Gamsjager	31-Dec-2017
2012-008-1-500 Hefter	31-Dec-2017
2012-022-1-500 Eysseltova	1-Sep-2017
2012-030-1-500 Guminski	1-Sep-2017
2012-031-1-500 Shaw	31-Dec-2016
2013-013-1-500 Camoes	1-May-2016
2013-025-2-500 Westwood	31-Dec-2017
2013-034-1-500 Gaune-Escard	31-Dec-2017
2014-025-1-500 Hibbert	31-Mar-2017
2015-008-2-500 Apak	31-Dec-2017
2015-020-2-500 Leito	30-Jun-2018
2015-021-1-500 Hibbert	30-Jun-2017
2015-024-2-500 Hibbert	31-Dec-2017
2015-028-2-500 Camoes	30-Sep-2016
2015-044-2-500 Bendova	31-Dec-2018
2015-051-1-500 Voigt	30-Jun-2018
2016-003-1-500 Atanassova	30-Jun-2018
2016-004-1-500 Filella	30-Jun-2017
2016-005-1-500 Nordstrom	30-Jun-2018
2016-007-1-500 Kuselman	30-Jun-2018
2016-043-1-500 Shaw	31-Dec-2017

New projects proposals submitted for evaluation:

2016-041-1 Filella (SSED)

2016-042-1 Filella (SSED)

2017-005-1 Labuda



I. Highlights and Executive Summary

Through its internationally recognized membership and project teams, Division VI – Chemistry and the Environment (DCE), provides unbiased and timely authoritative reviews on the behavior of chemical compounds in food and the environment. The DCE undertakes both fundamental and applied evaluations that contribute to solving environmental problems and enhancing the quality of food on a global scale.

An integral part of the Division activities is related to subcommittees.

- *The Subcommittee on Chemical and Biophysical Processes in the Environment* was established in 2014. It combines the activities of the previously existing division subcommittees on Biophysico-Chemical Processes in Environmental Systems and on Chemistry of Environmental Compartments. The subcommittee deals with topics regarding the distribution and environmental fate of chemicals (inorganic and organic compounds, nanomaterials), chemical and biophysical processes in environmental compartments (e.g., in soil and aquatic ecosystems), and interactions with organisms (bioavailability). Main outcomes from IUPAC projects are review papers, technical reports or books on certain topics. Recent examples are a book on the *biophysico-chemical processes and toxicity of engineered nanoparticles*, a review paper on the *consideration of bioavailability for the risk assessment of metal species in waters*, or a *guidance paper on substance-related environmental monitoring strategies regarding soils and waters*. A new way of dissemination is the operation of project websites, e.g., <http://www.metal-bioavailability.org/> on the bioavailability of metals. Another website on an e-waste related project is currently under progress.
- *The Subcommittee on Crop Protection Chemistry* provides authoritative views regarding environmental and human health aspects of crop protection chemistry through its projects and outreach activities. Outreach activities help move IUPAC project outcomes outside the small circle of specialists and into the broader scientific and regulatory arena, with a strong emphasis on technology transfer to developing countries. These outreach activities include periodic workshops focused on a specific set of regional issues related to crop protection chemistry and a quadrennial international congress of pesticide chemistry which serves to highlight state-of-the-art scientific advances and regulatory approaches.

Division VI has made progress on a number of important projects over 2016-2017 and initiated ten new projects, five of these projects are interdivisional. Division VI has also announced a special call for proposals with rolling 3 months deadline till September 2017 https://www.iupac.org/cms/wp-content/uploads/2016/09/IUPAC-DCE-Call-for-Proposals_sept-2016.pdf

Division VI has established cooperation with the Division of Chemistry and the Environment (DCE) of the European Association of Chemical and Molecular Sciences (EuCheMS) the Organisation for Economic Co-operation and Development (OECD). Three special symposia will be organized by Division VI at IUPAC World Chemistry Congress in Brazil. Besides, Division VI has announced Environmental Chemistry Poster Award sponsored by the division
<https://www.iupac.org/cms/wp-content/uploads/2017/01/IUPAC-DCE-WCC-Poster-Prize-2017.pdf>

II. Plans and priorities for the remainder of this biennium, and beyond

A special attention will be paid to interdivisional multidisciplinary projects. Project # 2016-015-2-600 (Perminova) "Developing Database on Molecular Compositions of Natural Organic Matter and Humic Substances as Measured by High Resolution Mass Spectrometry" supported by Divisions III, V, and VI can be an example. In general, close cooperation with IUPAC divisions and committees is of primary importance.

We are also planning to enhance cooperation with the Division of Chemistry and the Environment (DCE) of the European Association of Chemical and Molecular Sciences (EuCheMS) as well as with the Organisation for Economic Co-operation and Development (OECD).

Division VI is organizing a series of special events at the IUPAC World Chemistry Congress in Brazil including 3 symposia:

- Fate of Pesticides in Latin American Environments;
- E-waste- an emerging global challenge;
- Global Environmental Challenges of Nanomaterials .

The Division plans to improve system of critical assessment of ongoing projects. Project progress reports will be published annually on the Division web-sites and projects progress will be evaluated at Division meetings.

III. An overall report of Division/Committee activities and achievements during 2016-2017 biennium

Division VI has made progress on a number of important projects over 2016-2017 and initiated ten new projects, five of these projects are interdivisional. Division VI has also announced a special call for proposal, deadline is September 2017.

Selected Accomplishments and Outcomes according to the Goals and Objectives of IUPAC.

a. IUPAC provides scientific expertise to address critical world needs.

The following projects have been addressing the above

- i. Quantitative Review and Analysis of Pesticide Sorption and Its Effect on Degradation in Relation to Soil and Climate Project No. 2010-018-2-600 (Chen): This project while still underway has generated an ACS Symposium Series Book "Non-First Order Degradation and Time-Dependent Sorption of Organic

Chemicals in Soil”

(<http://pubs.acs.org/isbn/9780841229785>).

- ii. Book entitled “Climate Change. 2nd Edition. Observed Impacts on Planet Earth” has been published as an outcome of Project No. 2014-023-2-600 (Letcher) The book presents a multi-disciplinary overview of the Earth's changing climate, including models of climate change, geological history, and further engineering aspects.
<http://store.elsevier.com/Climate-Change/isbn-9780444635242/>
- iii. Project No. 2014-031-3-600 (Purchase) “The environmental and health challenges of e-waste and its management: an emerging 21st century global concern” is underway. It aims to bring together global expertise to a) examine current research on the chemical nature of e-waste and its global distribution; b) evaluate its environmental and health impact of e-waste and related risk management tools and models; c) identify short-comings in present regulations and management strategies as well as future challenges; and d) develop a set of specific recommendations for management approaches that are science-based and globally informed.
- iv. Project No. 2014-026-3-600 (Obare) - Chemical speciation of anthropogenic nanoparticles. The objective of this project is to develop guidelines and provide a framework for understanding the chemical speciation of nanoparticles and the associated environmental health and safety issues.
- v. Project No. 2015-048-1-600 (Unsworth and Lalah) - Ecological Risk Assessment Workshop for East Africa. The objective of this project was to conduct a focused workshop on Ecological Risk Assessment for scientists, students and government officials who were attending the 3rd International Conference on Innovation and Technology for Development in Nairobi, Kenya on February 23-25, 2016.

Items *ii,iii, iv,v* in particular are multidisciplinary projects addressing critical global issues.

IV. Additional materials

- a. New projects initiated in 2016-2017:
 - i. 2015-025-4-800 (McEwen) – InChI extension for mixture composition.
Interdivisional project, in cooperation with Division VIII
 - ii. 2016-004-1-500 (Filella) - Solubility in energy and waste issues of emerging concern.
Interdivisional project, in cooperation with Division V
 - iii. 2015-010-3-600 (Keen) - Standardization of electrical energy per order (EEO) reporting for UV/H₂O₂ reactors.
 - iv. 2016-025-1-600 (Carazo) - Ecological Risk Assessment Workshop for Central America.
 - v. 2016-016-2-600 (Kookana) - Guidance for Industry and Regulators on Assessment of the Environmental Fate and Risks of Nano-enabled Pesticides.
Interdivisional project, in cooperation with COCI
 - vi. 2016-019-2-600 (Terzano) - Trace elements analysis of environmental samples with X-rays: from synchrotron to lab and from lab to synchrotron.
 - vii. 2016-015-2-600 (Perminova) - Developing Database on Molecular Compositions of Natural Organic Matter and Humic Substances as Measured

by High Resolution Mass Spectrometry.

Interdivisional project, in cooperation with Divisions III and V

- viii. 2017-004-1-600 (Chung) – “Water and Environmental Analysis”, a special symposium to be organized at the Conference on High Performance Liquid Phase Separations and Related Techniques (HPLC2017).
- ix. 2016-047-1-600 (Xing) - “Multi-scale Biogeochemical Processes in Soil Ecosystems: Critical Reactions and Resilience to Climate Changes”, part IUPAC-Wiley Book Series (edited by Nicola Senesi and Baoshan Xing): Biophysico-Chemical Processes in Environmental Systems
- x. 2016-035-1 (Purchase, Obare) - Development of Three Technical Symposia on Environmental Chemistry at the 46th IUPAC World Chemistry Congress, Sao Paulo 2017

b. Selected publications

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Division VII Report to Council 2017

Thomas Perun, President

I.

Highlights and Executive Summary

The projects and activities conducted in Division VII have been overseen by three separate subcommittees: Drug Discovery and Development (DDD) , Toxicology and Risk Assessment (TRA), and Nomenclature for Properties and Units in Clinical Chemistry (NPU). Major thrusts have been to provide documents and recommendations that convey the importance of areas of chemistry that involve global issues that impact human health.

A major multidisciplinary effort has involved a joint project with Division IV on nanotechnology and its applications in medicine and other human usage including food technology and cosmetics. The potential toxicology of these applications will be examined. Two scientific reports will be issued, and an article for readers in the general public is in the planning stage.

A workshop on the safety of engineered nanomaterials will be held this year in Mexico to provide a critical overview of issues related to the safe and sustainable development of nanotechnology in this country.

The emergence of novel psychoactive compounds in the illicit drug market is being examined in a project, which will provide information useful to scientific, societal and governmental organizations involved with the growing problem. The first report covering synthetic cannabinoids is due this year.

The importance of IUPAC as a major organization has been given impetus by the worldwide recognition of the IUPAC-Richter Prize as an award for meritorious research in medicinal chemistry leading to important new drug entities. This was given to five previous winners, all from different countries. It has been continued on a biannual basis for ten more years by a new contract with the Gedeon Richter Company of Hungary, and the first winner with this new contract received the award in 2016.

Another important achievement has been the establishment of a steering committee, in concert with the International Federation of Clinical Chemistry, which oversees the development and promotion of NPU terminology for clinical chemistry and laboratory medicine. It has been adopted for use in the Scandinavian countries, Denmark, Sweden and Norway, and will be promoted for implementation in additional countries as the standard for medical laboratories.

In 1995, the first issue of the “Silver Book” was published. After 20 years, this Compendium of Terminology and Nomenclature of Properties in Clinical Laboratory Sciences was reissued as the second edition, and includes:

1. Updated recommendations and technical reports.
2. An enlargement of the subject field by several disciplines.
3. A development of concepts for properties that have no quantity dimensions.
4. Explain and illustrate the recommendations by examples.

In the area of chemical education, two successful short courses in medicinal chemistry were conducted in 2015, one in Brazil and one in India. Another weeklong course has concluded in February 2017 in Bangalore, India. A series of books on drug discovery has been published over the last ten years, and the fourth one, “Successful Drug Discovery” was published in 2015. The newest book, Successful Drug Discovery Vol. 2 was published in 2016. The series has provided such important reference textbooks for medicinal chemists that a continued series is envisioned.

A project on advances in immunochemistry led to a series of papers on the structural aspects and molecular recognition of the immune system, and the diagnostic and therapeutic applications of antibodies. These were published in single issue of PAC in late 2014.

A number of glossaries were completed during the last biennium. The “Glossary of terms used in Neurotoxicology” was published in PAC in 2015, and the Glossary of Terms used in Reproductive and Developmental Toxicology” has been completed and recently published in 2016. Similarly, the “Glossary of Terms used in Computational Drug Design” was finished and published in PAC in 2016.

One of the goals of the Division has been to partner with other IUPAC Divisions and outside organizations in order to share costs and maximize the importance of the outcomes achieved. This has largely been successful as demonstrated in the discussions of activities in the following sections of the report.

Another goal has been to make the outcomes more accessible to the scientific and lay public where appropriate, in order to show how IUPAC activities can affect human health in a general sense. The new IUPAC website should enable members to present such material with the proper controls. The need to make glossaries searchable on the Internet has been raised, and should elicit further discussion.

II.

Brand IUPAC in the Minds of Stakeholders

One of the major activities of the DDD subcommittee has been the sponsorship and implementation of the IUPAC-Richter Prize for excellence in medicinal chemistry. This \$10,000 award was funded by the Gedeon Richter company of Budapest for ten years, and five prize winners were selected over this period. The winners came from five different countries showing the diversity of medicinal chemistry. This award has led to an increased recognition of the role of IUPAC in pharmaceutical research and development.

The NPU subcommittee has been working closely with the International Federation of Clinical Chemistry (IFCC) to improve patient safety in medical settings through the harmonization of the terminology used in measuring properties and units in clinical laboratories. In 2014, a major step was achieved by establishing a steering committee with members from IUPAC, IFCC and the Danish National eHealth Authority. The purpose is to manage the governance, operation, development and promotion of the NPU terminology, and to broaden its usage throughout the world. IUPAC has been a major player in this effort. So far the NPU terminology has been adopted by Denmark, Sweden and Norway.

Emphasize Multidisciplinary Projects Addressing Critical Global Issues

The field of nanotechnology has grown exponentially over the last decade, and the TRA subcommittee has recognized the need to develop and produce documentation describing the use of nanomaterials in human health applications, such as drug delivery, imaging, food technology and cosmetics. This is a joint project with Division IV which is examining the preparative and analytical methods as well as the possible effects on occupational and environmental safety. The outcome will produce reports for the scientific community as well as the lay public.

Mexico has identified nanotechnology as a priority area for development in this country. As there are concerns about the safety of engineered nanomaterials and their potential risks to human health and the environment, a workshop will be held this year with opinion leaders from various countries including Mexico. The goals are to identify nanosafety concepts, the infrastructure needed to evaluate environmental hazards, and to foster a greater awareness of the best practices for the safe use of engineered nanomaterials.

An emerging problem is the increase in usage of novel psychoactive compounds in the illicit drug market. These compounds are chemically related to known drugs but are designed to be undetected by current analytical methods. A project in the DDD subcommittee is critically reviewing the current status, with the goal

of providing useful information to scientific, societal and governmental bodies dealing with the growing problem.

The DDD subcommittee has produced a number of widely used books describing the discovery of new drug molecules which have found their place in the armamentarium of agents used to treat human diseases. Many of the drugs described have been developed to resolve global health problems such as tuberculosis and hepatitis C. The chapters describe the details of the research involved in the development of these agents to help medicinal chemists throughout the world in their own research.

Support Chemistry Education, Particularly in Developing Countries

Two weeklong courses in medicinal chemistry were given by the DDD subcommittee in 2015, one in Brazil and one in India. Both courses were jointly sponsored and funded by the ACS Division of Medicinal Chemistry. The course in Brazil was conducted at the University of Rio de Janeiro as part of a summer school program for post graduate students with partial funding by the university. The course in India was conducted at Sri Ramachandra University in Chennai, with partial funding by the Indian local government. The success of these courses was demonstrated by requests to conduct similar courses in other locations. The latest course was given in February 2017 at the Biocon Academy in Bangalore, which is closer to industrial and academic organizations.

A number of glossaries were completed during this biennium. The Glossary of Terms used in Neurotoxicology was completed by the TRA subcommittee and published in PAC. It will also be published in the Journal of Neurotoxicology. A companion glossary of Terms Used in Reproductive and Developmental Toxicology was published in PAC at the end of 2016. A Glossary of Terms used in Computational Drug Design was been completed from the DDD subcommittee, and was published in PAC early in 2016.

III.

Continuing Activities

The IUPAC-Richter Prize has achieved worldwide recognition among medicinal chemists as a top award for meritorious advances in the discovery of new drugs for human diseases. A new contract with the Gedeon Richter Company has been agreed to, which will provide the funding for another ten years. The first prize winner in this new agreement was the chemist who is the inventor of sofosbuvir, the major component of the recently introduced treatment for hepatitis C. A total of 15 candidates were received, all of whom had exceptional qualifications for winning the prize. This was the best group of candidates since the prize was begun, and shows the growing significance of the award. The continuance of the award will enable four more winners to be selected over the next ten years.

Now that the NPU Steering Committee has been established, a major goal is to encourage the use of the NPU terminology in other countries beside those in Scandinavia. The newest project is to determine the feasibility of mapping and harmonizing the NPU Clinical Laboratory Sciences terminology with the SNOMED CT terminology used in many other parts of the world. The beginning of this effort is underway, but will require additional major funding to perform full-scale mapping. This support will need to come from IUPAC and IFCC as well as other sources. Partial funding is also being sought from the Swedish government.

The joint project between Division VII and Division IV, "Recent Advances in Nanoparticles and Colloidal Systems and their Impact on Human Health", has grown in significance, and two documents will be issued. One will be entitled "Nanomaterials and their impact on human health: preparation and analytical characterization." The second will be "Nanomaterials in body care and medical applications: their impact on human health." In addition to these documents which should be published in PAC this year, a specially written report for the general public will be submitted to science magazines and newspapers with science sections.

The success of the previous short courses in medicinal chemistry has provided impetus for continuing these courses in the future. The course material will also be expanded from the fundamentals of medicinal chemistry to include translational medicine and proof of concept studies in the clinic. With the emergence of biologics in the development of new drugs, this topic will be included in the new material. This again will be a joint course with the ACS Medicinal Chemistry Division, and partial funding will be sought from government sources, global pharmaceutical companies, and contract research organizations.

The book projects for Drug Discovery have produced five volumes in the series so far and a sixth one is currently in the preparation stage. With the success of these books as reference sources, the publisher has recommended a continuation of the series in the future. Plans are already being made for the next volume.

IV. Publications

Immunochemical Regulation and Applications. D. Templeton and M. Schwenk, PAC 2014; 86 1433-1434.

Structural Aspects of Molecular Recognition in the Immune System. Part I: Acquired Immunity. D. Templeton and K. Moehle, PAC 2014; 86 1435-1481.

Structural Aspects of Molecular Recognition in the Immune System. Part II: Pattern Recognition Receptors. J. Robinson and K. Moehle, PAC 2014; 86 1483-1538.

Immunodiagnostics and Immunosensor Design. V. Gubala, R. Klein, D. Templeton and M. Schwenk, PAC 2014; 86 1539-1571.

Applications of Immunochemistry in Human Health: Advances in Vaccinology and Antibody Design. R. Klein, D. Templeton and M. Schwenk, PAC 2014; 86 1573-1617.

The NPU Format for Clinical Laboratory Science Reports Regarding Properties, Units, and Symbols (IUPAC Technical Report). G. Ferard and R. Dybkaer, PAC 2014; 86 1923-1930.

Nanomaterials and Human Health: The Trends and Future Workshop. V. Gubala, University of Kent, September 15-16, 2014.

Glossary of Terms Used in Neurotoxicology. D. Templeton, M. Schwenk and J. Duffus, PAC 2015; 87 841-927.

Successful Drug Discovery. J. Fischer and D. Rotella, Wiley-VCH March 2015.

Highlights in Medicinal Chemistry. Short course conducted at the University of Rio de Janeiro, January 25-31, 2015.

Medicinal Chemistry II. Short course conducted at Sri Ramachandra University, February 8-12, 2015.

Glossary of Terms used in Computational Drug Design. Y.C. Martin, R. Abagyan, G.G. Ferenczy, V. Gillet, T.I. Oprea, J. Ulander, D. Winkler and N.S. Zefirov, PAC 2016; 88 239-264.

Glossary of Terms used in Developmental and Reproductive Toxicology. J.H. Duffus, M. Schwenk and D.M. Templeton, PAC 2016; 88 713-830.

Successful Drug Discovery Volume 2. J. Fischer and W.E. Childers, Wiley-VCH 2016

Compendium of Terminology and Nomenclature of Properties in Clinical Laboratory Sciences: Recommendations 2016. G. Ferard, R. Dybkaer and Xavier Fuentes-Arderiu, RSC 2016

T. J. Perun

President of the Division of Chemistry and Human Health, 2014-2017



INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

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May 17, 2017

Report to IUPAC Council on Division VIII Activities

It is my pleasure to be able to report that the Division of Chemical Nomenclature and Structure Representation is supporting numerous projects and activities in our area of responsibility – Chemical Nomenclature. It is one of the core IUPAC activities, and probably the one which is most frequently associated with IUPAC.

Details on active projects can be found on the IUPAC web pages. Unfortunately these pages are not as convenient to handle and not as clearly laid out as in former times. More importantly, they do not include nomenclature projects which have been assigned project numbers related to other Divisions. For a full list of projects related to Division VIII see Appendix 2 below. Members of Division VIII have also been involved in projects administered through the Inorganic Chemistry Division, Organic and Biomolecular Chemistry Division, and Polymer Division, as well as the IUBMB-IUPAC Joint Commission on Biochemical Nomenclature (JCBN). Such collaboration with other Divisions and also other organisations is essential and functionally important, because work on nomenclature must necessarily progress through interactions of nomenclature specialists with discipline specialists. So, currently four Division Committee members are also members of the Subcommittee on Polymer Terminology, two others are involved in projects administered through Division IV, and three Division Committee members (besides the JCBN Chairman who is an *ex officio* member of our Division Committee) are also Associate Members of JCBN. There is also cross-membership with Division III. Division VIII looks forward to further cross-fertilisation of ideas and activities through these interactions. Most recently an initiative has been started towards a closer collaboration with CPCDS because of the overlap of interests and responsibilities in the area of structure representation.

Key project work includes further development of the International Chemical Identifier (InChI) and Preferred IUPAC Names (PINs). The Division has also been developing closer contacts with organisations which are or will be users of chemical nomenclature. Links with the International Organisation for Standardisation (ISO) resulted in a challenging and yet promising project on developing nomenclature for carbon nanotubes and related nanomaterials. Preparations for another project with a similar collaboration on metal clusters are under way.

After the publication of the *Nomenclature of Organic Chemistry, IUPAC Recommendations and Preferred Names 2013* (the IUPAC Blue Book), a new project started at the beginning of this biennium to further develop the recommendations provided in this book.

A successful part of our work is dealing with the needs of the users. As an initiative for the International Year of Chemistry we started working on Brief Guides to several areas of Nomenclature. The first one on polymer nomenclature, run by the Subcommittee on Polymer Terminology and published some four years ago as a two-page document, already needs updating.

The Brief Guide to the Nomenclature of Inorganic Chemistry has four pages and was published in *Pure and Applied Chemistry* in October 2015. Its success can be judged from the fact that translations of this document into several languages have already been completed. Reprints and posters have also been prepared for distribution and presentation at relevant conferences or congresses. A similar four-page Brief Guide to the Nomenclature of Organic Chemistry will hopefully be completed soon. These Brief Guides should be thought of as quick references, and can easily be republished or included in Author Guidelines and textbooks.

Division Committee Membership 2016 – 2017

This biennium has again seen a significant changeover of membership – imposing consequences concerning continuity. Current membership as completed only in October 2016 is as follows.

President: Dr. Karl-Heinz Hellwich (will become Past President who acts as Vice President)

Vice President: Prof. Alan T. Hutton (will become President)

Secretary: Prof. Risto S. Laitinen (will continue as Secretary)

Titular Members: Prof. Osman Achmatowicz, Dr. Ture Damhus, Prof. Philip Hodge, Prof. Robin Macaluso, Prof. József Nagy, Dr. Michelle M. Rogers, Prof. Jiří Vohlídal.

Associate Members: Prof. Michael A. Beckett, Prof. Ivan L. Dukov, Dr. Gernot A. Eller, Dr. Elisabeth Mansfield, Ms. Molly A. Strausbaugh, Dr. Keith T. Taylor.

National Representatives: Dr. Fabio Aricò, Prof. Ana Maria da Costa Ferreira, Prof. Alain Fradet, Prof. Hyo Won Lee, Prof. Todd L. Lowary, Prof. Ebbe Nordlander, Prof. Martin Putala, Prof. Amélia Pilar Rauter, Jan Pieter van Lune, Andrey Yerin.

Ex officio: Dr. Gerard P. Moss, Prof. Richard M. Hartshorn.

It is obvious that in the area of nomenclature, perhaps more than in others, we need to work hard to identify colleagues with interest in the subject – and more so, to motivate and fill them with enthusiasm to spend their time and effort as volunteers into the goals of our Division and Union. We welcome any suggestions and constructive comments on this issue.

Projects in the final stages of preparation

There are several projects nearing completion. These are

- “Nomenclature of Flavonoids” which – after completion of public review and revision – now only needs a final proofread before it will be resubmitted for publication soon
- “Preferred names of constitutional units for use in structure-based names of polymers” after a final revision has been resubmitted for publication and accepted at the beginning of May 2017
- a document on nomenclature and terminology of dendrimers and hyperbranched polymers is currently under review by ICTNS and the public.
- a document on nomenclature of boron compounds has underwent Divisional review, but needs some alignment with other less advanced projects before approval for submission to ICTNS

Publications

For a list of publications related to Division VIII since the last General Assembly see Appendix 1 below.

Two of these are outstanding for completely different reasons. The Brief Guide to the Nomenclature of Inorganic Chemistry, a summary of the essence of the Red Book, has almost immediately after its publication been translated into several other languages. Reprints and Posters prepared from this document have found great interest at several conferences where it was presented.

The document on Source-based nomenclature for polymers, published only recently in *Pure Appl. Chem.* is the outcome of long-lasting discussions between members of the Subcommittee on Polymer Terminology (SPT) and Division VIII on the basic approach to the naming of polymers. It does not only codify the rules for source-based nomenclature in its entirety in a single document, but can also be considered as the first document on polymer nomenclature which is fully consistent with the nomenclature of organic chemistry. This goal was achieved by the introduction of a limited number of frequently encountered polymer names as “retained polymer names”.

Since the IUPAC journal *Pure and Applied Chemistry* has been contracted with the publishing house De Gruyter, we have unfortunately been experiencing several problems. They are not repeated here after these problems were raised with the De Gruyter representatives at the GA in Busan, and were also discussed there at the meeting of the PAC Editorial Advisory Board, and assurances were obtained that these problems were associated with the introduction of a new publishing platform and were not like to happen again. However, unfortunately, there have again been problems. Most of them are related to the review and revision process. Specifically in the second half of 2016 it repeatedly happened that authors of a document under review received a revision reminder although the deadline for the public review had not yet been reached. In one case, I myself as an invited reviewer could not upload the review, again before the deadline for the public review – with the explanation that the document was already being processed for publication!

Project Reviews and Funding Committed

There is only one project with Division VIII involvement approved so far in the 2016 – 2017 biennium:

2015-025-4-800 InChI extension for mixture composition.

In addition, another project proposal has been reviewed in 2016, but a revised version has not been received yet.

Further project proposals are in preparation or under consideration. The Division has also been developing closer contacts with organisations that are, or will be, users of nomenclature. This includes project work with the International Union of Biochemistry and Molecular Biology (IUBMB) under the auspices of the Joint Commission on Biochemical Nomenclature (JCBN) and with ISO. Most recently contacts have been made with CCDC.

Subcommittee on the IUPAC International Chemical Identifier

The Division continues to support the development of the International Chemical Identifier (InChI). The Subcommittee on the IUPAC International Chemical Identifier is the body responsible for the scientific activities supported by the InChI Trust. It reports to Division VIII and to the Committee on Publications and Cheminformatics Data Standards (CPCDS, formerly CPEP). One new project has recently been funded (see 2015-025-4-800 above).

Advisory Subcommittee

As in past years, I report that Division VIII also operates an Advisory Subcommittee which we – I now have to say – used in the past as a way of communicating with our community of interest, in particular in relation to review of nomenclature proposals.

However, since we are still facing technical problems with the Discussion Board – a means of communication and file exchange between Division Committee members and also with the Advisory Subcommittee members, these contacts have to be renewed. We hope that these communication tools will be updated in the near future in order to facilitate our work.

International Organisation for Standardisation (ISO) Liaison

We have had a liaison with the International Organisation for Standardisation (ISO) for the past couple of years. This resulted as yet in one new project (2013-056-1-800) aiming at developing nomenclature for carbon nanotubes and related nanomaterials. The project task group is composed of experts in the area selected by the ISO Technical Committee (TC 229) working in this area and nomenclature experts from Division VIII. It is anticipated that another project will be initiated on the development of nomenclature for metal clusters.

Budget Report

During the first half of the biennium only ca. 30 % of the biennial budget (USD 70,400) has been spent or committed to a project.

According to IUPAC guidelines approximately 70 % (USD 49,280) of the Division budget should be committed to support project work, and the remaining 30 % (USD 21,120) allocated to operational expenditure. As in past biennia in Division VIII we expect to exceed the operational expenditure target, because operational expenditure has been and will be used to support liaison activities (e.g. with the InChI Trust, ISO, ACS), which may lead to further future projects. There are also on-going commitments to support IUPAC involvement in the long-standing IUBMB-IUPAC Joint Commission on Biochemical Nomenclature (JCBN).

Key Projects for 2016 – 2017

Providing a standardised naming of chemical compounds for international communications on chemistry was the origin of IUPAC. In more recent times, the recognition that ever increasing interdisciplinarity, resulting in the boundaries between the disciplines becoming more and more blurred, led to the creation of Division VIII in 2002. The aim was to concentrate the nomenclature activities and to unify the recommendations so as to allow IUPAC to speak with one voice. These activities of our Division will be intensified as they are clearly covered by the Mission Statement in the new strategic plan ("The International Union of Pure and Applied Chemistry is the global organization that provides objective scientific expertise and develops the essential tools for the application and communication of chemical knowledge for the benefit of humankind and the world."). In general, the importance of nomenclature should be more strongly emphasised in IUPAC publications.

Similarly, it was noticed quite a while ago – already during the General Assembly in San Juan 2011 – that also in the area of terminology IUPAC should go a step forward in unifying definitions of terms beyond the restricted areas of disciplines.

Initiatives towards the goal of unified nomenclature recommendations, as already exemplified with projects mentioned above, will be intensified. One example is the new project on "Corrections, Revisions and Extension" for the new Blue Book. Unfortunately, since its publication over two

years ago quite a number of errors and inconsistencies have been detected in the more than 1600 pages of this book. The list of errata which has been prepared, and still is being amended on a regular basis, is publicly available on the IUPAC nomenclature homepage run by Gerry Moss and hosted at the University of London (<http://www.chem.qmul.ac.uk/iupac/bibliog/BBerrors.html>). In the meantime it has grown to contain more than 1500 entries. In addition to errors and inconsistencies which can be handled as errata, the task group has more and more identified sections which require further study, potentially leading to revision or addition of sections. The aim is not only to produce a corrected PDF of the Blue Book but eventually also to prepare a revised printed edition. This revision will include sections which were omitted in the 2013 edition, and revisions of sections which either are not consistent with other sections within the book or may be made more user-friendly if revised. Such revisions could be simplifications, or the removal of alternatives, or better alignments with other IUPAC recommendations such as the Red Book, the Purple Book and Biochemical Nomenclature.

This project will hopefully in the near future be supplemented by an interdivisional project on a revision and extension of one of the most frequently downloaded PAC documents: the "Glossary of class names of organic compounds and reactive intermediates based on structure" [*Pure Appl. Chem.* **67**, 1307 – 1375 (1995)].

In addition to work on projects, measures need to be established in order to ensure that similar embarrassing situations as those described for the Blue Book (but also with a few other recent IUPAC Publications in *Pure Appl. Chem.*) will not happen again in future projects. This will include collaboration with the Interdivisional Committee of Terminology, Nomenclature and Symbols (ICTNS) and the other Divisions, but will also have to include De Gruyter. A part of this initiative will comprise the review and potential revision of review procedures and also the removal of pressure by strict deadlines from the many volunteers – in particular pressure by publishers.

Beyond the classical methods of nomenclature a few areas have already been identified in which we need to think and develop concepts for the rational and unambiguous description of structures with ever increasing sizes which are accessible by new developments of synthetic procedures and required by advances in analytical methods characterising for example supramolecular structures.

As briefly mentioned above, we are reaching out to our users. This includes contacts with other organisations – and has already led to the above mentioned joint project with ISO. Contacts have also been made with the Cambridge Crystallographic Data Centre (CCDC) during our last Division Committee meeting, and are being sought to the European Patent Office. Joint workshops on nomenclature are being considered together with the ACS and the RSC. In addition, Division Committee members are actively presenting IUPAC documents in the form of posters or reprints of the Brief Guides at relevant conferences or congresses.



(Karl-Heinz Hellwich)

President

IUPAC Division of Chemical Nomenclature and Structure Representation

Appendix 1: Publications Related to Division VIII since last GA

a) Recommendations

R. M. Hartshorn, K.-H. Hellwich, A. Yerin, T. Damhus, A. T. Hutton, Brief Guide to the Nomenclature of Inorganic Chemistry, *Pure Appl. Chem.* **87**(9 – 10), 1039 – 1049 (2015); reprinted as a four-page tear-off document in the centre of *Chem. Int.* **37**(5 – 6) (2015).

W. H. Koppenol, J. Corish, J. García-Martínez, J. Meija, J. Reedijk, How to name new chemical elements (IUPAC Recommendations 2016), *Pure Appl. Chem.* **88**(4), 401 – 405 (2016)

Source-based nomenclature for single-strand homopolymers and copolymers (IUPAC Recommendations 2016), *Pure Appl. Chem.* **88**(10 – 11), 1073 – 1100 (2016)

Names and symbols of the elements with atomic numbers 113, 115, 117 and 118 (IUPAC Recommendations 2016), *Pure Appl. Chem.* **88**(12), 1225 – 1229 (2016)

How to name atoms in phosphates, polyphosphates, their derivatives and mimics, and transition state analogues for enzyme-catalysed phosphoryl transfer reactions (IUPAC Recommendations 2016), *Pure Appl. Chem.* **89**(5), 653 – 675 (2017)

b) Other publications

Lars Öhrstöm, Norman E. Holden, The Three-letter Element Symbols: Meddling Manner or Diplomatic Defusing? *Chem. Int.* **38**(2), 4 – 8 (2016)

John Corish, Procedures for the Naming of a New Element, *Chem. Int.* **38**(2), 9 – 11 (2016)

Bonnie Lawlor, The Chemical Structure Association Trust – Advancing Scientific Discovery for Fifty Years, *Chem. Int.* **38**(2), 12 – 15 (2016)

Discovery and Assignment of Elements with Atomic Numbers 113, 115, 117 and 118, *Chem. Int.* **38**(2), 16 – 17 (2016)

Henry S. Rzepa, Andrew Mclean, Matthew J. Harvey, InChI As a Research Data Management Tool, *Chem. Int.* **38**(3 – 4), 24 – 26 (2016)

Doug Templeton, The Use of IUPAC Names in Glossaries, *Chem. Int.* **38**(3 – 4), 34 – 39 (2016)

Jose Elguero, Is it possible to extend the Cahn-Ingold-Prelog priority rules to supramolecular structures and coordination compounds using lone pairs? *Chem. Int.* **38**(6), 30 – 31 (2016)

Appendix 2: Currently active Division VIII projects

Number	Chair	Short Title	Comments
2001-081-1-800 (Kahovec) Fradet		Nomenclature for Dendrimers	ICTNS Review till May 31
2003-045-3-800 Town		Graphic Representation Standards	see 2012-033-1-800 below
2004-024-1-800 Moss		JCBN Cyclic Peptides	Revive
2006-019-1-800 (Dixon †) Moss		JCBN Phosphorus Compounds	Revive
2006-038-1-800 (Hartshorn) Damhus		Inorganic PINs/Kappa Convention	
2009-018-2-800 Rauter		JCBN Flavonoids Nomenclature	Resubmit by 5 July 2017
2009-022-2-800 (Cammack/Ennis)		JCBN biologically important Small Molecules	Transfer to new Chair
2009-040-2-800 Batchelor		InChI Organometallic Compounds	
2009-041-1-800 Goncharoff		InChI Markush Structures	no feedback
2009-042-1-800 Yerin		InChI Polymers	
2009-043-2-800 Grethe		InChI Reactions	
2010-055-1-800 Hartshorn		Inorganic and Organic Brief Guides	Part 1 completed
2011-035-1-800 Jones		Inorganic Polymers (TINCOPS)	
2011-044-1-300 Brimble		Abbreviations for Protecting Groups	Completed, Errata needed
2012-023-2-800 Nicklaus		InChI Tautomerism	
2012-033-1-800 Town		Graphic Representation of Reactions	Extension needed
2012-037-1-800 Yerin		Hydrogenation (Hydro Prefixes/Indicated H)	
2012-039-2-800 Vliegenthart		JCBN Carbohydrate Nomenclature	Extended, see below
2012-045-1-800 Beckett		Boron Nomenclature	Divisional review
2012-046-2-800 (Rey)		InChI Inorganic	Transfer to new Chair
2013-010-1-800 Taylor		InChI Biomolecules	
2013-030-1-800 Hutton		Metallacycles	
2013-031-3-800 Chen		Star Polymers	Divisional review
2013-039-2-300 Blackburn		Phosphoryl Transition States	Published
2013-056-1-800 Mansfield		Carbon Nanotubes	
2014-001-2-200 Öhrström		Topology of Metal-Organic Frameworks	
2014-003-2-800 Dijkstra		Hyphenation of Chemical Names	
2014-034-2-400 Vert		Polymeric Carriers	
2015-003-2-300 Reaney		Homodetic Cyclic Peptides	
2015-019-2-800 Hartshorn		InChI QR-Code Extension	
2015-025-4-800 McEwen		InChI Mixtures	
2015-035-2-800 Vliegenthart		JCBN Carbohydrates [Project extension]	
2015-052-1-800 Hellwich		Blue Book Extension and Revision	
2015-053-1-200 Macaluso		Solid State Terminology	
2006-004-1-400 He		Abbreviations for Polymer Names	Completed, Errata needed
2008-015-1-400 Mormann		Preferred Names for Polymers	Accepted for publication
2008-020-1-400 Hodge		Web Guide to Polymer Naming	prepare final draft
2009-047-1-400 Hellwich		Stereo Poly	draft ms.
2014-033-1-400 Vert		Lactic Acid [Project extension]	

49th IUPAC Council Meeting
São Paulo, Brazil 12-13 July 2017

Election of Officers and Bureau Members

According to IUPAC statutes, Council must elect officers of the Union and elected members of the Bureau. Nominations for the various positions that fall vacant at the end of 2017 had to be received by the Secretary General at the IUPAC Secretariat before 30 March 2017.

Professor Qi-Feng Zhou (China/Beijing), Vice President and President-Elect will be president on 1 January 2018. The Vice President to be elected will be President-Elect on 1 January 2018 and will become President on 1 January 2020. The retiring President, Professor Natalia Tarasova (Russia), will remain an officer and a member of the Bureau for a period of two years as Past President. Secretary General, Professor Richard Hartshorn (New Zealand) will continue his first term of four years (2016-2019). Treasurer, Mr. Colin Humphris (UK) will continue his first term of four years (2016-2019).

The nominations received for **Vice President** are as follows:

- Christopher M.A. Brett (Portugal)
- Javier García Martínez (Spain)

Elected Members of the Bureau, retiring in 2017, who are eligible for re-election for an additional four-year term:

- Russell Boyd (Canada)
- Tavarakere Chandrashekar (India)
- Christopher Ober (USA)
- Kaoru Yamanuchi (Japan)

Elected Members of Bureau, who were elected at the 48th Council until 2019:

- Hemda Garelick (UK)
- Ehud Keinan (Israel)
- Kew-Ho Lee (Korea)
- Pietro Tundo (Italy)
- Christopher M.A. Brett (Portugal)
- Mei-Hung Chiu (China/Taipei)

At least four Elected Members of the Bureau must be elected at the 49th Council in Sao Paulo, i.e., the minimum number of ten Elected Members (Statute 7.2) less the six Elected Members who continue in office until 2019.

The nominations received for **Elected Members of the Bureau** are as follows:

- Russell J. Boyd (Canada)
- Christopher M. A. Brett (Portugal)
- Mary Garson (Australia)
- Javier García-Martínez (Spain)
- Chris Ober (USA)
- Ken Sakai (Japan)



INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

Membership - Division (I)
Physical and Biophysical Chemistry
2018 - 2019

Name	Status	Term	NAO
tbd	TM-President	2018-2019	
Prof. Angela Wilson	TM-Past President	2018-2019	USA
tbd	TM-Vice President	2018-2019	
tbd	TM-Secretary	2018-2019	
Prof. Frances Separovic	TM	2018-2019	Australia
Prof. Attila G. Császár	TM	2016-2019	Hungary
Dr. Pierangelo Metrangolo	TM	2016-2019	Italy
Prof. Hiroko Tokoro	TM	2018-2019	Japan
Prof. Dr. Bert Weckhuysen	TM	2016-2019	Netherlands
Prof. Jeremy Frey	TM	2018-2019	United Kingdom
Dr. Timothy Wallington	TM	2016-2019	USA
Prof. Roberto Marquardt	TM	2018-2019	France
Prof. Ron Weir	TM	2018-2019	Canada
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	

COMMISSION I.1

	TM-Chair	2018-2019	
	TM-Secretary	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	<i>exOfficio-DPI</i>	2018-2019	
	10 TMs, 6 AMs, 8 NRs		



INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

Membership - Division (II)

Inorganic Chemistry

2018 - 2019

Name	Status	Term	NAO
Prof. Lars R. Ohrström	TM-President	2018-2019	Sweden
Prof. Jan Reedijk	TM-Past President	2018-2019	Netherlands
Dr. Javier Garcia Martinez	TM-Vice President	2018-2019	Spain
Prof. Markku Leskelä	TM-Secretary	2012-2019	Finland
Prof. Xiangkun Zhu	TM	2018-2019	China
Prof. Lidia Armelao	TM	2016-2019	Italy
Dr. Miki Hasegawa	TM	2018-2019	Japan
Prof. Pavel Karen	TM	2016-2019	Norway
Prof. Milan Drabik	TM	2018-2019	Slovakia
Prof. Robin Macaluso	TM	2018-2019	USA
Prof. Daniel Rabinovich	AM	2018-2019	USA
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	<i>exOfficio</i>	2018-2019	
	10 TMs, 6 AMs, 10 NRs		



INTERNATIONAL UNION OF
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Membership - Division (III)
Organic and Biomolecular Chemistry
2018 - 2019

Name	Status	Term	NAO
Prof. Francesco Nicotra	TM-President	2018-2019	Italy
Prof. Margaret A. Brimble	TM-Past President	2018-2019	New Zealand
Prof. Nikolay Nifantiev	TM-Vice President	2018-2019	Russia
Prof. Amelia Rauter	TM-Secretary	2016-2019	Portugal
Prof. Zhen Xi	TM	2016-2019	China
Prof. Andreas Marx	TM	2018-2019	Germany
Prof. Ganesh Pandey	TM	2016-2019	India
Prof. Pher Andersson	TM	2016-2019	Sweden
Dr. Janet Scott	TM	2016-2019	UK
Prof. Jon Clardy	TM	2016-2019	USA
Prof. Jason Brian Harper	AM	2018-2019	Australia
Prof. Vanderlan Bolzani	AM	2016-2019	Brazil
Prof. Fengwu Bai	AM	2018-2019	China
Prof. Thomas Carell	AM	2016-2019	Germany
Prof. Injae Shin	AM	2018-2019	Korea
Prof. Lilliana Mammino	AM	2018-2019	South Africa
		2018-2019	
Prof. Wahab Khan	NR	2018-2019	Bangladesh
Prof. John Honek	NR	2018-2019	Canada
Prof. Shang-Cheng Hung	NR	2018-2019	China-Taipei
Prof. Mohammed Hegazy	NR	2018-2019	Egypt
Prof. Makoto Yamashita	NR	2018-2019	Japan
Prof. Dr. Koop Lammertsma	NR	2016-2019	Netherlands
Prof. Einar Uggerud	NR	2018-2019	Norway
Prof. Slavomir Jarosz	NR	2018-2019	Poland
Prof. Pryani Paranagama	NR	2018-2019	Sri Lanka
Prof. Hamdullah Kilic	NR	2018-2019	Turkey
	<i>exOfficio</i>	2018-2019	
	10 TMs, 6 AMs, 10 NRs		



INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

Membership - Division (IV)

Polymer

2018 - 2019

Name	Status	Term	NAO
Prof. Gregory Russell	TM-President	2016-2019	New Zealand
Prof. Christine Luscombe	TM-Vice President	2016-2019	USA
Prof. Michael Walter	TM-Secretary	2016-2019	USA
Dr. Chris Fellows	TM	2018-2019	Australia
Dr. Robin Hutchinson	TM	2018-2019	Canada
Prof. Roger Hiorns	TM	2018-2019	France
Dr. Igor Lacik	TM	2016-2019	Slovakia
Prof. Yusuf Yagci	TM	2016-2019	Turkey
Dr. Paul Topham	TM	2018-2019	United Kingdom
Dr. Natalie Stingelin	TM	2016-2019	United Kingdom
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	<i>exOfficio</i>	2018-2019	
	10 TMs, 6 AMs, 10 NRs		



INTERNATIONAL UNION OF
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Membership - Division (V) *Analytical Chemistry* 2018 - 2019

Name	Status	Term	NAO
Dr. Zoltan Mester	TM-President	2018-2019	Canada
Prof. Jan Labuda	TM-Past President	2018-2019	Slovakia
Prof. Erico M.M. Flores	TM-Vice President	2018-2019	Brazil
Prof. Takae Takeuchi	TM-Secretary	2018-2019	Japan
Dr. Yu Xia	TM	2018-2019	China
Prof. Medhat A. Al-Ghobashy	TM	2018-2019	Egypt
Prof. Attilia Felinger	TM	2018-2019	Hungary
Dr. Sandra Rondinini	TM	2016-2019	Italy
Dr. Irene Rodriguez Meizoso	TM	2018-2019	Sweden
Dr. Derek Craston	TM	2016-2019	UK
Dr. David Shaw	TM	2016-2019	USA
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	<i>exOfficio</i>	2018-2019	
	10 TMs, 6 AMs, 9 NRs		



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Membership - Division (VI) *Chemistry and the Environment* 2018 - 2019

Name	Status	Term	NAO
Dr. Rai Kookana	TM-President	2018-2019	Australia
Dr. Petr Fedotov	TM-Past President	2018-2017	Russia
Prof. Hemda Garelick	TM-Vice President	2018-2019	UK
Dr. Roberto Terzano	TM-Secretary	2018-2019	Italy
Prof. Annemieke Farenhorst	TM	2018-2019	Canada
Prof. Dr. Nadia Kandile	TM	2018-2019	Egypt
Prof. Fani L. Sakellariadou	TM	2018-2019	Greece
Prof. Doo Soo Chung	TM	2018-2019	Korea
Prof. Irina Perminova	TM	2016-2019	Russia
Dr. Laura McConnell	TM	2018-2019	USA
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	<i>exOfficio</i>	2018-2019	
	10 TMs, 6 AMs, 10 NRs		



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Membership - Division (VII)
Chemistry and Human Health
2018 - 2019

Name	Status	Term	NAO
Dr. Rita Cornelis	TM-President	2018-2019	Belgium
Dr. Thomas Perun	TM-Past President	2018-2019	USA
Dr. Helle Møller Johannessen	TM-Vice President	2018-2019	Denmark
Prof. Vladimir Gubala	TM-Secretary	2018-2019	UK
Prof. Adriano Andricopulo	TM	2018-2019	Brazil
Dr. Gerd Schnorrenberg	TM	2018-2019	Germany
Prof. Dr. Michael Schwenk	TM	2018-2019	Germany
Prof. Geok Bee (Sharon) Teh	TM	2018-2019	Malaysia
Prof. A. Ganesan	TM	2016-2019	UK
Dr. Vincenzo Abbate	TM	2016-2019	UK
Dr. Linda Johnston	AM	2018-2019	Canada
Dr. Janos Fischer	AM	2018-2019	Hungary
Prof. Urban Forsum	AM	2016-2019	Sweden
Dr. Balu Balasubramanian	AM	2016-2019	USA
Dr. Brandon C. Presley	AM	2018-2019	USA
Prof. Xiaohong Fang	NR	2018-2019	China
Dr. Hassan Ibrahim	NR	2018-2019	Egypt
Dr. Ling Peng	NR	2018-2019	France
Prof. Chulbom Lee	NR	2016-2019	Korea
Prof. Roland Pieters	NR	2018-2019	Netherlands
Prof. Bengt-Erik Haug	NR	2016-2019	Norway
Prof. Néstor Carballeira	NR	2016-2019	Puerto Rico
Prof. Paula Gomes	NR	2018-2019	Portugal
Prof. Sagarika Ekanayaka	NR	2018-2019	Sri Lanka
Prof. Hsing-Pang Hsieh	NR	2018-2019	Taiwan
	<i>exOfficio</i>		
	10 TMs, 5 AMs, 10 NRs		



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Membership - Division (VIII)
Chemical Nomenclature and Structure Representation
2018 - 2019

Name	Status	Term	NAO
Prof. Alan Hutton	TM- President	2018-2019	South Africa
Dr. Karl-Heinz Hellwich	TM-Past President	2018-2019	Germany
Prof. Risto Laitinen	TM-Secretary	2016-2019	Finland
Dr. Ture Damhus	TM	2016-2019	Denmark
Prof. Amélia Rauter	TM	2018-2019	Portugal
Prof. Ebbe Nordlander	TM	2018-2019	Sweden
Prof. Edwin Constable	TM	2018-2019	Switzerland
Prof. Mike Beckett	TM	2018-2019	United Kingdom
Dr. Michelle Rogers	TM	2016-2019	USA
Prof. Robin Macaluso	TM	2016-2019	USA
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
Prof. Richard Hartshorn	<i>exOfficio</i>	2016-2019	New Zealand
	<i>exOfficio</i> - JCBN	2018-2019	
	10 TMs, 6 AMs, 10 NRs		



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Membership – Standing Committee
Committee on Publications and
Cheminformatics Data Standards (CPCDS),
2018 – 2019

Name	Status	Term	NAO
Ms. Bonnie Lawlor	STC-Chair	2014-2019	USA
Dr. James Liu	STC-Secretary	2014-2019	USA
Dr. Bono Lučić	TM	2016-2019	Croatia
Prof. Dr. Wolfram Koch	TM	2014-2019	Germany
Mr. Kazuhiro Hayashi	TM	2016-2019	Japan
Dr. Lene Hviid	TM	2016-2019	Netherlands
Prof. Jeremy Frey	TM	2014-2019	UK
Ms. Carmen Nitsche	TM	2016-2019	USA
Ms. Leah McEwen	TM	2014-2019	USA
Dr. Stuart Chalk	TM	2018-2019	USA
Dr. Margherita Gavagnin	AM	2018-2019	Italy
Dr. Ethel Ríos-Orlandi	AM	2016-2019	Puerto Rico
Dr. Mark Kinnan	AM	2014-2019	USA
Prof. Hugh Burrows	<i>exOfficio - PAC</i>	2016-2019	Portugal
	<i>10 TMs, 3 AMs</i>		



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Membership – Standing Committee
Chemical Research Applied to World Needs (CHEMRAWN)
2018 – 2019

Name	Status	Term	NAO
Dr. Carlos Tollinche	STC-Chair	2016-2019	Puerto Rico
Dr. Gary W. vanLoon	STC-Secretary	2018-2019	Canada
Prof. Leiv K. Sydnes	TM	2018-2019	Norway
Dr. Oleg M. Demchuk	TM	2018-2019	Poland
Dr. Ekaterina S. Lokteva	TM	2018-2019	Russia
Dr. Venceslav Kaucic	TM	2018-2019	Slovenia
Prof. Zafra Lerman	TM	2018-2019	USA
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	AM	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	7 TMs, 6 AMs, 9 NRs		



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Membership – Standing Committee
Committee on Chemistry and Industry (COCI)
2018 – 2019

Name	Status	Term	NAO
Dr. Carolyn Ribes	STC-Chair	2018-2019	Netherlands
Prof. Anthony Brian Hanley	STC-Secretary	2018-2019	UK
Dr. Paul Baekelmans	TM	2016-2019	Belgium
Dr. Robert Audette	TM	2018-2019	Canada
Dr. Zaiku Xie	TM	2016-2019	China/Beijing
Dr. Daniel Bernard	TM	2016-2019	France
Dr. Bipulbehari Saha	TM	2018-2019	India
Dr. Kazuhiko Ishikiriyama	TM	2016-2019	Japan
Dr. Anna Makarova	TM	2018-2019	Russia
Dr. Sherif Abdeldaiem	AM	2018-2019	Egypt
Prof. Dr. Klaus Griesar	AM	2018-2019	Germany
Dr. Chang-Hyun Choi	AM	2016-2019	Korea
Dr. Lene Hviid	AM	2016-2019	Netherlands
Dr. Michelle M. Rogers	AM	2018-2019	USA
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	Div I	2018-2019	
	Div II	2018-2019	
	Div III	2018-2019	
	Div IV	2018-2019	
	Div V	2018-2019	
	Div VI	2018-2019	
	Div VII	2018-2019	
	Div VIII	2018-2019	
	<i>exOfficio-CCE</i>	2018-2019	
	<i>exOfficio-ChemRawn</i>	2018-2019	
	9 TMs, 5 AMs, 4 NRs, 8 DRs, 2 ExOfficios		



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Membership – Standing Committee
Committee on Chemistry Education (CCE)
2018 – 2019

Name	Status	Term	NAO
Prof. Jan Apotheker	STC-Chair	2018-2019	Netherlands
Dr. Suzanne Boniface	STC-Secretary	2018-2019	New Zealand
Dr. Rachel Mamlok-Naaman	TM	2016-2019	Israel
Prof. Masahiro Kamato	TM	2016-2019	Japan
Dr. Ting Kueh Soon	TM	2018-2019	Malaysia
Prof. Mariejje Potgieter	TM	2018-2019	South Africa
Prof. Felix Ho	TM	2018-2019	Sweden
Prof. Marcy Towns	TM	2016-2019	USA
	AM - I	2018-2019	
	AM - II	2018-2019	
	AM - III	2018-2019	
	AM - IV	2018-2019	
	AM - V	2018-2019	
	AM - VI	2018-2019	
	AM - VII	2018-2019	
	AM - VIII	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	NR	2018-2019	
	<i>exOfficio</i> -COCI	2018-2019	
	<i>exOfficio</i> - OPCW	2018-2019	
	<i>exOfficio</i> -EuChemS	2018-2019	
	<i>exOfficio</i> -ARICE	2018-2019	
	8 TMs, 8 AMs, 10 NRs		



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Membership – Standing Committee
Interdivisional Committee on Nomenclature,
Terminology and Symbols (ICTNS)
2018 - 2019

Name	Status	Term	NAO
Prof. Juergen Stohner	TM-Chair	2018-2019	Switzerland
Prof. Brynn Hibbert	TM-Secretary	2018-2019	Australia
Dr. Juris Meija	TM	2012-2019	Canada
Dr. Milan Drabik	TM	2014-2019	Slovakia
Dr. Jan Kaiser	TM	2012-2019	UK
Dr. Rita Cornelis	AM	2014-2019	Belgium
Dr. Amelia Rauter	AM	2018-2019	Portugal
Dr. Marcy Towns	AM	2018-2019	USA
	Div I	2018-2019	
	Div II	2018-2019	
	Div III	2018-2019	
	Div IV	2018-2019	
	Div V	2018-2019	
	Div VI	2018-2019	
	Div VII	2018-2019	
	Div VIII	2018-2019	
	International Organizations		Name of International Organizations
Dr. Robert Wielgosz	OF - BIPM	2016-2019	Bureau International des Poids et Mesures
Dr. Jenny Pellaux Dr. Marie-Noelle Bourquin	OF - ISO	2016-2019	International Organization for Standardization
Dr. Gerard P. Moss	OF - IUBMB	2016-2019	International Union of Biochemistry and Molecular Biology
Prof. Carol Brock	OF - IUCr	2016-2019	International Union of Crystallography
Dr. V Prakash	OF - IUNS	2016-2019	International Union of Nutritional Sciences
Dr. Michael Spedding Dr. Chris Southan	OF - IUPhar	2016-2019	International Union of Pharmacology
	OF - IUPAP	2018-2019	International Union of Pure and Applied Physics
	5 TMs, 3 AMs, 7 OFs, 8 DRs		



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Advancing Chemistry Worldwide

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Prof. Natalia P. Tarasova (Russia)

Vice President
Prof. Qi-Feng Zhou (China)

Secretary General
Prof. Richard Hartshorn (New Zealand)

Past President
Dr. Mark C. Cesa (USA)

Treasurer
Mr. Colin J. Humphris (UK)

Executive Director
Dr. Lynn M. Soby (USA)

13 April 2017

To: World Chemistry Congress and General Assembly 2021 and 2023 Bidding Organizations

We are very fortunate to have received a large number of bids for the World Chemistry Congresses to be held in 2021 and 2023. The decision on the location of the Congresses will be made at the meeting of the IUPAC Council which will be held at the General Assembly in São Paulo.

It is normal for those making such bids to make a presentation to the Council in addition to supplying full documentation of their bid. This allows amplification of the bid and provides an opportunity for members of Council to ask questions about the respective bids. The large number of bids will, however, place significant pressure on the time available for the business of the meeting. Each bid will therefore have a time limit of five minutes for their presentation, which will be strictly enforced. There will be up to a further five minutes available to each bid for questions from members of the Council.

According to By-Law 2.2.3 of the Union the decision on such non-scientific matters will be reached on a vote by delegations (using their allocated number of votes), where a simple majority vote is required.

The vote for 2021 will be taken first and will follow the pattern of the elections used for Officers of the Union (By-Law 2.2.2.2). If no bid receives a majority on the first ballot, the bid receiving the fewest number of votes will be eliminated and another ballot will be conducted. This will continue until a bid receives a majority of the votes cast. The decision for 2023 will be made in a similar way.

Sincerely,

Prof. Richard Hartshorn, Secretary General IUPAC

Cc IUPAC Bureau, National Adhering Organizations



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Committee on Publications and Cheminformatics Data Standards (CPCDS)

Report to Council, July 2017

Bonnie Lawlor, Committee Chair

I. Executive Summary

For the 2016 - 2017 and 2018 - 2019 bienniums, the IUPAC Committee on Publications and Cheminformatics Data Standards (CPCDS) has and will continue to focus on activities that are in alignment with the CPCDS Terms of Reference and the IUPAC Strategic Plan. These include initiatives regarding IUPAC publications, databases, software and computer system development, and the promotion of standards for the storage, management, and sharing of digital information. Highlights include:

Publications: CPCDS is working with the Editorial Boards of both *Chemistry International (CI)* and *Pure and Applied Chemistry (PAC)* to strengthen the content pipelines of both publications and to minimize production issues through meetings with IUPAC's publishing partner, De Gruyter. CPCDS is working with the *CI* Editorial Board on a new initiative, *CI Digital First*, a digital version of *CI* that is being developed for the IUPAC website.

Databases: The IUPAC Standards Online Database has been updated and was launched in June 2017 with new features and functionalities. Future enhancements are being considered for 2018.

Software/Computer Systems: CPCDS is working with the IUPAC Secretariat in identification of specifications for Phase II of the IUPAC website. A separate, but related initiative was the development of an authentication process for the IUPAC website that was put in place earlier this year. This allows seamless access from the IUPAC website to the De Gruyter website so that those who have the right to access IUPAC publications on the De Gruyter site can now do so easily.

CPCDS launched a project to stabilize and re-develop the current *Gold Book* website that will facilitate ease of updating by the responsible IUPAC bodies. The project is scheduled for completion at the end of 2017 and a beta site will be available for review during the General Assembly.

CPCDS is also looking into the feasibility of IUPAC, either alone or in partnership with others, creating a repository for NMR Spectra data along with workflow services that will facilitate the inclusion of such data in scientific publications.

Standards: CPCDS established the Subcommittee on Cheminformatics Data Standards in 2016. Their goal is to identify the cheminformatics data standards needs of the chemical community with the objective of prioritizing and efficiently meeting those needs through the collaborative efforts of relevant IUPAC Divisions, IUPAC Committees, and external scientific organizations, such as NIST, CODATA,



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and the Research Data Alliance (RDA). The work of the Subcommittee on Electronic Data Standards, including oversight of the JCAMP-DX and ThermoML data standards, is now under their purview. Quarterly reports will be circulated to all IUPAC Divisions and Committees and all IUPAC bodies have been invited to appoint a liaison to the subcommittee if interested.

Details on the above highlights can be found on the following pages. Committee, Subcommittee, and Task Force members are listed beginning on page 9 at the end of this report. They all deserve much thanks for the work that they have done over the past two years and for the significant amount of work that is required in the foreseeable future.

II. Plans and priorities for the remainder of 2016 - 2017 and beyond

Publications

CPCDS is working with the *CI* Editorial Board on the implementation of the CPCDS recommendations for the future of *Chemistry International (CI)*. During 2016 the transition of *CI* to four print issues per year was begun, with the official launch being in January 2017. In parallel, specifications were developed for *CI Digital First* - a more frequent, dynamic digital version of *Chemistry International* that will be accessible via the new IUPAC web site and that will offer new content between print editions. Initial meetings have been held with the IUPAC web developers and a proposal has been submitted to the Secretariat. A launch date has not been set, but hopefully the project will be completed this year or early in 2018. We will then focus on how it can be optimally utilized and what content and software enhancements should be considered moving forward.

CPCDS will continue to provide support to the Editors and the Editorial Boards of both *Chemistry International (CI)* and *Pure and Applied Chemistry (PAC)*. A key objective for the remainder of this biennium is to strengthen the content pipelines of both publications in order to avoid the necessity for combining issues, and to work with IUPAC's publishing partner, De Gruyter, to identify how the software used for *PAC* manuscript submission and production can be made more efficient. This support includes, at minimum, meetings with De Gruyter staff on a monthly basis for production issues and on a quarterly basis for business reviews, in addition to joint *CI/PAC* reviews on a quarterly basis with the journal Editors and the Chairs of the Editorial Advisory Boards of both publications.

Databases

CPCDS has already identified enhancements for the *IUPAC Standards Online* database that was initially released in the spring of 2016. The enhancements for 2017 will be released in June of this year and include the addition of InChI codes and InChI keys, a Periodic Table interface for searching specific elements and compounds, and fact sheets on specific compounds. CPCDS is working with the Secretariat on the promotion of the updated product launch that will include a 70% discount to *PAC* subscribers from July 1 - December 31, 2017. A demonstration will be available during the World Congress and General Assembly in July. In addition, database enhancements for the 2018 - 2019 biennium are in the process of being identified from the wish list developed during the initial creation of the database.



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Software/Computer Systems

CPCDS will work with the Secretariat on the implementation of user authentication that is required from the De Gruyter website to the IUPAC website. This authentication is required so that anyone who has the right to access *Chemistry International* digital content on the IUPAC website (IUPAC members and paying subscribers) can do so from the De Gruyter site. This is related to the *CI Digital First* project in that only IUPAC members and paid subscribers will have access to that content. The reverse handshake (IUPAC to De Gruyter) was implemented earlier this year.

The *Gold Book* project for the backup, maintenance, and re-development of the current *Gold Book* will continue through the end of 2017 (see [Project # 2016-046-1-024](#)). A demonstration of the beta version of the site and hands-on presentations will be offered at the IUPAC 2017 World Chemistry Congress in São Paulo, Brazil in July. The beta version will be accessible for three months in order for the Task Force to gather user feedback on any additional changes that are needed. After that period the newly-developed site will replace the interim one and enhancements that will facilitate the broadest possible use of IUPAC terminology will continued to be explored.

CPCDS is working on a feasibility study to determine if IUPAC can develop an NMR spectra repository (as well as a validation tool) analogous to the Cambridge Crystallographic Data Centre (CCDC), so that an aggregation of high-quality spectra data is readily and easily accessible to, as well a searchable and usable by, the global scientific research community. If proven feasible, a business plan will developed for review of and approval by the IUPAC Executive Committee

CPCDS, through the Web Vision Task Force, will continue to support the Secretariat as needed on the identification and implementation of specifications for Phase 2 of the IUPAC website.

Storage, Management, and Sharing of Digital Content

The newly-formed CPCDS Subcommittee on Cheminformatics Data Standards has a number of activities in progress and/or planned for the remainder of this biennium and beyond. Among others, these include: 1) the identification of Societies and other organizations that are involved in the development of standards for the management, storage, and sharing of digital chemical information/data; 2) the creation of a directory of existing chemical digital data and information standards; 3) submission of a Project Proposal for the development of an IUPAC Color Book on Cheminformatics Data Standards; 4) the identification of future enhancements to the technical underpinnings of the *Gold Book* that will make it more easily accessible so that its content can be easily incorporated into information systems used by chemists; 5) potential development of a validator for the JCAMP standard; 6) a symposium on Big Data for the 2017 IUPAC World Chemistry Congress, with a special issue of *Chemistry International* to be published on



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this topic just prior to the Congress; 7) a symposium on open structures for the fall 2017 National Meeting of the American Chemical Society; assisting in the NMR Spectra Repository feasibility study.

The objective of the Subcommittee is to support the overarching CPCDS goal of facilitating the development of a technical infrastructure that will enable IUPAC Divisions and Committees to leverage their content in a digital environment. With this objective in mind, the Subcommittee has invited liaisons from all interested Divisions and Committees, and welcomes input from all Council members.

III. Achievements during the 2016-2017 Biennium organized by goals and objectives

CPCDS activities support the IUPAC Mission, particularly “the development of the essential tools for the application and communication of chemical knowledge” through support of IUPAC’s publications, databases, and the development of standards for the management, storage, and sharing of digital chemical information.

CPCDS’ objective is to help build a technical infrastructure that will facilitate the maximum dissemination and usage of IUPAC’s content in a digital environment in support of IUPAC’s Vision to be an indispensable worldwide resource for chemistry. All of the activities highlighted earlier in this report are primarily related to:

Goal #2: Increasing the value of our products and services (publications, databases, and other intellectual property), and the following strategic objectives:

- 1) Brand IUPAC in the minds of stakeholders,
- 2) Improve the quality and frequency of communication with stakeholders
- 3) Increase revenue and improve long-term financial stability, and
- 4) Enhance interdivisional interaction and collaboration (through support of the website, re-development of the *Gold Book* website, and the development of standards to meet the needs of the global chemistry community)

A. Publications

IUPAC publications serve two main purposes: 1) promotion of IUPAC as a source of indispensable information for the global chemistry community; and 2) generation of revenue to provide financial support for IUPAC activities.

Pure and Applied Chemistry (PAC)

PAC was moved to IUPAC’s publishing partner, De Gruyter, effective with the first issue of 2014 and the initial production hiccups experienced during the transition have been resolved. However, *PAC* experienced some content pipeline problems during 2016 and two double issues had to be created (only ten physical products were mailed, not the twelve that were budgeted). There were two factors in play: 1) manuscripts were not flowing smoothly – slow submissions and backlogs in the review process; and 2)



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the software used for manuscript submission and processing does not easily display the current manuscripts in the system.

A meeting was held with De Gruyter in July 2016 to discuss the problems and monthly meetings have been initiated to continue the conversation and to identify and quickly resolve problems as they arise; e.g. De Gruyter has created a template so that manuscript status reports can be run shortly before each monthly production meeting to clearly identify what is in the pipeline. The 2016 financial results for *PAC* showed that while the budgeted topline revenue fell short, the bottom line contribution was met.

Chemistry International (CI)

During 2015 CPCDS developed recommendations for the future of *CI* that were approved by the IUPAC Executive Committee in October of that same year. The first to be quickly implemented was the creation of a *CI* Editorial Board in December of 2015. Monthly meetings were held throughout 2016 with a focus on building a content pipeline and implementing a second CPCDS recommendation - to reduce the number of printed issues while developing a digital version that would facilitate a more frequent, and perhaps interactive, engagement of readers.

Using the results of CPCDS' reader survey, the *CI* Editorial Board, in collaboration with CPCDS, developed specifications for this new version of *Chemistry International - CI Digital First* - that will most probably reside on the IUPAC website. The goal is to complete this project either by the end of 2017 or early in 2018. *CI Digital First* will allow IUPAC to more easily showcase its content and will provide more value to both IUPAC members and fee-based subscribers alike.

B. Databases

IUPAC databases serve two main purposes: 1) promotion of IUPAC as a source of indispensable information for the global chemistry community; and 2) generation of revenue to provide financial support for IUPAC activities.

The *IUPAC Standards Online* database was launched in March 2016, at which time potential enhancements for 2017 were identified. These include the addition of InChI codes and InChI keys, a Periodic Table interface for searching specific elements and compounds, and fact sheets on specific compounds and the updated database will be launched in June. Even though the IUPAC Standards and Recommendations are freely-available through the *PAC* back file, use of the database makes it much easier and quicker to locate and use the information. Sales have been slower than anticipated and IUPAC and De Gruyter will offer a 70% discount to *PAC* subscribers from July 1 - December 31, 2017. A demonstration will be available during the World Congress and General Assembly in July.

CPCDS initiatives that involve technical enhancements and the development of standards are primarily in support of:

Goal #3: Improve the vitality, effectiveness and efficiency of our Union, and the following strategic objectives:



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- 1) Brand IUPAC in the minds of stakeholders,
- 2) Improve the quality and frequency of communication with stakeholders, and
- 3) Enhance interdivisional interaction and collaboration (through support of the website, re-development of the *Gold Book* website, and the development of standards for the communication of chemical knowledge and the free exchange of scientific information)

A. Software/Computer Systems

A major initiative of CPCDS is the redevelopment of the *Gold Book* website. During 2016 it was brought to our attention that pages from the website had 'disappeared' (the files had become empty) for no apparent reason. As an emergency measure the website was moved to a new hosting platform and Dr. Stuart Chalk, the Project Task Group Chair, was able to recover more than eight thousand missing files from the Internet Archive. The new hosting platform can be administered through a web interface, allowing maintenance of the existing pages while the activities of this project are undertaken. There are four primary goals of this project and they are to create: 1) a stable, modern version of the current *Gold Book* website; 2) a downloadable vocabulary of *Gold Book* terms; 3) a simple website to administer updates to *Gold Book* terms; and 4) a simple Application Programming Interface (API) to access the *Gold Book* terms. Additionally, a log of time spent on the project is being captured and will be used to develop and estimate the ongoing maintenance needs of the *Gold Book* website. The Project started in January 2017 and is expected to be completed by year-end. A demonstration of the beta version of the site and hands-on presentations will be offered at the IUPAC World Congress in São Paulo, Brazil in July. The beta version will be accessible for three months in order for the Task Force to gather user feedback on any additional changes that are needed. After that period the newly-developed site will replace the interim one and CCDS will continue to identify enhancements that will facilitate the broadest possible use of IUPAC terminology.

CPCDS, through the technical expertise of its Secretary, James Liu, assisted the Secretariat in the development of an authentication capability for the IUPAC website that facilitates access to IUPAC Publications on the De Gruyter website by authorized users. CPCDS will continue to work with the Secretariat on methodology that will facilitate the reverse authentication for those on the De Gruyter site who have the right to access content on the IUPAC site (e.g. *CI Digital First*).

CPCDS is working on a feasibility study to determine if IUPAC can develop an NMR spectra repository (as well as a validation tool) analogous to the Cambridge Crystallographic Data Centre (CCDC), so that an aggregation of high-quality spectra data is readily and easily accessible to, as well as searchable and usable by, the global scientific research community. Interest in such a repository has emerged from global mandates that when an article based upon government-funded research is published, the data must be placed in a repository in such a way that it is accessible. There are two major objectives: 1) to help ensure the integrity of scientific research by providing validation of the data (under the umbrella of "reproducibility"); and 2) maximizing the usability of the data. Potential outcomes for IUPAC are: 1) we solve a problem for the scientific community; 2) by doing so we validate IUPAC's mission and value; and 3) IUPAC could possibly have another revenue stream even if this is done with a partner.



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CPCDS, through the Web Vision Task Force, will continue to support the Secretariat as needed on the identification and implementation of specifications for Phase 2 of the IUPAC website. Please refer to the November 2014 Web Vision Task Force report in the CPCDS section of the IUPAC website.

B. Standards for the Storage, Management, and Sharing of Digital Content

In 2016 CPCDS began a relationship with the Chemistry Research Data Interest Group (CRDIG) that had been approved as a special interest group within the Research Data Alliance (RDA). The membership of CPCDS and CRDIG overlap to a certain extent so we agreed to work together to identify areas that are in need of digital data management standards and work within both the RDA and IUPAC to ensure that such standards are developed. Building on the work done by the Division of Chemical Information of the American Chemical Society on identifying the pain points within the chemistry community regarding the storage, management, and sharing of digital Content, CRDIG and CPCDS agreed to hold a joint Workshop on Prioritizing Digital Data Challenges in Chemistry. The Workshop was held under the auspices of the U. S. Environmental Protection Agency on July 14-15, 2016 in Research Triangle Park prior to the CPCDS meeting.

The Workshop focused on chemical structures and terminology and the outcomes of the discussions have and will continue to lead to the development of projects related to the development of a Best Practice for standardization of software to ensure that despite the package that is used the same chemical structure is generated; 2) the development of recommendations for and standardizing the use of a handful of open chemical file formats/representations to improve interoperability and minimize errors in chemistry data exchange; 3) updating the IUPAC Chemical Structure Drawing standards to consider machine interpretation of chemical depictions and prevent corruption by chemist intentions when converted to chemical structures; 4) the education of all stakeholders on the importance of chemical structure standardization, its importance for chemical data exchange between humans and machines, and how these issues relate to their own work; 5) the development of a small scale ontology of chemical terms based on those in the current IUPAC *Orange Book*; and 6) an analysis of the current chemical data transfer and communication landscape for potential applications of semantic terminology.

In parallel to the workshop CPCDS established a Subcommittee on Cheminformatics Data Standards that will work with interested IUPAC Divisions and Committees, as well as external societies, in resolving the pain points in the storage, management, sharing, and usage of chemical information (see pages 11 - 13 for a list of the pain points identified by the Chemical Information Division of the American Chemical Society (ACS) at the Data Summit held in March 2016 at the spring National Meeting of the ACS. The objective of the Subcommittee is to support the overarching CPCDS goal of facilitating the development of a technical infrastructure that will enable IUPAC Divisions and Committees to leverage their content in a digital environment. With this objective in mind, the Subcommittee has invited liaisons from all interested Divisions and Committees and welcomes input from all Council members.



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IV. Tabular Material

Symposia/Workshops/Presentations

- 20-24 Aug. 2017: *Open Structures: Wither & Hence in the Digital Era*, a joint symposium organized by the IUPAC Committee on Publications and Cheminformatics Data Standards, the Chemical Structure Association Trust, the ACS Division of Chemical Information, the InChI Trust, and the Chemistry Research Data Interest Group to be held at the fall National Meeting of the American Chemical Society in Washington, DC, USA
- 9-14 July 2017: *Research Data, Big Data, and Chemistry*, a symposium organized by the IUPAC Committee on Publications and Cheminformatics Data Standards for the 2017 IUPAC World Chemistry Congress in São Paulo, Brazil
- 2-6 April 2017: *Reinventing the IUPAC Gold Book*, to be presented by Stuart Chalk at the spring National Meeting of the American Chemical Society, San Francisco, CA, USA
- 11-13 Sept. 2016: *The role of IUPAC in the curation of chemical data in the digital age*
Presented by Jeremy Frey at SciDataCon 2016 in Denver, CO, USA
- 14-15 July 2016: Joint RDA/IUPAC Workshop on *Prioritizing Digital Data Challenges in Chemistry*, EPA, Research Triangle Park, NC, USA

Publications

- July 2017: A special issue of *Chemistry International* on Big Data

Projects

- [2016-046-1-024:](#) Backup, Maintenance, and Redevelopment of the IUPAC *Gold Book* website
- [2013-052-1-024:](#) IUPAC Color Book Data Management
- [2013-055-2-024:](#) Increasing IUPAC's Social Media Presence



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Members of the Committee on Publications and Cheminformatics Data Standards (CPCDS 2016-2017)

Chair: Bonnie Lawlor (USA)
Secretary: James Liu (USA)

Titular Members:

Jeremy Frey (UK)
Kazuhiro Hayashi (Japan)
Lene Hviid (The Netherlands)
Wolfram Koch (Germany)
Bono Lučić (Croatia)
Leah McEwen (USA)
Carmen Nitsche (USA)

Associate Members:

Mark Kinnan (USA)
Yeon Gyu Yu (Korea)
Ethel Ríos-Orlandi (Puerto Rico)

Ex Officio Members:

Hugh Burrows (Portugal)

Members of the CPCDS Subcommittee on Cheminformatics Data Standards

Co-Chair: Leah McEwen (USA)
Co-Chair: David Martinsen (USA)

Members:

Gregory Banik (USA)
Ian Bruno (UK)
Stuart Chalk (USA)
Antony Davies (UK) (also Liaison from Division VIII)
Jeremy Frey (UK)
Robert Lancashire (JAM)
Ron Weir (CAN)
Andrey Yerin (RUS)



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Liaisons:

Dr. Cláudio dos Santos (Brazil) Division IV

Dr. Chris Fellows (Australia) Division IV

Web Vision Task Force Members

Christopher Brett (Portugal)

Mei-Hung Chiu (China)

Karl-Heinz Hellwich (Germany)

Fabienne Meyers (USA – IUPAC Associate Director)

Tom Perun (USA)

Ex Officio:

Brynn Hibbert (Australia)

Roberto Marquardt (France)



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Summary of Pain Points*

Access Issues

- Accessing good data that's not published data exchange standards/protocols/best practices
- Data locked in text
- Extracting data from literature (time consuming)
- Interoperability (systems, datasets)
- Machine learning for data extraction
- Quality of search results
- Querying across resources (global search across heterogeneous datasets)
- Specificity vs. generality
- Too many results -> search granularity (consequence of limited metadata?)

Audience Issues

- Answering complicated questions
- Context of user - perspective on data is important and impacts usage/needs
- Speaking the same language -> chemistry is different than biology targeting data/metadata to specific users
- Wide range of users with different backgrounds

Chemical Structure Representation Issues

- Dealing with large structures
- Different chemical entities in the same crystal
- Identifying parts of large structures -> partial ids? InChI parts?
- Organic compound stereochemistry
- Protein mapping issues
- Representation of inorganics
- Representation of stereo centers, cis/trans
- Structural representation of organometallics
- Symmetry

Community Issues

- Agreement on best practices for interoperability (of data, data systems, data formats)
- Approaches to normalization
- Community agreement on ... everything...
- Community standards change
- Community standards don't change fast enough
- Incentives for generating metadata

- Policies for making systems open...
- Where are the data/metadata resources?

Data Issues

- Bioactivity multiplexing
- Biological data different than chemical data
- Cannot interpret data
- Context of chemical data (complete? accurate? usable?)
- -Data formats not correctly used
- Data standardization
- Data without context
- Finding what we need to find
- Help with annotation
- Identifier mapping (across different identifier systems)
- Integrating legacy identifiers (important for historical data)
- Interoperability
- Make open data really open
- Metadata of experiments
- Normalization of data (crosswalking to standard format)
- Obvious data gaps
- Quality of data (trust in data)
- Scale of data/too much data (difficult to find what you need quickly/accurately)
- Share your data - please! (including 'dark data' the data that 'did not work')
- Structural multiplexing (equivalent drug forms cause problems in analysis)
- The data is always changing (better versioning needed?)
- Time dependent identifiers/classifications
- What are best sources for specific pieces of data?
- Units - cleanup needed
- Units normalization important for data interoperability

Ontology/Vocabulary Issues

- Consistent mapping of terms
- Coverage of ontologies (where are the gaps?)
- Creating an ontology -> coming to agreement on terms
- Don't make terms too specific (start by creating more generic terms that can be broadly used)
- Finding the (domain) experts to develop ontologies
- Gaps in terminology
- Harmonization/reaching consensus (of terms)
- How do we deal with ontology evolution (new terms added, some terms deprecated)
- Linking chemical terminology to biological terminology
- Ontology convergence (where there are multiple ontologies in the same domain)
- Invent ontologies for areas where there are none
- What Ontologies are out there? (list of ontologies and their coverage)
- Understanding what ontologies should be used

- Who has the authority/responsibility to coordinate ontology development? IUPAC
- Stability of ontologies (are they being actively managed?)
- User friendly vocabularies
- Vocabulary cleanup (who does it?)

Tools to Help Data/Metadata Capture Issues

- Best systems? (for storing, accessing data)
- Better tools that help data curation (i.e. research data plus metadata)
- Consistency of identifiers (naming)
- Curation of lists difficult
- Effective GUI for data input
- Globally synchronized data (across multiple sites) -> availability to third parties
- Improvements needed in machine learning
- Limiting options for users so they make sensible choices (provide contextual enum lists)
- No feedback on tools/usability
- Old code/legacy systems

* As noted at the 2016 Data Summit sponsored by the Division of Chemical Information (CINF) of the American Chemical Society (ACS) March 13-17, 2016 during the 251st ACS meeting in San Diego, CA

IUPAC Standing Committee

Chemical Research Applied to World Needs (CHEMRAWN) Report to Council Meeting Sao Paulo 12 – 13 July 2017

Overview

For this biennium, the committee has aimed towards: a) assuring the deliverables from the two conferences on the schedule; b) advancing the planned conferences while addressing matured topics under consideration for development into future events; c) leverage on the IUPAC platform to enhance communications and collaborations in interdivisional initiatives; d) respond to the request for delineating the basis for the future strategic directions of the Committee; e) look into delineating the roadmap for the work plan alignment with activities that respond to the IUPAC strategic plan goals/objectives. Considering the aforementioned framework, from an operational perspective, it is deemed necessary to potentiate among the members a culture of empowerment with a sense for participation and productivity while procuring year round engagement. The latter requires: 1) having an institutional definition for the expected roles and responsibilities for the AM's & TM's in standing committees, balance membership in concordance to the plan of action compliant with the diversity principle; 2) under our control, change the meetings dynamic with format / content modified to have group breakouts to generate ideas for the conference pipeline, build the open innovation platform to search practical solutions to attend unmet world needs and provide a baseline for the members involvement in the various initiatives of the work plan; 3) procure the use of the available Union platform (webpage and the virtual meeting system) to assure a year round engagement; 4) address the action items in the work plan in order to develop the respective activities for accomplishing of a 4 - 5 year plan; 5) still a major situation to resolve, is the access to funding for running conferences and initiatives which requires an upfront effort to explore fund raising and sponsoring strategies. From a functional standpoint, to achieve a 5-year plan, there is a necessity of elaborating a good value proposition along with a communication plan that provides the visibility and branding aspects for establishing the uniqueness of the Committee according to its charter. For continuity purposes, it would be practical to generate a guiding document for the operation of the Committee based on the Terms of Reference and pursue the updating of the four guiding documents that encompass the process of developing a conference. The above described working principles articulate our relevancy.

Achievements for this period relates to conferences and other activities in the work plan. Details in Part I.

- Of the two conferences on schedule:

- the *CHEMRAWN XX Conference on Herbal Medicine for Health Care in the 21st Century*, was successfully held in Dhaka, Bangladesh, on 6-9 November 2015. This event was about access to quality medicines in world regions where the only source of therapeutics are plants derived.
 - the *CHEMRAWN XXI Conference on Urban Solid Waste Management*, was held in Rome, Italy, 6-8 April 2016. The intention of the conference was to present a comprehensive perspective on the current challenges being faced with solid urban waste management and new directions for their exploitation, especially through a from-waste-to-resource approach.
- Started an initiative, beyond the regular conference program, where our members have been giving individual presentations on IUPAC and ChemRAWN in other conferences. A total of four have already been offered.
- The Committee continues the collaboration in the support of the administration of the biennial process for the CHEMRAWN VII Prize for Green Chemistry. The 2016 award was given to Dr. Ali Maleki of the Iran

University of Science & Technology and delivered at the 6th International IUPAC Conference on Green Chemistry.

- Successfully used the Secretariat's Go to Meeting platform for two virtual Committee meetings this year on January 20th and May 19th. Prior to this platform was used for a Strategic Plan presentation broadcasted into our off-year Committee meeting in Bergen on July 2016.

I. Highlights and/or Executive Summary

The main priorities targeted for the 2016-2017 biennium are articulated by the major points annotated below.

- Assure a successful CHEMRAWN XXI Conference. See that the Future Actions Committee reports for ChemRAWN XX & ChemRAWN XXI are rendered with the specific recommendations to be implemented through a work plan.
 - the CHEMRAWN XX Conference *on Herbal Medicine for Health Care in the 21st Century*, was successfully held in Dhaka, Bangladesh, in 6-9 November 2015 chaired by Prof. Mohammad Mossihuzzaman. This event was about access to quality medicines in world regions where the only source of therapeutics are those derived from plants. The conference was attended by 240 participants from 15 countries with an interest in discussing the challenges that must be met if herbal medicines are to become more accessible and affordable as well as having assured efficacy and safety. This would benefit not only low income countries by ensuring access to good quality pharmaceuticals, but also be an aid to establishing global markets for companies manufacturing these products. The Future Actions Committee came with a list of observations and aspects entitled "What should we do about" to address issues from raw materials/agriculture, safety, chemistry/bio activity to finished products. One of the priority actions relates to the establishment of an International Centre for Natural Products
 - the CHEMRAWN XXI Conference *on Urban Solid Waste Management* was held in Rome, Italy, 6-8 April 2016 with Prof. Mario Malinconico as Chair and Vincenza Faraco as Vice Chair. The intention of the conference was to present a comprehensive perspective on the current challenges of solid urban waste management and new directions for their exploitation, especially through a from-waste-to-resource approach. The Conference brought together 120 experts from 20 countries of the urbanized world, as well as experts from developing countries. The event also included a preconference course at University of Naples and a post conference Jubileum Audience with Pope Francis at the Vatican. In accordance with the CHEMRAWN conference platform the component Future Actions Committee (FAC) was set in place. A report is to be published soon outlining the plans to develop subsequent activities to address the issues identified for future attention.
- In general, the results on the development of the next conferences are mixed. The principal concern is the fact that funding/sponsorships or seed money for the conferences are not easy to obtain. As alternatives, we are exploring opportunities for inserting ChemRAWN initiatives as sessions within other conferences. As an example of this approach, communications have started to set up a ChemRAWN session on Green Catalysis either with the 7th or the 8th Green Chemistry meeting. Conversely, the

conference development efforts are being directed to only two topics in the next biennium: low cost point of care diagnostic technologies for resource limited countries and E-waste disposal in Africa.

- Started an initiative, beyond the regular conference program, where our members have been giving individual presentations on IUPAC & ChemRAWN in other conferences. A total of four of these activities were offered in regional and national meetings ranging from workshops, seminars to presentations. More details in Part IV.
- The Committee continues collaborating and supporting the administration of the biennial process for the CHEMRAWN VII Prize for Green Chemistry. The 2016 award was given to Dr. Ali Maleki of the Iran University of Science & Technology. It was delivered at the 6th International IUPAC Conference on Green Chemistry in Venezia. The broader promotional efforts did appear to have drawn more interested from scientists and the ease of applying on-line.

II. Plans and Priorities for the remainder of the biennium and beyond

The aspects outlined below provides the general framework for the strategic directions to be contemplated in the work plan for the next biennium

- Achieved the goals set for the off-year meeting in Bergen, Norway (30 June – 1 July), in terms of attendance, accomplishing a short training to immerse the members in the review of the terms of reference, breakouts for ideas generation for the work plan and a presentation by Dr. Mark Cesa of the IUPAC Strategic Plan broadcasted by Dr. Lynn Soby with the use of the Go to Meeting platform.
- Recognizing the need to virtually convene more often (on a 6-months basis), successfully utilized the Secretariat's Go to Meeting system for a 2.5 hr. reunion on 20 January 2017. The objective was to review status of the projects and establish their path forward. The opportunity was also taken to start doing some introspection about the unique role of ChemRAWN, the envisioning of its future direction and how compliant and relevant our charter respond to the IUPAC strategic plan and deliverables. Another meeting is planned for May 19th in preparation for the Sao Paulo meeting. Also, the members will start in the mapping of the specifics for the elaboration of the CR work plan for its implementation attuned to the new directions being set to guide our future.
- The conference development efforts are being directed towards only two topics in the next biennium: low cost point of care diagnostic technologies for resource limited countries (2018 or 2019) and E-waste disposal in Africa (~2019). In these, and in other conference initiatives, we encourage leadership to be taken by persons from low-income and transitional countries where there are unique needs for access to technologies to which chemists are able to make central contributions.
- In the procurement for alternate conference platforms, the experience and development capabilities for translational knowledge events has permitted ChemRAWN to partner with the PR NAO in the preparation and development of several conferences. The goal is to allow the incorporation of a ChemRAWN session in their conferences of 2017 Innovations in Nanosciences and 2018 Neglected Tropical Diseases. A similar objective was pursued in the co-preparation of a proposal

for the unsuccessful bid for 14th IUPAC International Congress of Pesticide Chemistry. The latter leverage on the strong presence in PR of the agbio global companies and the fact of 360 days a year crop planting experimental cycles.

- ChemRAWN has been in touch with the organizers of the WCLM 2017 and will participate in the round table discussions with the YO providing for them a two minutes elevated speech summarizing what the Committee is all about.
- Have successfully introduced, as part of the conference format the One to One Partnering sessions for networking connections. The idea is to encourage more the interactions that normally occur among and between scientists, producers, and regulators which in exchange will foster understanding and collaboration in the future.
- In conjunction to the One to One Partnering activities, ChemRAWN plans to incorporate into the conference program an entrepreneurship & innovation session. It should outstand that the solving of the world problems foster opportunities for entrepreneurship. Therefore, ChemRAWN can provide the ecosystem for catalysing any commercialization component derived from the discussions on socio-economic development. In many of the occasions, the circular economy principles will propel the prospects for the entrepreneurship activities.
- In the aforementioned context, besides building a workshop, ChemRawN could partner with COCI to develop an International Conference in Chemistry Entrepreneurship.
- A workshop is under consideration and development about the repositioning of the chemical sciences towards enhancing research for capacity building. The objective is to train younger scientists on the application of chemistry globally, especially in developing countries, towards solving their specific needs. To this end, we are in the early stages of maturing an initiative of this type that would focus on encouraging young scientists in Nepal to look for innovative ways of developing research that would benefit the Nepalese society – in areas like water protection, food provision making use of unique local resources.
- A preliminary proposal has been submitted to the Executive Committee outlining the uniqueness and value added of CR, based on an 8 point goals framework that will also serve to lead the work plan for the next biennium. For the latter, additional actions and steps are deemed necessary for formalizing the implementation of the proposal. A virtual meeting in May will set the basis for the final action plan to be finalize/ratified in a face to face CR meeting in Sao Paulo. Aligning

III. An overall report of Committee activities and achievements during 2016-2017 biennium organized by the Goals and Objectives of the current Strategic Plan

In principle, the alignment to the current Strategic Plan requires that a set of implementation guide lines be given by the Secretariat. The rolling out of the Strategic Plan implementation, to the internal stakeholders in particular to the committee members, is envisioned still as requiring that Chairs be trained and/or provided with the proper

toolsets. It will be of help to have available for our use a communication plan to convey the organization value proposition in a simple manner that everyone understands.

We understand that as the organizations, like IUPAC, respond to the implementation of a strategic plan, they must realize that changes are required from their traditional way of doing things. Therefore, as the Union continues to align its processes and systems to respond to the Strategic Plan, it is foreseen as essential for the standing committees and divisions, among others in the organization, to reassess/rethink their roles, functionality and establish their uniqueness. We at ChemRAWN do recognize the necessity to review our charter in terms of future directions attuned to the aforementioned expectancies from the Strategic Plan perspective.

The achievements and contributions of CHEMRAWN reflects the impact towards supporting the increase in the value of IUPAC within the context of the Strategic Goals and Objectives

The work the ChemRAWN committee does is, in essence, to bring chemistry into action in the civil society in a way that benefits the people and their quality of life. The most urgent needs are in countries in transition, but the perspective is really global. All ChemRAWN activities are therefore aimed at fulfilling the IUPAC's vision / mission statements through the committee's goals in pursuit of the application of chemistry in the service of humankind. Therefore, in terms of the strategic goals and objectives the comments offered below are relevant to this Council report.

More recently, upon the request of the Executive Committee to all committees for an outline of their strategic directions, ChemRAWN has put together and submitted a report about what it is envisioned as future strategic pathways. The exercise was carried out around the current terms of reference while taking into account a clear set of ideas that reflect a broad view of our thinking on the basis of the integrated responses received from the members. The proposal consists on an 8-point committee's goals that reflects its relevancy and from which the plan of work will be derived. As soon as the feedback is received, the group will proceed with the next steps: developing a work plan, alignment of the membership, prepare the value proposition and communication plan before launching

Included herein is a description of activities under the work plan with the degree of alignment and conformance to the Strategic Plan using the limited guidelines available for measuring attainment.

Goals -

- **Provide Scientific Expertise to address critical world needs**
 - Virtually all ChemRAWN conferences have emphasized on issues or aspects of interest or of major importance globally. That has been the case for the completed conferences: CHEMRAWN XX Conference *On Herbal Medicine for Health Care in the 21st Century* in Dhaka,

Bangladesh on November 2015 and CHEMRAWN XXI Conference *on Urban Solid Waste Management* held in Rome Italy on April 2016.

- The two (2) topics currently under consideration for the development of conferences are focused to addressing world needs.
- The 8 point aspects submitted in the report to the Executive Committee and include in the Bureau report for the April 8th meeting provides for ample contributions to sustain this goal.

- **Increase the value of our products and services**

Under limited reference / definition to guide us with this goal and the others, as soon as equipped with the appropriate toolsets, the Committee will seek initiatives to enhance this attribute.

- **Improve the vitality, effectiveness and efficiency of our Union**

Through the 8 point goals framework that was recently delineated for structuring the future vision and strategic directions of ChemRAWN our work plan will definitely permit significant contributions in the attainment of this goal.

Objectives –

- **Brand IUPAC in the mind of stakeholders**

External Stakeholders – We need to have a listing of these stakeholders to envision how to best impact them from this point onward. Nonetheless, in general terms, most of the CHEMRAWN conferences, activities and presentations have the IUPAC endorsement and manifested or evident by the use of the logo and tag lines. That branding component is in all promotions, at all times, during the events. In the case of the conferences, the branding continues with the work to be conducted by the Future Actions Committee. All these activities related to the conferences, result in networking, connections that will occur among and between scientists, industry, government / regulators.

Internal Stakeholders – For this biennium onward, strategies have been drawn to educate the Committee Members to bring them up to date in term of what the Strategic Plan represents for the Union and the direction of our work plan. It is necessary from the Union to issue a guidance document for undertaking the alignment of the activities in the action plans to respond to the Union Strategic Plan goals/objectives. During the GA, a space should be provided for benchmarking the best practices among the standing committees and divisions.

- **Improve quality and frequency of communications with stakeholders**

Critical component for outreach to both internal and external stakeholders. The continued improvement of the website and posting documents of past meetings and conferences would make it more attractive, informative and accessible. We appreciate the efforts made to give increased publicity of our conferences CHEMRAWN XX and XXI as well as the ability to accept online applications for the biennial process for the CHEMRAWN VII Prize for Green Chemistry.

The CHEMRAWN Conferences provides the means to communicate with others outside the Union. As an example, the CHEMRAWN XX Conference *On Herbal Medicine for Health Care in the 21st Century*, most important was the fact that we

managed to attract the attention of key people from outside IUPAC that contributed a lot and achieved attendance from 15 countries. Conversely, CHEMRAWN XXI Conference *on Urban Solid Waste Management* brought together 120 experts from 20 countries. The event also included a preconference course at University of Naples and a post conference Jubileum Audience with Pope Francis at the Vatican. It introduced, as part of the conference format the One to One Partnering sessions for networking connections. The idea is to encourage more the interactions that normally occur among and between scientists, producers, and regulators which in exchange will foster understanding and collaboration in the future.

From the Future Actions Committee (FAC) for both ChemRAWN conferences all the issues identified and classified into specific areas will allow to continue the contacts with the stakeholders. A summary of these conferences is also covered in the Conference Call section of Chemistry International.

The initiative started in this biennium, beyond the regular conference program, where our members have been giving individual presentations on IUPAC & ChemRAWN in other conferences or occasions. A total of four already offered impacting NAO's and the chemistry community outside IUPAC.

Our 8-point proposal, submitted for creating the framework for the future strategic directions of ChemRAWN, relies on the use of the webpage. Additional material has recently been sent for posting on the webpage.

For the Internal Stakeholders: still pending is the preparation of a value proposition for ChemRAWN together with Communication Plan for branding and visibility of the relevancy of the Committee and the activities that are being carried-out

- **Increase revenue**

Not within the charter scope of ChemRAWN

- **Expand and retain Member and Volunteer base with an emphasis on diversity and inclusion**

There is not a direct measure for gauging the attainment of this objective in terms of membership. Conversely, by its very nature, ChemRAWN is more interdisciplinary. Therefore, it could be more attractive to younger chemists with an interest in the role that chemistry plays in finding practical solutions for important problems and unmet global needs. We have a balanced committee in terms of global distribution, age and experience, and gender.

- **Enhance interdivisional interaction and collaboration**

The Committee continues collaborating and supporting the administration of the biennial process for the CHEMRAWN VII Prize for Green Chemistry. The 2016 award was given to Dr. Ali Maleki of the Iran University of Science & Technology. It was delivered at the 6th International IUPAC Conference on Green Chemistry. The broader

promotional efforts did appear to have drawn more interested from scientists in submitting an application on-line. The prize was established from the profit made by

ChemRAWN VII. It was handed out for the first time in 2010. Up to 2016, the award was promoted jointly with Division III and its Subcommittee on Green Chemistry and for the next biennium with the newly formed Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD).

Through the 8-point goals framework, that was recently delineated for structuring the future vision and strategic directions of ChemRAWN, our work plan will definitely provide for additional interdivisional collaborations

During the GA in Sao Paulo, a space should be provided in the program for benchmarking interaction of best practices among the standing committees and divisions in an effort to also identify the opportunities for interdivisional collaborations.

- **Emphasize multidisciplinary projects addressing critical global issues**

CHEMRAWN conferences are special meetings because the chemical challenges are primarily discussed in for scientific purposes, but in a societal context, often with technical solutions as a desirable outcome. Consequently, these conferences are much more multidisciplinary than many other meetings organized under the IUPAC umbrella. As a result, the participants thus constitute a mixed crowd. CHEMRAWN conferences are therefore rather demanding to plan and run, and relatively difficult to fund.

Examples of conferences completed or on schedule

- ❖ CHEMRAWN XIX Renewable and Sustainable Energy from Biological Resources took place in Kuala Lumpur, Malaysia, 27-28 September 2011.
- ❖ The last conference was CHEMRAWN XX Conference *on Herbal Medicine for Health Care in the 21st Century*, held in Dhaka, Bangladesh, on 6-9 November 2015.
- ❖ CHEMRAWN Conference XXI *on Urban Solid Waste Management* held in Rome, Italy, on 6-8 April 2016.

Moreover, we have several new members, some young, and they have already shared with the Committee new initiatives and ideas to potentiate other activities outside the conference platform. The committee composition broadly represents the world chemical community quite well.

Through the 8-point goals framework that was recently submitted to the Executive Committee, it delineates the basis for structuring the future vision and strategic directions of ChemRAWN. The Committee work plan will clearly substantiate many other initiatives and activities for our involvement in critical global needs.

- **Support chemistry education, particularly in developing countries**

- A. It is a priority of the Committee in development of conferences. Education and sound knowledge development is part of the mission derived from the Future Action Committees after each conference. As an example, the last CHEMRAWN XX Conference *On Herbal Medicine for Health Care in the 21st Century*, the Future

Actions Committee identified five areas to work on to attend the findings, issues highlighted with recommendations. In each one, educational and training initiatives will be necessary: Supply chain (raw materials) / Ethnopharmacological Documentation / Safety / Chemistry and Bioactivity / Industrial & Regulatory.

Similarly, *CHEMRAWN XXI Conference on Urban Solid Waste Management* identified several areas for further work. It also included a preconference course at University of Naples and a post conference Jubileum Audience with Pope Francis at the Vatican. In particular, this conference introduced as part of the event format, the One to One Partnering sessions for networking connections. The idea is to encourage more interactions than normally occur among and between scientists, producers, and regulators. The latter dynamic in exchange will foster understanding and collaboration in the future.

The initiative, started in this biennium, where our members have given individual presentations on IUPAC & ChemRAWN in other conferences or occasions. A total of four of these activities were offered in regional and national meetings ranging from workshops to teachers, seminars to presentations. More details in Part IV.

- B. Also, the Committee has established contact with the International Organization for Chemical Sciences in Development (IOCD). The idea is to see whether a conference could be developed on a modular approach to teaching chemistry at various level in particular with an applications focus towards solving world needs. A closely related initiative corresponds to the workshop, to be develop, about the repositioning of the chemical sciences towards enhancing research for capacity building. The objective is to train younger scientists on the application of chemistry globally, especially in developing countries, towards solving their specific needs.
- C. The preparation of infographics will be part of the work plan for illustrating among others the waste management, the situation with E-Waste, the next world problems needing attention, among other topics to be conceptualized.

IV. List of Publications and conferences symposia organized during the biennium 2016 - 2017

Summarized in this section are the written and oral presentations for the biennium

The following articles related to the committee's work have been published:

- Leiv K. Sydnnes, "ChemRAWN XX Herbal Medicine for Health Care in the 21st Century", *Chemistry International* **2016**, 38 (3-4), 41-42.
- IUPAC Wire, Ali Maleki Is Awarded the 2016 IUPAC CHEMRAWN VII Prize for Green Chemistry, *Chemistry International* 2016, 38 (5), 22.
- A publication for CHEMRAWN XXI Conference on Urban Solid Waste Management held in Rome, Italy on 6-8 April 2016. In-progress.

The following lectures related to the committee's work have been given:

- Leiv K. Sydnnes, "Chemistry and the Needs of Our World / La química y las necesidades de nuestro mundo", University of PR - Rio Piedras Campus, Chemistry Graduate Seminars Program, San Juan, PR (02.11.16). The opportunity was taken to meet with the PR NAO IUPAC Committee members and Council Delegation, and a private meeting with the President of the PR NAO
- Soon, Ting-Kueh, "ChemRAWN Teachers Workshop on Green Chemistry", ICCE 2016 in Malaysia (08.16)
- Lotveka, Ekaterina, "IUPAC activity: how to participate", X International Conference Mechanisms of Catalytic Reactions, held in Svetogorsk, Russia (10.2-6.16).
- Lerman, Zafra, "Science Diplomacy: using chemistry to bridge the gap between nations", University of PR Chemistry Graduate Seminars Program, San Juan, PR (02.27.17). Zafra also met with young women faculty/researchers from the Molecular Sciences Research Center. The opportunity was also taken for networking with the PR NAO officials; IUPAC Committee members & Council Delegation, as well as former Bureau and Council members from PR.

Summary of conferences and/or Symposia organized

- *CHEMRAWN XX Conference on Herbal Medicine for Health Care in the 21st Century*, held in Dhaka, Bangladesh, 6-9 November 2015 with Mohammad Mossihuzzaman as Chair. This event was about access to quality medicines in regions where the only source of therapeutics are those derived from plants. The conference was attended by 240 participants from 15 countries with an interest in discussing the challenges that must be met if herbal medicines are to become more accessible and affordable globally. The principal aims were to provide a global perspective on the future developments of the many chemical, biological, botanical, and legal facets of herbal (traditional) medicine, as they relate to the accessibility of quality, safe, efficacious and consistent herbal medicines for the improvement of healthcare globally. One of the hottest topics in the field of natural products development in health care is access to quality, safe, effective, and sustainable medicines. This has been highlighted by WHO since 2000, and an IUPAC technical bulletin was

published in this area (2008). Analytical and natural product chemistry, including metabolomics, will be significantly represented, as well as chemical and biological information systems development, new technologies, efficacy-focused clinical trials, agro-economic and sustainable development, intellectual property rights and patents, production, marketing, and synergistic integration with evolving government regulations. In each of these areas, chemistry is one of the elements to success internationally. Cutting edge applications involving integrated areas of chromatographic and spectroscopic analysis using a variety of IR, Raman, NIR, NMR, and mass spectral techniques are being used internationally to address quality control needs. Network pharmacology is beginning to explain the multiple targeting of traditional medicines, and the globalization of traditional medicines and phytotherapeutics is dramatically impacting the chemical sciences. This event was the first IUPAC conference to bring all these aspects together with a focus on the integrated contributions that chemistry can make at the international level to improve health care. The Future Actions Committee (FAC) has worked on five major areas identified during the conference for which plans were delineated towards the development of future activities and initiatives. One of the priority actions relates to the establishment of an International Centre for Natural Products

- The second is *ChemRAWN XXI Conference on Urban Solid Waste Management*, which was held in Rome, Italy, 6-8 April 2016 with Prof. Mario Malinconico as Chair and Vincenza Faraco as Vice Chair. The intention of the conference was to present a comprehensive perspective on the current challenges of solid urban waste management and new directions for their exploitation, especially through a from-waste-to-resource approach. The Conference brought together 120 experts from 20 countries of the urbanized world, as well as experts from developing countries, giving an opportunity not only to scientists from many disciplines, but also to other organizations, policy makers and groups involved in control and certification, to meet together and discuss future trends and action required. Significant amounts of wastes are yearly produced all around the world. The amount of Solid Urban Waste, one of the most important by-products of an urban lifestyle, is growing even faster than the rate of urbanization. Poorly collected or improperly disposed waste and lack of enforced regulations, mainly in low- and middle-income countries, can have a detrimental impact on the environment due to contamination of groundwater and surface water by leachate, as well as air pollution from burning. There were four main outcomes from the conference: 1) A raising of global awareness concerning the issues which every country in the world faces with respect to waste management. 2) A raising of global awareness concerning the best practices to be adopted. 3) A consensus that scientists within countries, within regions, and across the world must cooperate and collaborate to improve waste management systems. A less tangible, yet real, outcome was the networking connections that occur among and between scientists, producers, and regulators which will foster understanding and collaboration in the future. The event also included a preconference course at University of Naples and a post conference Jubileum Audience with Pope Francis at the Vatican. In accordance with CHEMRAWN conference platform the component Future Actions Committee (FAC) was set in place. A report is to be published soon outlining the plans to develop the subsequent initiatives and the future activities to address the issues identified.

IUPAC: Committee on Chemistry and Industry

Report to Council – 2017

Bernard West, Chair, COCI

Executive Summary

Focus for the 2016-2017 Biennium

1. Regional Workshop in China supported by SINOPEC.
2. ThalesNano Prize for Flow Chemistry.
3. Industry and IUPAC: Voice of the Customer, assessment and recommendations.
4. Regional Safety Training Programs.
5. Responsible Care linkage with the International Council of Chemical Associations [ICCA].
6. Strategic Approach to International Chemicals Management [SAICM] links with ICCA

Update in April 2017

I Regional Workshop in China supported by SINOPEC

Regional Workshop, Chemical Industry of Sustainable Development

The Committee on Chemistry and Industry [COCI] has held 4 regional workshops in the past. The latest one was held in Beijing on 12th September in Beijing. The workshop was planned and hosted by Dr. Zaiku Xie and members of his team of SINOPEC. Dr. Xie is Director of Science & Technology Department at SINOPEC and he is a Titular Member of COCI.

IUPAC COCI members are very grateful to Dr. Xie and SINOPEC for hosting an excellent Workshop. The meeting was well attended and praised by the attendees in the discussion session at the end of the meeting. We were also honoured to have the Vice-President of IUPAC, Professor Zhou Qifeng of Peking University to open the workshop.

This workshop brought together speakers from China, Korea, India and Switzerland. The focus of the meeting was Sustainability and how the industry is working towards this goal.

In addition to the local speakers there was participation by members of the COCI from Canada, USA/Netherlands, Japan, Belgium, Switzerland, Korea and Russia.

A summary of the presentation has been published in Chemistry International later in 2017.

II ThalesNano 7.5K Prize Awarded for a Third Time in 2016.

The terms of reference for the award which is sponsored by the ThalesNano Company of Hungary are that the prize of US\$ 7500 shall be awarded to an internationally recognized scientist (preferably chemist) whose activities or published accounts have made an outstanding contribution to the practice of flow chemistry. ThalesNano also covers the travel expenses of the awardee up to \$2500.

Professor Volker Hessel was the third recipient of the award. The presentation took place during the

Flow Chemistry Session at the IMRET 14 conference in Beijing in September 2016. The presentation was made by Dr. Bernard West for COCI and Dr. Ferenc Darvas for ThalesNano and for the Flow Chemical Society.

The fourth award will be given during the IMRET 15 Conference in Germany in 2018.

The call for nominations will go out in September 2017, with a closing date of 31 January 2018.

III Company Associates - Project.

The project (Project #2014-018-2-022) used a survey to discover what the various stake holders knew about the IUPAC CA processes and their interaction with industry. Results were analyzed and the feedback used to explore options for changing the initiative to better serve the needs of the Companies and IUPAC, especially to line up with the Strategic Plan.

A firm proposal has been developed Carolyn Ribes and Colin Humphris. This was approved at the April 2017 Bureau meeting and is being taken for approval by Council at the 2017 General Assembly.

IV Safety Training Program. New Fellows trained CRDF Global/CSP

STP continues to be a major focus in the COCI activities. Built up and headed until the San Juan meeting by Mark Cesa and now led by Bernard West. A new STP leader will be selected from the 2018-2019 COCI members since BW is retiring from COCI.

STP was supported by UNESCO until 2012 and has since been supported by the CRDF and the Chemical Security Program, CSP, of Washington.

The STP Workshop in Busan focused on laboratory safety, industry safety, security and the linkage provided by Responsible Care. In addition, the newly trained Fellows presented their experiences. Proposals from former Fellows explored possibilities for setting up regional training for South America, India and parts of Africa.

CRDF has renewed their support of the STP but at a reduced financial level due to their budget constraints. During 2017 we are seeking new Fellow applicants who meet the CRDF as well as the IUPAC criteria.

There will be an STP/Responsible Care Workshop in Sao Paulo.

SOLVAY HOSTED two Fellows for training in May 2017. They chose three IUPAC approved Fellows who had been waiting for host company training, but one had to withdraw due to a job change. They are from Africa and were trained in The UK and at SOLVAY HQ in Brussels. Paul Baekelmans has been very instrumental in setting up this hosting and training. Paul has indicated that Solvay will host more Fellows in future.

The interest in developing Regional STP is progressing. Fabian Benzo an STP Fellow from Uruguay has designed and successfully ran a Spanish Language course at his University in Montevideo, Uruguay. Fabian will speak at the STP Workshop in Brazil along with one of the students.

India is also reviewing how to set up a Regional Safety Training Program. Dr. Sala is a new industrial member of COCI and has offered to help Dr. Grover with the Indian STP.

The African Regional Training project needs to be reviewed and developed in a country focused way. There should be synergy with the expectations of the ICCA and its drive for Responsible Care in Africa.

V Responsible Care Projects

The book "Responsible Care a Case Study". continues to be used with companies and Universities. Most recently SOLVAY in Brussels purchased 5 copies. ICCA is working to bring Responsible Care to African countries. This fits the philosophy of Responsible Care's Product Stewardship initiative. We continue to

explore how we can assist. For example, there might be more case studies that would be more helpful for in an African context. BW is in discussions with the Dean of Engineering with a view to developing an RC course to be given in the Department of Chemical Engineering at Western University in London Ontario Canada

VI *SAICM Beginning a Project Design.*

Anna Makarova, COCI NR from Russia, took on the leadership for contact with SAICM by attending meetings related to SAICM and Green Chemistry. An article has been published in CI based on information from all IUPAC Divisions and Standing Committees listing their extensive array of projects and activities that fit in with the SAICM themes. Anna updated the COCI AGM with proposals to be followed up and the details are in the Minutes of that meeting.

This continues to be an important opportunity for IUPAC because it could lead to better links with Industry, and ICCA, which is active with SAICM and could lead to support from SAICM for new IUPAC/SAICM projects.

VII *Cross Division/Standing Committee support to their initiatives.*

Our limited committee resources will mean that again we can only contribute time and money to selected activities

IUPAC: Committee on Chemistry and Industry

Report to Bureau – 2017

Bernard West, Chair, COCI

Introduction

The Committee on Chemistry and Industry (COCI) is a focal point in IUPAC for issues of importance to chemistry-related industries. COCI organizes its activities into five Program Areas and interacts with each of the IUPAC Divisions and Standing Committees.

The principal objectives of COCI as set forth in its Terms of Reference are to:

- Advise the President and Executive Committee on options and actions by which IUPAC could become more attractive in order to increase participation by scientists from industry;
- Develop and maintain an active program to recruit, guide and inform Company Associates;
- Develop liaisons with national and international associations that represent chemical industries, chemical societies, and international bodies involved in scientific and industrial development;
- Initiate and maintain a portfolio of projects with implications for industry.

COCI places strategic emphasis on projects, which share best practices globally and focus on:

- Capacity building
- Public appreciation of chemistry
- The authoritative role of IUPAC as an NGO, Reputation and trust
- Enabling public and political debates

COCI has focused its activities in five main areas over the past decade.

1. Health, Safety and Environment
2. NAO/Company Associates Recruitment and Retention
3. NGO/IGO/Trade Association
4. Public Appreciation of Chemistry
5. Division and Standing Committee Collaborations

Biennium 2016-2017 COCI continues the need to focus on a few important areas.

Regional Workshop in China supported by SINOPEC

Thales/Nano Prize

Industry and IUPAC: Voice of the Customer, assessment and recommendations.

Regional Safety Training Programs.

Responsible Care linkage with ICCA.

SAICM links with Industry and other NGO's

SUMMARY OF ACTIVITIES

A summary follows of the activities accomplished during 2016 and 2017, organized with reference to the IUPAC strategic goals.

- I IUPAC will provide leadership as a worldwide scientific organization that objectively addresses global issues involving the chemical sciences.**

1. **Regional workshops** were created to strengthen IUPAC/COCI ties with industry in specific regions of the world. The topics were shaped based on the scientific and technical focus of the industrial participants. The following is a summary of four the Regional Workshops that were held prior to this biennium.

The series began with the European Regional Workshop entitled, “Chemistry in a Changing World – New Perspectives Concerning the IUPAC Family,” (Project No. 2006-030-1, see CI, 30 (5), 2008) on 25 April 2008 in Marl, Germany, followed by the second COCI Workshop held on 7 April 2009 on “Chemical Industries & IUPAC in East Asia” (Project No. 2008-038-1, see CI, 32 (2), 2010) at Kanagawa Science Park (KSP) Hotel in Kawasaki, Kanagawa, Japan, and a panel discussion on “Activities and Research Development in Kuwait Industry”, in Kuwait, on 9 March 2010. The fourth workshop was held in Toronto on June 1st, 2012, which Bernard West organized and which focused on the Great Lakes Area in the US and Canada. The theme was the “Chemistry of Sustainable Supply Chains”. A mini workshop, focused on the Middle East, had been planned for Istanbul, August 2013, but was postponed due to speaker scheduling difficulties.

A new Workshop was held in Beijing in mid-September 2016.

Dr. Xie of SINOPEC China kindly agreed to organize this along with assistance from Dr. Ishikiriya of Toray of Japan and Dr. Saha of India. The focus of the meeting was sustainability in the chemical industry. Topics ranged from innovative startup initiatives, through plant operations innovation to Responsible Care topics.

The meeting was very well attended and had a very successful outcome. A summary of the presentations at the Workshop will appear in Chemistry International

Thank you to SINOPEC for hosting and financially supporting this meeting.

2. **Recruitment and retention of Company Associates** is of great concern to COCI and we have made progress in developing a redesigned CA process for IUPAC in concert with other potential changes to IUPAC membership streams.

This issue also remains of high importance to the IUPAC Executive. COCI took this on as a high priority development for the Biennium and brought forward a Project to assist in the development of a more robust process for redefining the Company Associates program and links with Industry.

In recent years, the offer of a free CA membership for a year to sponsors of any IUPAC related congress or workshop has been successful in identifying new CA's, but it has not been successful in keeping them. Also the benefits of CA membership have not been well understood inside and outside of IUPAC

The project (Project #2014-018-2-022), initially Lead by Bryan Hanley and then extensively developed by Carolyn Ribes, used a survey to discover what the various stake holders know and think about the CA process and interaction with industry. Over fifty responses were obtained from members of IUPAC Divisions and Committees. The questions explored the benefits and challenges of IUPAC-industry interactions. The feedback was analyzed and a proposal for an improved system was discussed at the COCI AGM in September 2016. Subsequently a modified version of those recommendations including input from Colin Humphris has led to a proposal, which will be presented to the Bureau and, if agreed to, this will subsequently be taken to the GA Council.

Carolyn Ribes singlehandedly developed this project to the point of the excellent basis for a renewed approach to Company Associate membership and the benefits that can be offered.

II *IUPAC will facilitate the advancement of research in the chemical sciences through the tools that it provides for international standardization and scientific discussion.*

Responsible Care Project and Text Book

The first Responsible Care project titled "Responsible Application of Chemistry: An Introduction to Responsible Care" was completed at the end of 2010. The overall goal of the project was to produce documents that could be used as "teaching aids" or "mentoring aids". The focus was to recognize the importance of Responsible Care in the development of best practices in the developed and developing world. The project (No. 2006-047-1-022, led by Bernard West) was brought to practice with a well-received prototype workshop at McMaster University, Hamilton, Canada, where teaching tools for the use of the case studies were tested with a group of Masters students. A second project (2011-020-1-022, was again led by Bernard West), The selected story is about Sulco, a Canada Colors and Chemicals Company, which has been in Responsible Care from its inception.

The Responsible Care Project material has been assembled into a book and published by IUPAC / DeGruyter. The title is "Responsible Care - A Case Study" (1). COCI purchased 100 copies, some to be freely distributed and some to be sold [price is 49 Euros]. All remaining copies are located in Toronto, Canada.

2014-2015 activities: The book has already been provided to a number of individuals and associations. It is being translated into Arabic and possibly into Russian and French. As a result of the book and the agreement with CRDF/CSP of Washington. Bernard West was involved in two Responsible Care Workshops for the Egyptian Chemical Industry (3,4,5,6) in 2013 and 2014 and also a Green Chemistry Seminar in Moscow in 2014.

The STP Workshop in Busan was very successful and covered both safety and also the broader aspects of Responsible Care. Recently Colin Humphries followed up with the key note speaker at the WCLM and had discussions with the CEFIC and the ICCA, [of which they are the secretariat], about how ICCA and IUPAC could work together. ICCA is very interested in getting the Responsible Care process into African countries. We have a number of STP Fellows in Africa, as well as the RC Book, which could assist ICCA in their African initiative. We will be following up during this biennium.

Also, ICCA is very interested in SAICM, as are we via the work of Anna Makarova. Therefore, we might have a couple of lines of interest to build upon with ICCA.

III IUPAC will assist chemistry-related industry in its contribution to sustainable development, wealth creation, and improvement in the quality of life.

The Strategic Approach to International Chemicals Management [SAICM], an initiative of the UN implemented through UNEP and WHO, is a policy framework to foster the sound management of chemicals (www.saicm.org.) IUPAC is a registered NGO with SAICM. In late 2014 Anna Makarova, COCI NR from Russia, took leadership for contact with SAICM by attending a meeting in Switzerland. She is continuing to develop a project, which will be supported by COCI. The first step has been to ask all IUPAC Divisions and Standing Committees for a list of their projects and activities that fit in with the SAICM themes. A document was prepared and delivered to SAICM. Also an article has been published in Chemistry International based on this information and co-authored by Anna Makarova and Colin Humphris.

This is an important opportunity for IUPAC because it could lead to better links with Industry, ICCA, which is active with SAICM and it could also lead to support from SAICM for new IUPAC/SAICM projects.

Anna Makarova is overseeing the initiative with SAICM and Green Chemistry related to this. We know that ICCA is working with SAICM and there are possible overlapping areas where we could contribute an objective science based approach similar to how IUPAC relates to OPCW .

IV IUPAC will foster communication among individual chemists and scientific organizations,

with special emphasis on the needs of chemists in developing countries

Safety Training Program [STP]

This remains a major focus in the COCI activities. Built up and headed until the San Juan meeting (2011) by Mark Cesa and since then led by Bernard West. STP was formally supported by UNESCO until 2012 and has since been supported by the Civilian Research and Development Foundation (CRDF) and the Chemical Security Program (CSP), of Washington. CRDF has now renewed their support for the program for another two years.

The Chemical Security Program aims to raise awareness and provide assistance to improve chemical safety and particularly security best practices; foster national and regional dialogue on improving chemical safety and security, and promote scientific cooperation among chemical professionals. CRDF Global is an independent non-profit organization that promotes international scientific and technical collaboration through grants, technical resources and training. CRDF Global is an implementer for the Chemical Security Engagement Program.

The following Fellows are the latest to be trained in the Safety Training Program who . In April 2015 CRDF/CSP supported Fellow, Professor Ahmed Youssef from Cairo University was trained at host company Bayer CropScience in Research Triangle Park, North Carolina, USA. He spent a month in the US visiting various sites and attending a conference on Process Safety. Professor Youssef has a particular interest in chemical recycling in Egypt and more widely in North Africa. Laura McConnell of Bayer CropScience and IUPAC Division IV President facilitated the training.

CRDF/CSP also supported Fellow, Christine Ashaolu, was trained at host company National Silicates, A PQ Company, in Toronto Canada in August 2015. Christine is Assistant Chief Regulatory Officer, Chemical Evaluation and Research, NAFDAC, Abuja, Nigeria.

STP Fellows Elbalky, and Youssef, participated in the Safety Training Program workshop in Busan. They highlighted the impact the training had on them and shared the results of changes they have been able to drive in their home institutions and countries. Christine Ashaolu did not attend the Busan meeting because she was in the training in Toronto at the time. CRDF have said that they will support her attendance at the next IUPAC Congress, General Assembly and COCI STP Workshop in Brazil in 2017.

We do have a short list of accepted trainees waiting for assignments with host companies. Signing up host companies is the biggest constraint to expanding the STP activities, although with the excellent support from CRDF/CSP we have recently found suitable hosts.

A list of the STP Fellows trained since 2000 and their reports is available in the IUPAC Website. [http://www.iupac.org/nc/home/about/members-and-committees/committees/coci/stp-fellows.html?sword_list%5B%5D=program]

A table showing a sampling of Fellows work once they have returned home is attached to this report.

We still want to explore how we can regain the sponsorship from UNESCO/UNIDO, since that provides additional credentials when recruiting host companies.

Currently SOLVAY has proposed to train 3 Fellows from Africa during May 2017 at one plant in the UK and at the R&D offices in the Brussels HQ. They have chosen Fellows who have been patiently waiting for a Host company.

Paul Baekelmans of SOLVAY and TM in COCI has facilitated this generous offer by his company

Safety Training Program Workshop

This workshop has been held during the Congress and GA for many years. The workshop held in

Busan in 2015 was very successful. It provides the opportunity for STP Fellows to share their experiences in their home countries and to learn from experts in chemical health, safety and environmental protection. Members of COCI use the Workshops to evaluate the effectiveness of the STP by reviewing the accomplishments of the STP fellows in their home countries after their training. In Busan, we had good attendance from the Young Observers, as well as Fellows, and COCI members and other IUPAC members. This led to an excellent round-table discussion, which generated many good ideas for enhancing the STP.

The STP Workshop in Busan focused on laboratory safety as well as industry safety, security and the linkage provided by Responsible Care. The recently trained Fellows presented their experiences since returning to their home countries.

Proposals from former Fellows to explore the possibilities for setting up regional training for India, South America and parts of Africa were discussed.

Specific follow up has occurred to develop Regional Safety Training Courses in local languages.

- The first of these In South America, lead by Fellow Dr. Fabian Benzo has been completed. The training materials were developed and the course completed last fall at Professor Benzo's University in Uruguay. Reports back from those trained are expected during 2017.
- In India a proposal has been made led by Fellow Dr. Gursharn Grover and Dr. Saha of Nagarjuna Agrichem Limited. Dr. Saha is a member of COCI. This project is on hold until some administrative details of the training in India are worked out.
- Africa is being led by Fellow Dr. Jonathan Babalola, but the approach may have to be approached on a country basis rather than a region.

Chemistry Prize in Flow Chemistry

We are proud to reiterate that together with the Hungarian technology company ThalesNano, the Industrial Prize has been awarded now three times. It is given to acknowledge the key role that flow chemistry plays toward improving chemical processes. Flow chemistry is considered an important step towards green chemistry.

"The prize of \$ 7500 shall be awarded to an internationally recognized scientist (preferably chemist) whose activities or published accounts have made an outstanding contribution to the practice of flow chemistry. ThalesNano also covers the travel expenses of the awardee up to \$2500. The company will cover the cost of the prize, five times over a period of ten years."

MIT Professor Klaus F. Jensen (Cambridge, USA) was the first recipient. This award was presented on March 13th 2013 at the Select Biosciences Conference in Munich by chair Michael Droescher and Dr. Ferenc Darvas for ThalesNano and for the Flow Chemical Society.

The second award was presented to Professor Steve Ley (Cambridge, UK) in June 2014 during the Flow Chemistry session at the IMRET 13 conference by Michael Droescher for COCI and Dr. Ferenc Darvas for ThalesNano and for the Flow Chemical Society.

Professor Volker Hessel (Eindhoven University of Technology) was the third recipient of the award. The presentation took place during the Flow Chemistry Session at the IMRET 14 conference in Beijing in September 2016. The presentation was made by Dr. Bernard West for COCI and Dr. Ferenc Darvas for ThalesNano and for the Flow Chemical Society.

The fourth award will be given during the IMRET 15 Conference in Germany in 2018. The call for nominations will go out in September 2017, with a closing date of 31 January 2018.

V IUPAC will utilize its global perspective and network to contribute to the enhancement of

chemistry education, the career development of young chemical scientists, and the public appreciation of chemistry.

COCI has assisted the co-chairs of the Busan WCLM organizing committee in the development of plans for the meetings.

COCI has also contributed financially to a number of new projects shown in the appendix.

COCI will continue to contribute as time and financial resources are available.

VI *IUPAC will broaden its national membership base and will seek the maximum feasible diversity in membership of IUPAC bodies in terms of geography, gender, and age.*

The program of **Division Representatives** to COCI is now continuing with a full list of Division contacts.

We now need to allocate the reverse, that is COCI member contacts into the Divisions.

References

1. Responsible Care, A Case Study. Peter Topalovic, Gail Krantzberg (Eds), DeGruyter 2014, ISBN 978-3-11-034316-8.
2. "World Chemistry Young Leadership Meeting: Echoes from the 2013 Meeting", Michael Droescher, *Chemistry International*, Volume 36, Issue 1, Pages 24–28, ISSN (Online) 1365-2192, DOI: [10.1515/ci.2014.36.1.24](https://doi.org/10.1515/ci.2014.36.1.24), January 2014
3. FEI-ECO Responsible Care® Awareness Workshop, Kuala Lumpur, Malaysia, December 9-10, 2013. Supported by CRDFGlobal and CSP.
4. FEI-ECO Responsible Care® Capacity Building Workshop, Kuala Lumpur, Malaysia, December 11-12, 2013. Supported by CRDFGlobal and CSP.
5. FEI-ECO Responsible Care® CEO Kickoff Meeting, Cairo, Egypt, November 18, 2014. Supported by CRDFGlobal and CSP.
6. FEI-ECO Responsible Care® Awareness Workshop for Chemical Managers Cairo, Egypt, November 19-20, 2014. Supported by CRDFGlobal and CSP.

COCI Membership 2016 - 2017

Name	Status	Term	NAO
Dr. Bernard West	TM-Chair	2016-2017	Canada
Dr. Carolyn Ribes	TM-Secretary	2016-2017	USA
Prof. Kan-Nan Chen	TM	2016-2017	China/Taipei
Dr. Paul Baekelmans	TM	2016-2017	Belgium
Dr. Zaiku Xie	TM	2016-2017	China/Beijing
Prof. Kazuhiko Ishikiriya	TM	2016-2017	Japan
Dr. Anthony B Hanley	TM	2016-2017	UK
Dr. Igor G Kukushkin	TM	2016-2017	Russia
Dr. Daniel Bernard	AM	2016-2017	France
Dr. Robert Audette	AM	2016-2017	Canada
Dr. Bipulbehari Saha	AM	2016-2017	India
Dr. Chang-Hyun Choi	AM	2016-2017	Korea
Dr. Lene Hviid	AM	2016-2017	Netherlands
Prof. Jacques Desbrieres	AM	2016-2017	France
Dr. Frank J. Chen	NR	2016-2017	China/Taipei
Dr. Anna Makarova	NR	2016-2017	Russia
Dr. Mario Marchionna	NR	2016-2017	Italy
Dr. Jody A. Jurkiewicz Kocsis	NR	2016-2017	USA
	NR	2016-2017	
	NR	2016-2017	
	NR	2016-2017	
Dr. Frank van Veggel	Div. I Rep.		Canada
Dr. Markku Leskelä	Div. II Rep.		Finland
Dr. Margaret Brimble	Div. III Rep.		New Zealand
Dr. Robin Hutchinson	Div. IV Rep.		Canada
Dr. Jan Labuda	Div. V Rep.		Slovakia
Dr. Hemda Garelick	Div. VI Rep.		UK
Dr. Edmond Differding	Div. VII Rep.		Belgium
Dr. Michelle M. Rogers	Div. VIII Rep.		USA
	CCE Rep		
	CHEMRAWN Rep		

SAFETY TRAINING FELLOWS FOLLOW UP ACTIVITIES

16-

SUMMARY	OF WORK	OF	FELLOWS
Year/Name/Country	Where Trained	Total People "touched"	Comments
2000/Toprak/Turkey University	BP Chemicals USA	4,000+	See attached notes. Note seminars for Women on Women's Day
2002/Gwaza/Nigeria Shell Oil	Sasol S Africa	4,000	Training across Shell in Nigeria. His focus is on Process Safety.
2007/Nyarco/Ghana Tema lube Oil Co	Mitsui Japan	1,500+	See attached table. Considerable non-company contacts
2008/Grover/India Nat'l Research Cncil	Novozymes Denmark	10,000+	See attached notes. Perhaps the most energetic and prolific communicator on Safety
2013/Babalola/Nigeria University	DOW Holland	>2,000	Activities at several levels. Department, University Senate level and Nigerian National Government level.
2014/Zenhom/Egypt FEI-ECO	Woodbridge Canada	>100	Is working in FEI-ECO developing codes also auditing small companies in several cities.
TOTAL IMPACT	Worldwide	>20,000	Very significant impacts in their home countries.



Committee on Chemistry Education
report submitted to IUPAC Council 2017, Sao Paulo, Brasil
by Mustafa Sözbilir, Chair
on May 25, 2017

I. Highlights and/or Executive Summary:

CCE is one of the bodies in IUPAC that has close collaboration with all divisions and committees due to its function and roles. Education is a common ground for all areas. Therefore, CCE keeps collaborations with all bodies in IUPAC. For each biennium, we revise our priorities and try to implement them. The last CCE meeting was held at the 24th ICCE in Kuching, Sarawak, Malaysia in August 15 (full day) & 17 (half day). Dr. Mark Cesa, IUPAC Past President, Prof. Dr. Richard Hartshorn, IUPAC Secretary General, CCE Chair, Secretary and all TMs, except for Leontina Lazo-Santibanez from Chile, were participated together with several NRs. Chris Fellows from Australia, AM for Div. IV, was participated online, as well as some guests including Prof. Ei-ichi Negishi, the Nobel Laureate in Chemistry in 2010 from Purdue University. Beyond regular issues discussed during one and half day meetings, Prof. Richard Hartshorn (Secretary General) Richard Hartshorn suggest to engage the divisions more with CCE, by involving the division representatives with our meeting. In the preparation for the GA this could be more explicit. Mark Cesa also stresses the CCE should cooperate a bit more. Net meeting/skype conference calls are also ways to interact with committees.



Photo is taken at CCE meeting in Kuching, Sarawak Malaysia on August 15, 2016.

Discussions were made how to prepare as CCE to IUPAC centenary in 2019. It was agreed that CCE can develop new projects such as Development of Research in Chemistry Education in the World (proposed by Mustafa SOZBILIR), Mei-Hung CHIU is planning to develop the second stage of ISCE (https://iupac.org/projects/project-details/?project_nr=2013-022-2-050) to work on more to cover chemistry curriculums and its practices in different part of the world. Supawan Tantayanon presented a new project idea on using microscale materials, supported by DOW Chemical. The project aims to help for teachers is given on small scale chemistry. Supawan would like to make the program more global and get this project under IUPAC flag. Expense will be borne by DOW chemicals. A small video (<https://youtu.be/pI-8GJKRtLE>) was shown, demonstrating the material developed by DOW. Mei-Hung CHIU was also given information about their work on joint ICSU project involving International Mathematics Union (lead 1), IUPAC (lead 2), IUPAP, IAU, and IUBS as supporting Unions to collaborate on the global survey and a joint study on publication patterns. The project is accepted and started. See CCE supported IUPAC project at https://iupac.org/projects/project-details/?project_nr=2017-007-1-020.

During the 24th ICCE in Kuching, Malaysia, there was a global release of the new interactive electronic version of the IUPAC Periodic Table of the Elements and Isotopes, created by an IUPAC project (#2012-048-3-400) team. Peter Mahaffy has done the launch in a special session entitled "Special IUPAC Plenary Session on Global Launch of an IUPAC Interactive Electronic Isotopic Periodic Table and Supporting Resources".

The next CCE meeting is scheduled on July 9&10 (2 days during IUPAC 49th General Assembly & 46th World Chemistry Congress will held at Sao Paulo from July 7-14, 2017. The conference will be hosted by Brazilian Chemical Society (SBQ). Among the issues which needs to be discussed in CCE meeting, beyond regular topics, will be the role of CCE contributions for preparations of IUPAC centenary in 2019. Plans need to be made for the educational activities to celebrate the centenary. During this meeting decision also will be made on the venue of 26th ICCE. Currently there are two countries (Germany and Thailand) has shown interest to host 26th ICCE. Presentation also will be made about the 25th ICCE which will be held on July 10-14, 2018 in Sydney, Australia by the University of Sydney. The chair of the conference is Associate Professor Dr. Siegbert Schmid.

II. An overall report of Division/Committee activities and achievements during 2016-2017 biennium and the first part of 2016 organized by the Goals and Objectives laid out in the current IUPAC Strategic Plan:

During the last biennium, the 24th IUPAC International Conference on Chemistry Education (ICCE) 2016 was successfully organized by Institut Kimia Malaysia (IKM) at the Borneo Convention Centre Kuching, Kuching, Sarawak, Malaysia from 15 – 20th August 2016. At the same time, Institut Kimia Malaysia (IKM) Sarawak Branch, in celebrating its 30th Anniversary this year, also held the International Symposium on Pure and Applied Chemistry (ISPAC) in Kuching, Sarawak, Malaysia from 16 – 18th August 2016 in conjunction with ICCE 2016 with the support of the Foundation of Interaction of Science and Technology (FIST), Japan. The conference was well attended. There were 456 participants all together representing the 38 countries. The Malaysian delegation was the biggest at 196 to be followed by Japan (109), India (15), Taiwan (14), China (13) and Australia (10). 50 teachers from Sarawak schools were provided with complimentary registration under the Tan Sri Law Hieng Foundation and Lee Foundation. IKM also supported 14 teachers from Peninsular Malaysia with a grant of RM1.500 each to enable them to participate in ICCE 2016. 264 papers were presented including 9 plenary and 18 keynote lectures. Among the plenary speakers there was 2010 Nobel Laureate in Chemistry, Prof Ei-ichi Negishi from Purdue University, USA. Prof Negishi delivered plenary lecture at ICCE 2016. Other two highlights were the *Global Launch of new Electronic Interactive IUPAC Periodic Table* and the presentation of *IUPAC CCE Award on Distinguished Contribution to Chemistry Education (DCCE)* to Prof Kazuko Ogino of Tohoku University, Japan. Scientific programs, social & cultural activities were all together great success. IKM has done a great work. All participants were received high level of appreciation by the local organizers. Dr. Soon has submitted a report to IUPAC to be published in Chemistry International.

There was an online conference which was supported by IUPAC CCE entitled “OPCW ConfChem: An Open Access Online Conference about Chemistry, Disarmament and Education” between May 2- June 30 2016. The conference was organized by Jonathan E. Forman from OPCW & Robert E. Belford, University of Arkansas at Little Rock. Dr. Belford. Dr. Belford. The conference web page is <http://confchem.ccce.divched.org/2016SpringConfChem>. All presentation and discussions are accessible at the web page.

Regarding the projects carried out, CCE has several projects. These projects are listed under the heading IV below.

III. Plans and priorities for the 2016-17 biennium, and beyond:

CCE Chair is closely collaborating with 46th World Chemistry Congress organizers. Chemistry education is one of the main sessions. Mustafa SOZBILIR is working with Fernando Galembeck (Institute of Chemistry - University of Campinas, Campinas SP, Brazil) to organize chemistry education session. Chemistry education going to be one of the rich session in Sao Paulo Brasil.

The Main topics are:

- Teaching chemistry for sustainability and diversity
- Assessment in practical settings and technologically enhanced environments
- Teaching chemistry in culturally diverse environments
- Internalization of chemistry teaching, learning and curriculums
- Public understanding and appreciation of chemistry
- Chemistry curriculum development and evaluation
- Developing skills and values through chemistry education
- Teaching chemistry to students in special needs
- Technology enhanced chemistry teaching and learning
- Research and practice
- Nature and history of chemistry education
- Context oriented chemistry education.

There will be 1 plenary speaker, 10 invited and keynote lecture speakers devoted for the chemistry education. More information can be accessed at <http://www.iupac2017.org/symposia.php#ce>.

3rd ACRICE is going to be organized by Ferhat ABBAS University SETIF 1 under the chairmanship of Prof. Djafer BENACHOUR at Setif University in Algeria on October 8-11. The conference web site is <http://www.univ-setif.dz/OCS/FT/ACRICE>. IUPAC is providing Financial Support for Conferences (FSC #2017-003-1) in Scientifically Emerging Regions (SER) for the conference with 3900 USD. Funding is intended to bring scientist to the conference. Moreover, CCE members are also providing support by participating the conference. Speakers from CCE can be seen at <http://www.univ-setif.dz/OCS/FT/index/pages/view/Speakers>.

7th Network of InterAsian Chemistry Educators (NICE 2017) will be held in Seoul, South Korea on 26-28 July 2017.

As of May 25, 2017, there is no project by CCE members under review. However, there are few more project under preparation to be submitted by CCE members. CCE members have always been encouraged to develop more projects in order to accomplish the CCE priorities listed above. Particular interest will be focusing on IUPAC centenary, organizing more FCEP particularly in South America, establishing more collaboration on bodies outside IUPAC.

IV. Tabular material:

Current CCE (or joint) projects are listed below:

1. LEARNING OBJECTIVES AND STRATEGIES FOR INFUSING SYSTEMS THINKING INTO (POST)-SECONDARY GENERAL CHEMISTRY EDUCATION" (#2017-010-1-050)
Co-Chairs: Peter MAHAFFY & Stephen MATLIN. Further information can be found at https://iupac.org/projects/project-details/?project_nr=2017-010-1-050. (Joint Project with the International Organization for Chemical Sciences in Development (IOCD))
2. A GLOBAL APPROACH TO THE GENDER GAP IN MATHEMATICAL AND NATURAL SCIENCES: HOW TO MEASURE IT, HOW TO REDUCE IT? - IUPAC'S ROLE IN ICSU PARENT PROJECT (#2017-007-1-020)
Chair: Mei-Hung CHIU. Further information can be found at https://iupac.org/projects/project-details/?project_nr=2017-007-1-020.
3. THE CONSTITUTION OF GROUP 3 OF THE PERIODIC TABLE (#2015-039-2-200) with Div. II
Chair: Eric Scerri. Further information can be found at https://iupac.org/projects/project-details/?project_nr=2015-039-2-200.
4. SURVEY OF DEFINITIONS AND USE OF COMMON SOLID-STATE CHEMISTRY TERMINOLOGY (#2015-053-1-200) with Div.II
Chair: Robin T. Macaluso. Further information can be found at https://iupac.org/projects/project-details/?project_nr=2015-053-1-200.
5. FLYING CHEMISTRY EDUCATORS PROGRAM IN THE SOUTH PACIFIC (#2015-054-1-050)
Chair: Suzanne Boniface. Further information can be found at https://iupac.org/projects/project-details/?project_nr=2015-054-1-050.
6. IUPAC'S CONTRIBUTION TO ACHIEVING THE NEW UN SUSTAINABLE DEVELOPMENT GOALS -- THE FOCUS FOR THE 2015 WCLM (#2015-004-1-020)
Chair: Mei-Hung CHIU & Laura McConnell. Further information can be found at https://iupac.org/projects/project-details/?project_nr=2015-004-1-020.
7. DESIGN FOR INTERNATIONAL STANDARDS FOR CHEMISTRY EDUCATION (ISCE) (#2013-022-2-05) Joint with COCI
Chair: Mei-Hung CHIU. Further information can be found at https://iupac.org/projects/project-details/?project_nr=2013-022-2-050.
8. UPDATING, PILOTING, AND DISSEMINATING EDUCATIONAL MATERIAL FOR RAISING AWARENESS OF THE MULTIPLE USES OF CHEMICALS AND THE CHEMICAL WEAPONS CONVENTION (#2013-020-1-050) Joint with OPCW
Chair: Alastair Hay. Further information can be found at https://iupac.org/projects/project-details/?project_nr=2013-020-1-050.

CCE terms of references and strategies to meet these terms of references

- (i) To advise the President and the Executive Committee on matters relating to chemistry education, including public appreciation of chemistry.
- (ii) To maintain a portfolio of educational projects and to coordinate the educational activities of IUPAC.
- (iii) To monitor chemistry education activities throughout the world and to disseminate information relating to chemical education, including public appreciation of chemistry.
- (iv) To develop liaisons with international organizations such as UNESCO, national and regional chemical societies, chemical education committees, and organizations concerned with the public appreciation of science.

CCE accomplishes its role through projects and dedicated efforts of eight titular members, eight associate members representing divisions, 16 national representatives, and ex officio members who are representing more than 30 countries.

Our routine tasks include identifying priorities for the biennium, conducting projects and biennial ICCE conferences, reviewing project proposals, and cooperating with IUPAC divisions and standing committees. Also, CCE works and interacts with partners outside of IUPAC, such as OPCW and IOCD. AMs from the IUPAC divisions are also helpful in strengthening our outreach in educational implementation.

Membership for 2016-17

Chair

Sözbilir, Mustafa (Turkey)

Secretary

Apothker, Jan (Netherlands)

Titular Members

Boniface, Suzanne (New Zealand)

Chiu, Mei-Hung (Taiwan)

Kamata, Masahiro (Japan)

Lazo-Santibanez, Leontina (Chile)

Mamluk-Naaman, Rachel (Israel)

Towns, Marcy (USA)

National Representatives (NR)

Anthony (Tony) Wright	Australia
Borislav V. Toshev	Bulgaria
Zhigang Shuai	China
Susanne Kristina Wiedmer	Finland
Uday Maitra	India
Antonella Rossi	Italy
JaeYoung Han	Korea
Ting-Kueh Soon	Malaysia

Rameshwar Adhikari	Nepal
Ethel Ríos-Orlandi	Puerto Rico
Alexandre Pokrovsky	Russia
Makhtar Guene	Senegal
Marietjie Potgieter	South Africa
Felix Ho	Sweden
Supawan Tantayanon	Thailand
Ian Sydney Butler	Canada

ExOfficico

Forman, Jonathan OPCW (Netherlands)
Maciejowska, Iwona EuChemS (Poland)
Mammino, Liliana ACRICE (South Africa)
West, Bernard COCI (Canada)

Representatives from Divisions

Assaf Friedler Div-I (Israel)
Lidia Armelao Div-II (Italy)
Mary Garson Div-III (Australia)
Chris Fellows Div-IV (Australia)
Maria Filomena Camoes Div-V (Portugal)
Manos Dassenakis Div-VI (Greece)
John Duffus Div-VII (UK)
Robin T. Macaluso Div-VIII (USA)

Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS)

Biennial Report to the IUPAC Council in Sao Paulo 12-13 July 2017

Executive Summary dated 01 May 2017

During the four-year period 01 Jan 2013 to 31 Dec 2017, ICTNS continued its activities on behalf of IUPAC. It has reviewed, edited and approved for publication (58) Recommendations and Technical Reports in Pure and Applied Chemistry (PAC) for a total of (1607) journal pages (Table 1). The activities of ICTNS are summarized in the two tables within the Appendix below. Information is complete to for PAC volume 88, the January to December 2016 issues.) Note that neither Recommendations nor Technical Reports appear in the January to April 2017 issues of PAC 89(1,2,3,4).

For the same four-year period but up to 01 May 2017 (Table 2), ICTNS carried out editing for the completed projects that culminated in ten books that include two Colour Books, viz. the (Blue Book Nomenclature of Organic Chemistry 1,351 pp and the (Silver Book Compendium of Terminology and Nomenclature of Properties of Clinical Laboratory Sciences 211 pp). All books bear the label of IUPAC. The total book pages edited to ensure adherence to IUPAC requirements number 7,708.

The ICTNS continued its consultation and advisory work with several international societies and agencies on which ICTNS has representation that include the BIPM. One important issue dealt with during the reporting period with the BIPM concerned the definition of the mole and ancillary matters. The ICTNS was part of the Task Group examining the definition of the mole and way ahead. Manuscripts are with reviewers for PAC. In addition, ICTNS provided the on-going resource for the Secretariat in dealing with queries from scientists, engineers, teachers, students and the general public on terminology, nomenclature, symbols and units.

The Chair acknowledges the members of the ICTNS who have shouldered the heavy workload as described in the detailed Appendix below. The TMs are Professor Jürgen Stohner (Switzerland), Dr. Juris Meija (Canada), Dr. Gerard Moss (UK), Professor Brynn Hibbert (UK); the AMs are Professor Rita Cornelis (Belgium), Dr. Milan Drabik (Slovakia), Dr. Jan Kaiser (UK); the representatives from the Divisions and other international organisation are Drs. Marie-Noelle Bourquin, Carol Brock, Ture Damhus, Petr Fedotov, Attila Felinger, Pavel Karen, Roberto Marquardt, Graeme Moad, Jenny

Pallau, V. Prakesh, Amelia Rauter, Chris Southan, Michael Spedding, Robert Wielgosz. The Chair also thanks the staff at the Secretariat for their assistance especially Fabienne Meyers, Cheryl Wurzbacher, Lynn Soby, Enid Weatherwax and at De Gruyter publishing Joshua Gannon and Katharina Kaupen.

My double four-year appointment as Chair ICTNS must end on 31 Dec 2017. As volunteers to the work of IUPAC via ICTNS, I appreciate the sacrifices all members have made to help maintain the IUPAC goal for a common scientific currency in the world. Your reviews have been excellent and your comments have been helpful to me in making the decisions. I thank each of you.

Members are reminded of the following motion as Minute 17 passed at the 89th IUPAC Bureau meeting held 17-18 Apr 2010 in Sofia, Bulgaria.

http://old.iupac.org/news/archives/2010/bureau_min_sofia_2010.pdf.

17. REAFFIRMATION OF THE ROLE OF ICTNS

The Chairman of ICTNS, Prof. Weir, submitted a Briefing Note to the Secretary General requesting a statement of continuing support from the IUPAC Bureau or Executive Committee that acknowledges the responsibilities of ICTNS to enforce existing IUPAC Recommendations in publications sponsored by IUPAC and to maintain cooperation with international bodies on which IUPAC is represented. The Briefing Note may be found in the Agenda Book.

Prof. Black discussed the historical implications of this matter and introduced the following Motion: *The Bureau reasserts its strong support for the responsibilities of ICTNS to enforce existing IUPAC Recommendations in publications sponsored by IUPAC and to maintain cooperation with international bodies on which IUPAC is represented.* This motion was seconded by several Bureau members and was unanimously passed without discussion.

1. ICTNS Report, 01 January 2013 to 01 May 2017

1.1 Terms of Reference of ICTNS

These include:

(i) To be responsible for submission to the Bureau/Council, in accordance with Bylaw 2.11, for publication or otherwise, any IUPAC document concerned with terminology, nomenclature, symbols and other conventions.

(ii) Before recommending any material for publication as an IUPAC document, to ensure that full consultations have taken place, and the widest possible consensus has been reached among all Divisions and other bodies of the Union, and between IUPAC and other ICSU bodies, the international standardizing organizations, and Conférence Générale des Poids et Mesures (CGPM) and its Committees.

(iii) To ensure, via each Division's Titular Member on ICTNS, that all documents for publication emanating from that Division have been subject to a satisfactory level of review of substantive material by the Division Committee.

(iv) To ensure that any considered IUPAC view shall carry the fullest possible weight among other international organizations, all negotiations on matters concerned with nomenclature and symbols with other ICSU bodies, with the international standardizing organizations, and with CGPM and its Committees, shall be conducted through ICTNS, which shall advise the Executive Committee accordingly.

(v) To be responsible, after consultation with all relevant bodies of IUPAC, for the official IUPAC comments on all documents on nomenclature, symbols, terminology and conventions sent to the Union for comment.

(vi) To advise the President and the Executive Committee on suitable persons for appointment as representatives of IUPAC on other bodies concerned with nomenclature, symbols and terminology.

As a consequence, ICTNS is responsible for editing and approving the content of IUPAC Recommendations and Technical Reports for publication in *Pure and Applied Chemistry*, for approving publication of IUPAC reports in journals other than PAC that include publication of reports that contain new experimental data, for reviewing IUPAC-sponsored books for adherence to IUPAC standards of Terminology, Nomenclature, Symbols and Units, and also for approving, on behalf of IUPAC, publications emanating from international bodies on which IUPAC has representation. Editing of these publications is carried out by the respective organisation.

The ICTNS carries out these tasks by very extensive review processes. For IUPAC Recommendations, a Public Comment Period of five months is required, with input from members of ICTNS within three months. Both Recommendations and Technical Reports are carefully scrutinized for conformity with IUPAC-approved Terminology and Nomenclature, and are also edited carefully for scientific content. For those documents whose source lies with international bodies, ICTNS also carries out careful reviews. The overall goal from these activities is to continue to enhance the reputation of IUPAC as a source of international standards in chemical terminology and nomenclature through publication of *Pure and Applied Chemistry* and continuing interaction with international organisations.

Publication of the on-line Gold Book *IUPAC Compendium on Chemical Terminology* provides an opportunity for nearly continuous update of IUPAC-approved terminology, as well as corrections where required. The ICTNS maintains up-to-date and detailed instructions for the preparation of publication for *Pure and Applied Chemistry* and also acts as a consulting resource for the Secretariat and other IUPAC bodies in answering queries from professionals and students on problems in terminology and nomenclature.

The Terms of Reference require ICTNS to conduct, and advise the Executive Committee accordingly, all negotiations concerned with nomenclature, terminology and symbols with other ICSU bodies, with international standardizing organisations, and with CGPM and its committees. This measure ensures that IUPAC views carry the fullest possible weight among other international organisations. In practice, ICTNS maintains contacts with IUPAC representatives on these organisations and also through ICTNS members from the Bureau International des Poids et Mesures (BIPM), International Organisation for Standardization (ISO), and the International Unions for Biochemistry and Molecular Biology (IUBMB), Crystallography (IUCr), Pharmacology (IUPHAR), and Pure and Applied Physics (IUPAP).

2.0 Changes to Operating Procedures

Nil

R. D. Weir

Ron D. Weir, Chair; Juergen Stohner, Secretary

APPENDIX

A1.0 Summary of Publications in *PAC* for the period 01 January 2013 to 01 May 2017

The previous biennial reports by Professors J.W. Lorimer and R.D. Weir covered the periods from 01 June 2005 to 30 June 2009 (Lorimer), from 01 July 2009 to 30 June 2011 (Weir), from 01 June 2013 to 30 June 2015 (Weir), respectively. In the following summary, the reference number, title, author names, and the project origination follow the entries shown within Manuscript Central.

To assess any trends in the results from work by ICTNS, the statistics for the 12 year period June 2005 to 01 May 2017 are summarised in Table 1. Shown are the total numbers of Reports and Recommendations that were processed. These are subdivided by journal pages reviewed for each category. Also shown are the numbers of revised versions of manuscripts that ICTNS processed as a consequence of the review process. Also listed are the total and average number of months elapsed between manuscript submission and publication in *PAC*.

In section 1.1.1 below, there are listed the detailed of the manuscripts processed for the three-year period 01 January 2014 to 01 May 2017. Included are the titles, authors, *PAC* issue, dates of receipt and publication of each manuscript and the number of revised versions processed. Note that the detailed list of papers published during 2013 are excluded to shorten this report since that these details were published previously.

Table 1. Volume of Technical Reports and Recommendations processed by ICTNS

Total Articles				Technical Reports						Recommendations								
PAC vol.	Total Articles			Note 1	Note 2	Note 3	Technical Reports			Note 1	Note 2	Note 3	Recommendations			Note 1	Note 2	Note 3
	#	pages pp	avg. pp	# revisions	# Mos	avg mos	#	pages pp	avg. pp	# revisions	# mos	avg mos	#	pages pp	avg pp	# revisions	# mos	avg mos
77 (2005)	12	414	35	-	-	-	9	267	30	-	-	-	3	147	49	-	-	-
78 (2006)	13	354	27	-	-	-	8	168	21	-	-	-	5	186	37	-	-	-
79 (2007)	8	466	58	-	-	-	4	135	34	-	-	-	4	331	83	-	-	-
80 (2008)	12	463	39	-	-	-	6	168	28	-	-	-	6	295	48	-	-	-
81 (2009)	13	455	37	-	-	-	10	250	27	-	-	-	3	205	68	-	-	-
82 (2010)	10	266	27	-	-	-	8	170	21	-	-	-	2	96	48	-	-	-
83 (2011)	20	657	33	39	224	11	11	366	33	20	89	8	9	291	32	19	135	15
84 (2012)	12	450	38	14	100	8	7	169	24	9	62	9	5	281	56	5	38	7.6
85(2013)	18	592	33	35	267	14.8	11	293	27	18	131	11.9	7	299	43	17	136	19.4
86(2014)	16	443	28	21	147	9	13	397	31	15	106	8.1	3	46	15	6	41	13.7
87(2015)	8	140	17	14	60	7.5	5	76	15	11	36	7.2	3	64	21	3	24	8.0
88(2016)	16	432	27	32	162	10	8	162	20	16	77	9.6	8	270	34	16	85	9.4
89(2017 Jan to Apr inclusive)	0	0																

Note 1. Total number of revisions processed by ICTNS. Note 2. Total number of months elapsed between submission date and on line publication in *PAC*. Note 3. Average number of months elapsed per manuscript.

**Table 2. Books processed by ICTNS for the four-year period
01 January 2013 to 01 May 2017**

Year	Medium	Pages	Pages
2013	IUPAC Blue Book (Nomenclature of Organic Chemistry)	1,351	
2013	Volume Properties: Liquids, Solutions and Vapours		623
2013	Future Energy: Sustainable & Clean Energy Alternatives		738
2014	Chemical Processes: Sustainable Future		800
2015	Climate Change, 2 nd edition		669
2015	Experimental Thermodynamics IX B: Non-Equilibrium Thermodynamics and Applications		620
2015	Successful Drug Delivery Vol II		214
2015	Storing energy		526
2015	IUPAC Silver Book (Compendium of Terminology and Nomenclature of Properties of Clinical Laboratory Sciences)	211	
2016	Chemistry Beyond Chlorine		599
2017	Chemical Issues in Biomass Burning in sub-Saharan Africa		152
2017	Successful Drug Delivery Vol III Chapters 1 to 15		605
2017	Glossary of Terms in Reproductive and Developmental Toxicology (Royal Society of Chemistry publisher)		600
	Σ	1,562	6,146
	$\Sigma\Sigma = 7,708$ pages		

A1.1 Publications reviewed, edited and approved by ICTNS for publication in *Pure and Applied Chemistry*

Total number of Recommendations (Recs) and Technical Reports (TRs):

Four-year period 01 Jan 13 to 31 Dec 16: Σ Recs + TRs = 58; pages = 1607

Three-year period 01 Jan 14 to 31 Dec 16: Σ Recs + TRs = 40; pages = 1015

A1.1.1 IUPAC Recommendations for three-year period 01 Jan 2014 to 31 Dec 2016

Total number: 14

Total pages published: 380

PAC-REC-06-04-06 *Definitions of terms relating to mass spectrometry*, Kermit K. Murray, Robert K. Boyd, Marcos N. Eberlin, G. John Langley, Liang Li and Yasuhide Naito-Div V, PAC 85(7) 1515-1609 (2013), 95 pp.

24 April 2006 – 06 March 2013; 82 months; 8 revisions.

PAC-REC-12-05-10 *Definition of the halogen bond*, Gautam R. Desiraju, P. Shing Ho, Lars Kløo, Anthony C. Legon, Roberto Marquardt, Pierangelo Metrangolo, Peter Politzer, Giuseppe Resnati and Kari Rissanen-Div I, PAC 85(8) 1711-1714 (2013), 4 pp.

28 May 2012 – 22 May 2013; 12 months; 3 revisions.

PAC-REC-12-11-20 *Terminology of metal–organic frameworks and coordination polymers*, Stuart R. Batten, Neil R. Champness, Xiao-Ming Chen, Javier Garcia-Martinez, Susumu Kitagawa, Lars Öhrström, Michael O’Keeffe, Myunghyun Paik Suh and Jan Reedijk-Div II, PAC 85(8) 1715-1724 (2013), 10 pp.

28 Nov 2012 – 11 June 2013; 7 months; 1 revision.

PAC-REC-12-11-23 *Glossary of terms used in medicinal chemistry, Part II*, Derek R. Buckle, Paul W. Erhardt, C. Robin Ganellin, Toshi Kobayashi, Thomas J. Perun, John Proudfoot and Joerg Senn-Bilfinger-Div VII, PAC 85(8) 1725-1758 (2013), 34 pp.

30 Nov 2012 – 01 July 2013; 7 months; 2 revisions.

PAC-REC-12-08-01 *Definition of the transfer coefficient in electrochemistry*, Rolando Guidelli, Richard G. Compton, Juan M. Feliu, Eliezer Gileadi, Jacek Lipkowski, Wolfgang Schmickler and Sergio Trasatti-Div I, PAC 86(2) 259-262 (2014), 4 pp.

17 April 2013 – 21 November 2013; 7 months; 2 revisions.

PAC-REC-12-06-09 *ICTAC nomenclature of thermal analysis*, Trevor Lever, Peter Haines, Jean Rouquerol, Edward L. Charsley, Paul Van Eckerén and Donald J. Burlett-Div I, PAC 86(4) 555-583 (2014), 29 pp.

16 June 2012 – 16 January 2014; 19 months; 2 revisions.

PAC-REC-12-12-03 *Abbreviations of polymer names and guidelines for abbreviating polymer names*, Jiasong He, Jiazhong Chen, Karl-Heinz Hellwich, Michael Hess, Kazuyuki Horiea, Richard G. Jones, Jaroslav Kahovec, Tatsuki Kitayama, Pavel Kratochvil, Stefano V. Meille, Itaru Mitaa, Claudio dos Santos, Michel Vert and Jiří Vohlidal-Div IV, PAC 86(6) 1003-1015 (2014), 13 pp.

12 December 2012- 12 February 2014; 15 months; 2 revisions.

PAC-REC-13-02-01.R2 *Definitions of terms relating to individual macromolecules, macromolecular assemblies, polymer solutions, and amorphous bulk polymers* Robert Stepto, Taihyun Chang, Pavel Kratochvil, Michael Hess, Kazuyuki Horiea, Takahiro Sato and Jiří Vohlidal – Div VIII, PAC 87(1) 71–120 (2015), 50 pp.

1 February 2013 - 28 June 2014, 17 months, 2 revisions

PAC-REC-14-06-10 *Nomenclature and graphic representations for chemically modified polymers* Richard G. Jones, Tatsuki Kitayamaa, Edward S. Wilksa, Robert B. Fox, Alain Fradet, Karl-Heinz Hellwich, Michael Hess, Philip Hodge, Kazuyuki Horieb, Jaroslav Kahovec, Pavel Kratochvil, Przemyslaw Kubisa, Ernest Marechal, Werner Mormann, Christopher K. Ober, Robert F.T. Stepto, Michel Vert and Jiří Vohlidal – Div VIII, PAC 87(3) 307-319 (2015), 13 pp.

26 June 2014 - 18 December 2014, 7 months, 1 revision

PAC-REC-14-06-10 *Erratum to Nomenclature and graphic representations for chemically modified polymers* Richard G. Jones, Tatsuki Kitayamaa, Edward S. Wilksa, Robert B. Fox, Alain Fradet, Karl-Heinz Hellwich, Michael Hess, Philip Hodge, Kazuyuki Horieb, Jaroslav Kahovec, Pavel Kratochvil, Przemyslaw Kubisa, Ernest Marechal, Werner Mormann,

Christopher K. Ober, Robert F.T. Stepto, Michel Vert and Jiří Vohlídal – Div VIII, PAC 87(4) 441 (2015), 1 p.

February 2015; 0 months, 0 revisions

PAC-REC-12-12-04 *Glossary of Terms used in Computational Drug Design, Part II* Yvonne Martin, Ruben Abagyan, György Ferenczy, Val Gillet, Tudor Oprea, Johan Ulander, David Winkler, Nicolai Zefirov - Div VII, PAC 88(3), 239-264 (2016), pp 26

14 December 2012 – 30 October 2015, 34 months, 4 revisions

PAC-REC-15-08-02 *How to name new chemical elements*, Willem H. Koppenol, John Corish, Javier García-Martínez, Juris Meija, Jan Reedijk, -Div II, PAC 88 (4) 401-405 (2016), 5 pp.

20 Aug 2015 – 03 Dec 15; 3.5 months; 2 revisions.

PAC-REC-15-06-05 *Vocabulary of concepts and terms in chemometrics*, David B. Hibbert, -Div V, PAC 88(4) 407-443 (2016), 37 pp.

20 June 2015 – 02 Jan 2016; 6.5 months; 1 revision.

PAC-REC-15-09-03 *Glossary of Terms used in extraction*, Colin Poole, Zoltan Mester, Manuel Miró, Stig Pederson-Bjergaard, Janusz Pawliszyn, -Div. II, PAC 88(5) 517-558 (2016), 42 pp.

16 Sep 2015 – 27 Mar 2016; 5.5 months; 1 revision.

PAC-REC-15-12-02 *Glossary of Terms Used In Developmental and Reproductive Toxicology*, John H Duffus, Michael, Douglas M. Templeton, -Div. VII, PAC 88(8) 713-830 (2016), 118 pp.

04 Dec 2015 – 23 August 2016; 9 months, 2 revisions.

PAC-REC-15-12-04 *Comprehensive definition of oxidation state*, Pavel Karen, Patrick McArdle, Josef Takats, -Div. II, PAC 88(8) 831-839 (2016), 9 pp.

16 Dec 2015 – 23 Aug 2016. 8 months; 2 revisions.

PAC-REC-15-07-02 *Source-based nomenclature for single-strand homopolymers and copolymers*, Richard G. Jones, Tatsuki Kitayama, Karl-Heinz Hellwich, Michael Hess, Aubrey D. Jenkins, Jaroslav Kahovec, Pavel Kratochvíl, *the late* Itaru Mita, Werner Mormann, Christopher K. Ober, Stanisław Penczek, *the late* Robert F. T. Stepto, Kevin Thurlow, Jiří Vohlídal, Edward S. Wilks, -Divs. VIII and IV, PAC 88(10-11) 1073-1100 (2016), 28 pp.

10 July 2015 – 27 June 2016, 12 months; 2 revisions.

PAC-REC-16-05-01 *Names and symbols of the elements with atomic numbers 113 115, 117 and 118*, Lars Öhrström, Jan Reedijk, -Div. II, PAC 88(12) 1225-1229 (2016), 5 pp.

01 May 2016 – 29 Oct 2016; 6 months; 2 revisions.

A1.1.2 IUPAC Technical Reports for three-year period 01 Jan 2014 to 31 Dec 2016

Total number: 26

Total pages published: 635

PAC-REP-10-02-38 *Assessment of theoretical methods for the study of hydrogen abstraction kinetics of global warming gas species during their degradation and by product formation*, Ponnadurai Ramasami, Hassan H. Abdallah, Edet F. Archibong, Paul Blowers, Thomas A. Ford, Rita Kakkar, Zhigang Shuai and Henry F. Schaefer, III-Div I, PAC 85(9) 1901-1918 (2013), 18 pp.

25 Feb 2010 – 01 July 2013; 40 months; 3 revisions.

PAC-REP-12-03-03 *Determination of the photoluminescence quantum yield of dilute dye solutions*, Ute Resch-Genger and Knut Rurack-Div V, PAC 85(10) 2005-2026 (2013), 22 pp.

05 March 2012 – 04 August 2013; 17 months; 2 revisions.

PAC-REP-13-06-03 *Chemical speciation of environmentally significant metals with inorganic ligands. Part 5: The $\text{Zn}^{2+} + \text{OH}^-$, Cl^- , CO_3^{2-} , SO_4^{2-} , and PO_4^{3-} systems*, Kipton J. Powell, Paul L. Brown, Robert H. Byrne, Tamás Gajda, Glenn Hefter, Ann-Kathrin Leuz, Staffan Sjöberg and Hans Wanner-Div V, PAC 85(12) 2249-2311(2013), 63 pp.

10 June 2013 – 14 October 2013; 4 months; 1 revision.

PAC-REP-13-05-01 *A database of water transitions from experiment and theory*, Jonathan Tennyson, Peter F. Bernath, Linda R. Brown, Alain Campargue, Attila G. Császár, Ludovic Daumont, Robert R. Gamache, Joseph T. Hodges, Olga V. Naumenko, Oleg L. Polyansky, Laurence S. Rothman, Ann Carine Vandaele and Nikolai F. Zobov-Div I, PAC 86(1) 71-83 (2014), 13 pp.

24 May 2013 – 28 October 2013; 5 months; 1 revision.

PAC-REP- 13-10-23 *Assessment of international reference materials for isotope-ratio analysis*, Willi A. Brand, Tyler B. Coplen, Jochen Vogl, Martin Rosner and Thomas Prohaska-Div II, PAC 86(3) 425-467 (2014), 43 pp.

21 Oct 2013 – 11 December 2013; 2 months; 0 revisions.

PAC-REP-13-05-05 *Toward a comprehensive definition of oxidation state*, Pavel Karen, Patrick McArdle and Josef Takats-Div II, PAC 86(6) 1017-1081 (2014), 65 pp.

31 May 2013 – 13 January 2014; 8 months; 1 revision.

PAC-REP-12-06-05 *Single-molecule fluorescence imaging by total internal reflection fluorescence microscopy*, Alex E. Knight-Div III, PAC 86(8) 1303-1320 (2014), 18 pp.

06 June 2012-17 April 2014; 23 months; 2 revisions.

PAC-REP-13-09-18 *Variation in the terrestrial isotopic composition and atomic weight of argon*, J.K. Böhlke-Div II, PAC 86(9) 1421-1432 (2014), 12 pp.

20 September 2013-09 February 2014; 5 months; 0 revisions.

PAC-REP-13-10-20 Structural aspects of molecular recognition in the immune system. Part I: acquired immunity, Douglas M. Templeton and Kerstin Moehle-Div VII, PAC 86(10) 1435-1481 (2014), 47 pp.

18 October 2013 - 17 April 2014; 6 months; 1 revision.

PAC-REP-13-10-26 Structural aspects of molecular recognition in the immune system. Part II. Pattern recognition receptors, John A. Robinson and Kerstin Moehle-Div VII, PAC 86(10) 1483-1538 (2014), 56 pp.

22 October 2013 - 17 April 2014; 6 months; 1 revision.

PAC-REP-13-10-27 Immunodiagnostics and immunosensor design, Vladimir Gubala, Reinhild Klein, Douglas M. Templeton and Michael Schwenk-Div VII, PAC 86(10) 1539- 1571 (2014), 33 pp.

22 October 2013 - 17 April 2014; 6 months; 1 revision.

PAC-REP-13-10-28 Applications of immunochemistry in human health: advances in vaccinology and antibody design, Reinhild Klein, Douglas M. Templeton and Michael Schwenk-Div VII, PAC 86(10) 1573-1617 (2014), 35 pp.

22 October - 22 August 2014; 10 months; 1 revision.

PAC-REP-11-05-03 *The NPU format for clinical laboratory science reports regarding properties, units, and symbols* Georges Ferard and Rene Dybkaer – Div VII, PAC 86(12) 1923–1930 (2014), 8 pp.

19 May 2011 - 12 Nov 2011; 6 months, 2 revisions

PAC-REP-14-02-08 *Recommended isolated-line profile for representing high-resolution spectroscopic transitions* Jonathan Tennyson, Peter F. Bernath, Alain Campargue, Attila G. Csaszar, Ludovic Daumont, Robert R. Gamache, Joseph T. Hodges, Daniel Lisak, Olga V. Naumenko, Laurence S. Rothman, Ha Tran, Nikolai F. Zobov, Jeanna Buldyreva, Chris D. Boone, Maria Domenica De Vizia, Livio Gianfrani, Jean-Michel Hartmann, Robert McPheat, Damien Weidmann, Jonathan Murray, Ngoc Hoa Ngo and Oleg L. Polyansky – Div I, PAC 86(12) 1931–1943 (2014), 13 pp.

10 February 2014 - 11 September 2014; 7 months, 2 revisions

PAC-REP-13-06-01 *Guidelines for checking performance and verifying accuracy of rotational rheometers: viscosity measurements in steady and oscillatory shear* Martin Laun, Dietmar Auhl, Rudiger Brummer, Dirk J. Dijkstra, Claus Gabriel, Marc A. Mangnus, Maximilian Rullmann, Wim Zoetelief and Ulrich A. Handge – Div IV, PAC 86(12) 1945–1968 (2014), 24 pp.

3 June 2013 - 25 June 2014, 13 months, 2 revisions

PAC-REP-13-09-12 *Time-resolved fluorescence methods* Helge Lemmetyinen, Nikolai V. Tkachenko, Bernard Valeur, Jun-ichi Hotta, Marcel Ameloot, Nikolaus P. Ernsting, Thomas Gustavsson and Noel Boens– Div III, PAC 86(12) 1969–1998 (2014), 30 pp.

12 September 2013 - 30 May 2014, 9 months, 1 revision

PAC-REP-14-01-04 *Reference correlations for the viscosity and thermal conductivity of fluids over an extended range of conditions: hexane in the vapor, liquid, and supercritical regions* Richard A. Perkins, Marcia L. Huber, Marc J. Assael, Efthimia K. Mihailidou, Sofia K. Mylona and Evita A. Sykioti – Div I, PAC 87(3) 321-337 (2015), 17 pp.
21 January 14 – 25 August 2014; 7 months, 1 revision

PAC-REP-14-07-18 *Brief guide to the nomenclature of inorganic chemistry* Richard M. Hartshorn, Karl-Heinz Hellwich, Audrey Yarin, Ture Damphus and Alan T. Hutton – Div VIII, PAC 87(9-10) 1039-1049 (2015), 11 pp.
24 July 2014 – 09 February 2015; 7 months, 2 revisions

PAC-REP-14-11-17 *Physisorption of gases with special reference to the evaluation of surface area and pore size distribution* Matthias Thommes, Alexander Neimark, James P. Olivier, Francico Rodriguez Reinoso, Jean Rouquerol and Kenneth W. Sing – Div I, PAC 87(9-10) 1051-1069 (2015), 19 pp.
17 Nov 2014 – 30 April 2015; 5.5 months, 1 revision

PAC-REP-14-05-02 *Standard electrode potentials involving radicals in aqueous solution: inorganic radicals* David A. Armstrong, Robert E. Huie, Willem H. Koppenol, Sergei V. Lymar, Gábor Merényi, Pedatsur Neta, Branko Ruscic, David M. Stanbury, Steen Steenken and Peter Wardman – Div I, PAC 87(11-12) 1139-1150 (2015), 12 pp.
10 May 2014 – 05 July 2015; 14 months, 3 revisions

PAC-REP-14-08-04 *Maritime pollutants in shipping and commercial European ports based on relevant physical and biogeochemical environmental parameters* Fani Sakellariadou – Div VI, PAC 87(11-12) 1151-1166 (2015), 16 pp.
15 August 2015 – 06 October 2015; 2 months, 4 revisions

PAC-REP-15-05-02 *Discovery of the elements with atomic numbers $Z = 113, 115, 117$* Paul J. Karol, Robert C. Barber, Bradley M. Sherill, Emanuelle Vardaci and Toshimisu Yamazaki – Div II, PAC 88(1-2) 139-154 (2016), 16 pp.
19 May 2015 – 29 October 2015; 5.5 months, 3 revisions

PAC-REP-15-05-01 *Discovery of the element with atomic numbers $Z = 118$ completing the 7th row of 7th periodic table* Paul J. Karol, Robert C. Barber, Bradley M. Sherill, Emanuelle Vardaci and Toshimisu Yamazaki – Div II, PAC 88(1-2) 155-160 (2016), 6 pp.
19 May 2015 – 22 October 2015; 5 months, 2 revisions

PAC-REP-15-03-05 *Atomic weights of the elements 2013* Juris Meija*, Tyler B. Coplen, Michael Berglund, Willi A. Brand, Paul De Bièvre, Manfred Groning, Norman E. Holden, Johanna Irrgeher, Robert D. Loss, Thomas Walczyk and Thomas Prohaska – Div II, PAC 88(3), 265-291 (2016), pp 27

26 March 2015 – 08 December 2015, 8 months, 2 revisions

PAC-REP-15-05-03 *Isotopic compositions of the elements 2013* Juris Meija*, Tyler B. Coplen, Michael Berglund, Willi A. Brand, Paul De Bièvre,

Thomas Walczyk and Thomas Prohaska – Div II, PAC 88(3), 293-306 (2016), pp 14

29 May 2015 – 08 December 2015, 6 months, 2 revisions

PAC-REP-15-11-01 *IUPAC/CITAC Guide: Classification, modelling and quantification of human errors in a chemical analytical laboratory*, Ilya Kuselman, Francesca Pannecchi, -Div. V, PAC 88(5) 477-515 (2016), 38 pp.

05 Nov 2016 – 20 Apr 2016; 5 months; 1 revision.

PAC-REP-15-07-05 *Extraction for analytical scale sample preparation*, Colin Poole, Zoltan Mester, Manuel Miró, Stig Pederson-Bjergaard, Janusz Pawliszyn, -Div. V, PAC 88(7) 649-687 (2016), 39 pp.

31 Jul 2015 – 05 Aug 2016; 12 months; 2 revisions.

PAC-REP-16-02-03 *Review of footnotes and annotations to the 1949–2013 tables of standard atomic weights and tables of isotopic compositions of the elements*, Tyler Coplen, -Div. II, PAC 88(7) 689-699 (2016), 11 pp.

05 Feb 2016 – 26 June 2016; 5 months; 2 revisions.

PAC-REP-16-07-06 *Guidelines for Measurement of Luminescence Spectra and Quantum Yields of Inorganic Compounds, Metal Complexes and Materials*, Hitoshi Ishida, Jean-Claude Bünzli, Andrew Beeby, -Div. II, PAC 88(7) 701-711 (2016), 11 pp.

10 Jul 2014 – 29 Jul 2016; 25 months; 2 revisions.

Report of the Project Committee

Submitted May 15, 2017

Doug Templeton

Summary

This report covers the activities of the Project Committee (PC) for the 2016/2017 Biennium to date. It is divided into four sections: 1. Membership and Mandate, 2. Relevance to IUPAC's Strategic Plan, 3. Financial Activity (details in Appendix), and 4. Issues under discussion by the Committee.

Section 1 is for information. Sections 2 and 3 provide accountability with respect to IUPAC's goals and PC finances, respectively. Section 4 is most important for shaping discussion on the philosophy and evolution of the PC.

1. Membership and Mandate

The membership of the Committee in 2016/2017 was follows:

Prof. Doug Templeton (Chair, Canada)
Dr. Fabienne Meyers (Secretary, IUPAC Secretariat)
Prof. Qi-Feng Zhou (Ex officio, China)
Prof. Russell Boyd (Canada)
Prof. Hemda Garelick (UK)
Prof. Kew-Ho Lee (Korea)
Prof. Christopher Ober (USA)
Prof. Kaoru Yamanouchi (Japan)

The Committee met during the Bureau meeting in Montreal, April 2016. Policies and procedures were reviewed, and it was felt that none needed to be revised at this time, although several issues were discussed, as outlined in Section 4.

The PC receives applications for funding for Projects and for Scientific Conferences. Preference is given to projects that are highly rated for scientific quality and impact consistent with the goals of IUPAC. Projects are put forward to the PC by Divisions or Standing Committees, and are typically too large to be funded by a Division budget alone. Projects that are interdivisional, spanning the interests of more than one Division and Standing Committee are viewed favourably, and the willingness of the supporting Division(s) to co-fund the project is also an important factor.

While IUPAC Endorsement of meetings and conferences does not entail financial support, such support may be requested from the PC in two circumstances: If the conference is of international scope and held in a "Scientifically Emerging Region" (FSC-SER), with preference for funding regional participation of young scientists; or if the conference is deemed to promote truly "New Directions in Chemistry" (FSC-NDC), typically of a highly interdisciplinary nature or of a rapidly emerging area of chemistry.

2. Relevance of PC activity to the Strategic Plan

The Union has listed seven "Measurable Objectives" targeted toward meeting our goals. Some guiding principles in funding decisions by the PC contribute to these as follows:

i. Brand IUPAC in the minds of stakeholders

Our project activity is specifically designed to fund large and interdisciplinary projects that will be of use to stakeholders in industry and academia. If we fund initiatives that produce data bases, terminology, and guidelines that become indispensable, we will have achieved this goal. Scientific merit and quality of the output must be a guiding principle here. And, FSC awards in SERs are a tremendous opportunity for disseminating the IUPAC brand.

ii. Improve quality and frequency of communication with stakeholders

This follows on the comments immediately above: If we foster output of high scientific quality, it will be accessed reliably and frequently by stakeholders, and this is taken into account in funding decisions by the PC.

iii. Increase revenue

The PC has limited input here, but in funding scientific conferences in SERs, we have urged local organizers to engage local stakeholders and industries in co-financing, and benefiting from, participation. We have an opportunity here to leverage the IUPAC brand.

iv. Expand and retain member base

A hope is that by funding high quality meetings in SERs, participating individuals and regional chemical societies will see the advantage of engaging with IUPAC. But the keywords here are 'high quality' - feedback from the PC can sometimes push in this direction. There is also an opportunity in disbursement of the Project budget to urge inclusion and participation of new members/NAOs in large and interdisciplinary projects.

v. Enhance interdivisional interaction and collaboration

Our project budget is intentionally directed to larger and interdisciplinary projects. We have an unapologetic bias toward contributive funding of projects where one or more Divisions/SCs commit funds of their own.

vi. Emphasize multidisciplinary projects addressing critical global issues

The PC gives priority to funding projects that are multidisciplinary, and because global issues are by their very nature usually multidisciplinary, we have a built-in bias to funding such projects when they come forward.

vii. Support chemistry education in developing countries

This ties in very strongly with each of the above goals, and where the PC has a particular opportunity through its FSC-SER budget. While support for the educational conference ACRICE (see Appendix) is a direct example, the identification and support of meetings in SER has an indirect educational component.

3. Summary of financial activity, Jan. 2016 - June 2017

This summary covers financial activity during the first 14 months of the Biennium. Details of the applications (applicants names, project titles, amounts requested and awarded, etc.) are given in the Appendix. All monetary values are in USD.

Projects:

The PC's budget for projects for 2016/2017 is \$70,000. We have reviewed eight project applications and provided funding to all.

Total requested \$112,000

Total requested from PC ***

Total awarded by the PC \$35,710 (average award \$4,464)

Total co-funded (Division and SCs) \$67,900 (\$292,600 NAS).

These numbers indicate the extent to which the PC contribution supplements those of Divisions and Committees, and do not reflect significant contributions from outside agencies (see Appendix).

Funding for Scientific Conferences:

The PC's budget for FSCs (FSC-SER + FSC-NDC) for this Biennium is \$30,000.

Conferences in Scientifically Emerging Regions (FSC-SER)

To date, the PC has reviewed four applications for FSC-SER and provided at least partial funding for three.

Total requested \$17,300

Total awarded \$9,300 (average award \$3,100)

New Directions in Chemistry

Two applications were received and both were approved.

Total requested \$10,350

Total awarded \$8,000 (average award \$4,000)

4. Issues under discussion

Issues discussed by the PC at its meeting in Montreal (April 2016) and reported to the Bureau the next day are included in the Bureau Minutes from the Montreal meeting. Highlights and updates are:

i) A satisfactory definition of a Scientifically Emerging Region. This is proving difficult, as many different interpretations, and limited quantitative data for each, need to be considered. However, lack of a rigorous definition has not proven to be an impediment to PC decisions so far in this Biennium. It should be revisited in Sao Paulo at the next PC meeting.

ii) Should explicit guidelines be included in the current Proposal Application form to highlight aspects of the Strategic Plan? No action has been taken by the PC, as we feel the current form allows us to judge adequately how priorities are being met (see Section 2 above). We also note that the great majority of Proposals are dealt with at the Division Level and do not reach the PC, so this is 'not for us alone'. Perhaps the issue needs to be reopened.

iii) Quoting from the Montreal minutes:

"the Committee decided that from now on it will postpone to the following biennium, the assessment of proposals coming from Divisions seeking full support for a large proposal when at that time, the Division has itself already committed its entire biennium budget to other projects. A resubmission postponed to the following year will require a recommendation from the new Division President. This practice is to encourage Divisions to better manage their own budgets and to recognize that the PC funds are not simply an extension of their own Division funds, but are for interdivisional/multidisciplinary projects or large projects in which the Division itself must make a commitment."

This met with no dissent, and will be the policy of the PC in 2017.

iv) PC funding for ongoing series of meetings. At what point should the sponsoring Division of a conference in a successful series take ownership of the conference, plan it



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into its budget, and free funds for the PC to stimulate new initiatives? This recurs, and the PC has denied funding in a recent situation.

Emerging questions that have arisen for the PC over the last few months are sketched out here for information only, and will be discussed among PC members before and during the Sao Paulo PC meeting, although Bureau members may wish to comment as well.

- i) When organizers of FSC-SER conferences receive funding from IUPAC to support attendance of young regional scientists, should they be able to deduct registration fees from the awards?
- ii) Should the PC be involved in reviewing all interdisciplinary meetings (as the wording of its mandate might suggest), or only those few it is being asked to fund (as has traditionally been the case)?
- iii) Should PC funds be used to support Divisional activities at an IUPAC WCC?
- iv) Should PC funds support symposia at venues where IUPAC delegates are charged registration fees to attend?
- v) In the past, a 'Special Operating Fund' (SOF) was set aside for large special projects, and the PC occasionally referred projects that were worthwhile, but did not quite fit the PC mandate, to the Secretary General/Executive Committee to tap this fund. The SOF no longer exists as a budget line item. Two recent projects that we would have previously recommended to the SOF, regarding the GA/WCLM, have been passed back from the PC to the Executive through an ad hoc series of exchanges. What guidelines should the PC be given?



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Appendix - Details of requests to the PC, Jan. 2016 - Feb. 2017

Information is reported with the following syntax:

Lead applicant surname 'Project Title' (Project no.)

Amount requested USD / **PC awarded** / Supporting & contributing Divisions & Committees

Note that sponsoring Divisions and Committees are not expected to use their budget to sponsor scientific conferences, and no supplementary amounts are indicated for them.

Projects (Budget \$70K)

Resnati 'Categorizing Chalcogen, Pnictogen, and Tetrel Bonds, and Other Interactions Involving Groups XIV-XVI Elements' (2016-001-2)
\$15,000 / **\$5,000** / [I (\$4,000), III (\$5,000)]

McEwen 'InChI extension for mixture composition' (2015-025-4)
\$11,110 / **\$4,110** / [VIII (\$6,000), VI (\$1,000), CPCDS]

Zaiku and West 'Chemical Industry of Sustainable Development' (2016-020-1)
\$20,000 / **\$5,000** [COCI (\$10,000), Local sponsors (\$5,000)]

Benzo Moreira 'IUPAC-UNITAR Safety Training Program focal point for Latin America' (2016-021-1)
\$16,000 / **\$4,000** / [COCI (\$4,000), UNITAR (\$8,000)]

Forman '4th International Workshop on the Impact of Scientific Developments on the Chemical Weapons Convention' (2017-001-1)
\$5,000 / **\$3,100** / [III (\$500), V (\$400), VI (\$1,000), NAS (\$292,612)]

Hansen 'Online Dynamic NPU Manual' (2016-044-2)
\$15,300 / **\$6,000** / [VII (\$5,000)]

West 'IUPAC Safety Training Program Workshop, Sao Paulo, Brazil' (2017-009-1)
\$12,600 / **\$6,000** / [COCI (\$6,600)]

Mahaffy 'Learning Objectives and Strategies for Infusing Systems Thinking into (Post)-Secondary General Chemistry Education' (2017-010-1)
\$16,990 / **\$2,500** / [CCE (\$5,000), IOCD (\$7,00)]

FSC (Budget \$30K)

FSC-SER



Santic '25th Meeting of Croatian Chemists and Chemical Engineers' (2016-013-1)
\$2,400 / **\$2,400** / [III]

Klumperman 'UNESCO/IUPAC Workshop and Conference on Macromolecules & Materials' (2016-011-1)
\$8,000 / **\$3,000** / [IV]

Benachour 'ACRICE 2017, 3rd African Conference on Research in Chemistry Education' (2017-003-1)
\$3,900 / **\$3,900** / [CCE]

Chin Han Chan '25th POLYCHAR 2017 World Forum on Advanced Materials and 25th "Short Course on Polymer Characterization" ' (2016-034-1)
\$3,000 / **Nil** / [IV]

FSC-NDC

Brandstädter 'IUPAC International Symposium on Bioorganic Chemistry (ISBOC-11) Autumn School [in] Chemical Biology' (2016-029-1)
\$4,000 / **\$4,000** / [III]

Purchase 'Three Technical Symposia at the "Energy, Water and Environmental Sciences" component of the 46th World Chemistry Congress' (2017-008-1)
\$6,350 / **\$4,000** / [VI]



Evaluation Committee (EvC)

Report for the Council Meeting – São Paulo General Assembly

The Evaluation Committee (EvC) has been carrying out the tasks decided on in the EvC meeting on 8 April 2016, immediately before the Montreal Bureau Meeting, and is also presenting to Council for ratification, a proposal for revision of the Terms of Reference as decided in the Bureau Meeting on 8 April 2017.

1. Report on Evaluation Committee Activities

The tasks for the biennium which were approved in the EvC Meeting on 8 April 2016 can be summarized as:

- Implementation of the new terms of reference of the EvC ratified in the Busan GA 2015
- Examination of the portfolio of projects and other activities as well as making suggestions for possible improvement of the outcome of projects, based on lessons learned from past projects and activities, which are of relevance to IUPAC, streamlining the process and identifying any bottlenecks. This is particularly important in order to make efficient use of funds that can be allotted to projects as well as of the time spent by the task group members.

In the Bureau meeting on 9-10 April 2016, the importance of interim progress reports was also highlighted. Other suggestions were to consider if the task group memberships have been sufficiently diverse and also if members and/or chairs are simultaneously titular or associate members of the Division/Standing Committees.

In August 2016, a letter was sent to all Division Committee Presidents and to the Chairs of the Standing Committees CCE, COCI and CPCDS, outlining what the EvC wished to achieve. Each member of the EvC has had a specific responsibility in acting as a link with a specific Division/Standing Committee. A date of 31 December 2016 was taken as the point at which a snapshot of the state of projects and activities would be examined. Following this, a short questionnaire (Annex 1) was distributed to the DP/SCC for their comments and which would enable further analysis to be undertaken by the committee.

Financial and Project Report 31 December 2016

The Financial and Project Report dated 31 December 2016 leads to the following deductions, adding together the data from all the Divisions and Standing Committees considered, and following the colour coding in the report:

- Completed projects	20
- Active projects with a completion date in 2017 or later	111
- Active projects with a completion date of 31 Dec. 2016	25
- Reported projects past their scheduled 2016 completion date (before 31 Dec.)	27
- Reported projects more than one year past the scheduled completion date	14

Thus, the large majority of running projects were, at the date of the snapshot, respecting the timelines, 136 out of a total of 177 (including those whose completion date is 31 Dec. 2016) with 20 projects completed. There is some correlation between those divisions with a larger total number of projects and the number of overdue projects. The number of projects varies up to 38 for one of the divisions.

Responses to the questionnaire

A summary of the responses to the questions asked is given below:

1. Which are the projects you have completed (not before 2012) that you would label as successes and how do you measure the success?

All Divs/SCs gave excellent examples of successful projects which had resulted in recommendations, technical reports in PAC, additional articles in other journals, articles in Chemistry International or books. All affirmed that the final success is measured by the response from the outside world to the dissemination, nowadays through e.g. citations, downloads.

2. Have your recent projects, in general, kept to time? If not, should project timelines be longer?

The response to this question depended on the Division/SC. Projects which were finished on time normally related to technical reports or outreach activities. Those which took longer tended to be recommendations and, even more so, nomenclature, for which it was commented that it was rare to keep to the original schedule, attributed to the rigorous review procedure which recommendations and nomenclature have to undergo before acceptance.

It was commented that project timelines should not be much longer than at present, in order to give incentives to completing projects on time, but extensions should be granted on presentation of a proper progress report and justified reasons for the delay. It should be remembered that projects are carried out on a voluntary basis and it is not possible to pressure members of the task groups too much, given their commitments outside IUPAC.

3. Are there specific cases where the original timelines were inappropriate and this was not foreseen, or not able to be foreseen, at the review stage?

Some specific cases where the original timelines were not appropriate were indicated, often due to changes in the professional/personal circumstances of task group members, but also to unforeseen complexity of the proposed task and to insufficient requested funds.

4. Which larger projects have continuity i.e. the topic does not have a start/end date and are divided up into a succession of smaller projects (e.g. colour books)?

It was agreed that the colour books are good examples of this situation. Some Divs/SCs have decided to deal with these large and longer projects by having a succession of short term projects, for example one per biennium.

5. Which of your recent projects do you think should be publicized widely in the media and be advertised to NAOs?

The examples that were given all relate to projects of interest to the chemistry and scientific community in general and to society challenges including health, foods and environment and sustainability, as well as nomenclature, education in schools and responsible care activities.

6. Are there ways in which the running of projects could be improved from inception through to final publication and measuring the success of the dissemination?

Suggestions included:

- Ascertain from the beginning that the task group works as a team with a dedicated coordinator.
- During the project review process, more care to ensure that there are adequate milestones and that evaluation criteria are realistic, useful and measurable.
- Submit an annual report to the Div. President/SC Chair to demonstrate the progress made.
- Identify projects which have shown no action at all early on, remove them and redeploy the funds.
- Try to move towards running IUPAC projects in a similar way to research project, i.e. apart from progress reports, a lack of progress would impact project funding.
- Ensure that project chairs fully understand the review system undergone by reports/recommendations and how it functions, so they do not feel frustrated at the review stage by an apparent lack of progress.
- Undertake parallel public relations actions of completed project results to ensure successful dissemination at an earlier stage in questions related to nomenclature.
- Give better support of face-to-face meetings of project task groups concurrently with other task groups.
- Easy accessibility of correct and full project data and archives on the web site. Adherence to quality assurance procedures.
- Get the website fully up and running so that anything needed can be easily posted.

7. Any other comments.

Some of the other comments were:

- Streamline the project procedures from beginning to final.
- Oblige project leaders to report on progress ahead of division meetings – only short reports.
- Once a technical report or recommendation is fully approved, the processing for the publication in PAC should be fast and without any changes in content.
- Publication of project results should be mandatory either in PAC or in CI.

Brief analysis

Financial and Project Report.

The majority of projects are complying with their timeline or are within one year after the project scheduled completion date, but there are 14 that should have been finished in 2015 or earlier. We recommend that all projects that have continued past the scheduled completion date be examined and that a progress report be made by the task group chair, the probability that they will be finished assessed and, if it is concluded that they will be, a new completion date approved.

Responses to questionnaire

We thank the Divisions and Standing Committees for their valuable responses.

The diversity of the responses to the questions asked reflects the different objectives of the divisions and standing committees with respect to technical reports, recommendations, nomenclature, interdivisional activities and outreach. The suggestions for making the project running more efficient and the miscellaneous comments (questions 6 and 7) are particularly appreciated.

The main problems identified concern the progress of projects after approval and deviations from the original project plan that can be due to circumstances beyond the direct control of the task group members. The EvC recommends that all Divs and SCs implement the appointing of Div/SC committee members as mentors for each project, whose task is to follow the project at all stages throughout the process from inception to completion (at the present time this is widespread but not universal). They are also the contact in the committee should anything unexpected occur in the progress of the project, they obtain progress reports before the Division/SC meetings and ensure that such progress reports are placed on the project page in the website after validation in the Div/SC Committee meeting. Their function can also be to inform those Task Group chairs who are not familiar with the detailed workings of IUPAC projects, of any administrative details that are necessary for the formal procedures linked to project completion, production of final reports/recommendations and evaluation.

Comments were also made regarding the website. Inspection shows that the Divisions and Standing Committees are making use of the website to different extents and some have more

up-to-date information than others. There are difficulties in gaining access to the data pertaining to older projects and, in some cases, there is little or no data on progress immediately available concerning current projects. Given that IUPAC needs to actively demonstrate its activities and disseminate them widely, this aspect needs the full attention of the Division and Standing Committees.

We note the suggestion and recommend that publication of the results of all projects should be given either in PAC or CI, even if there are also other forms of dissemination.

Financial and Project Report 30 April 2017

The Financial and Project Report dated 30 April 2017 gives the following data, adding together the data from all the Divisions and Standing Committees, in the same way as for 31 December 2016, and using the colour coding in the report:

- | | |
|---|-----|
| - Completed projects | 28 |
| - Active projects with a completion date in 2017 or later | 118 |

Thus, in this 4 month period, a further 8 projects have been completed and the number of projects scheduled to be completed in 2017 or later has increased slightly from 111 to 118. Further, more continuous analysis would be needed to ascertain to what extent this rhythm of activity varies during the biennia, which will be easier to carry out in the future now that Financial and Project Reports are issued regularly.

2. Modification of the Evaluation Committee Terms of Reference

In the Bureau Meeting on 8 April 2017, it was decided that the Terms of Reference of the EvC (see https://iupac.org/who-we-are/committees/committee-details/?body_code=014) should be revised to broaden the EvC role in order to allow evaluation of the IUPAC Divisions and Standing Committees.

It is thus proposed that the following new Term of Reference be inserted as ToR “(iv)”:

(iv) To evaluate the roles and contributions of Divisions and Committees with respect to the mission and strategic initiatives of the Union.

The full Terms of Reference of the Evaluation Committee would therefore become (changes in italics):

- (i) To monitor statistical data on the nature and breadth of project portfolio and the geographical spread of Task Group participation.
- (ii) To examine project completion reports, identify lessons to be learned, and liaise with the Project Committee.

(iii) To collect and analyse reports from Task Group Chairs, Divisions, and Committees on responses to strategic initiatives of the Union.

(iv) To evaluate the roles and contributions of Divisions and Committees with respect to the mission and strategic initiatives of the Union.

(v) To report to the Bureau, in writing, annually on the results of the evaluations done.

(vi) To inform, after discussion in the Bureau, the National Adhering Organizations of the completed evaluations.

We therefore recommend that Council ratifies the modified Terms of Reference.

Evaluation Committee: Christopher Brett (chair), Lynn Soby (secretary),
Tavarekere Chandrasekhar, Jan Reedijk,
Mustafa Sozbilir, Bernard West

ANNEX 1

Evaluation Committee Short Questionnaire 2016-17

Div/SC...

Thank you for your cooperation

1. Which are the projects you have completed (not before 2012) that you would label as successes and how do you measure the success?
2. Have your recent projects, in general, kept to time? If not, should project timelines be longer?
3. Are there specific cases where the original timelines were inappropriate and this was not foreseen, or not able to be foreseen, at the review stage?
4. Which larger projects have continuity i.e. the topic does not have a start/end date and are divided up into a succession of smaller projects (e.g. colour books)?
5. Which of your recent projects do you think should be publicized widely in the media and be advertised to NAOs?
6. Are there ways in which the running of projects could be improved from inception through to final publication and measuring the success of the dissemination?
7. Any other comments or suggestions.

2015 IUPAC Finance Committee

Monday, 16 February 2015, 09:00 – 17:00 Hours
Offices of Reber Rechtsanwälte, Utoquai 55
CH-8034 Zürich, Switzerland

Minutes

Members Present: Dr. Christoph F. Buxtorf (Chair), Prof. John Corish, Prof. Wolfram Koch, Dr. Nobuyuki Kawashima, Dr. Lynn M. Soby

Lunch Discussion: Dr. Pat N. Confalone via remote access

1. INTRODUCTORY REMARKS & FINALIZATION OF AGENDA

Dr. Buxtorf welcomed those present at the meeting, and Dr. Pat Confalone who will join by phone during lunch and thanked Reber Rechtsanwälte for the excellent arrangements and facilities. He thanked Dr. Soby, Executive Director and the Treasurer for the excellent work that they had done putting the Detailed Agenda and Agenda Book together for the meeting. All present joined in their appreciation of the work.

Dr. Buxtorf suggested that in his view the pressing item of discussion should be the new Investment Policy given the change IUPAC has made with the Investment Portfolio in November 2014. He thanked the Treasurer and Executive Director for their assistance with developing the proposals for review and decision to recommend BB&T/Scott & Stringfellow. The Treasurer commented that the Finance Committee's time and attention regarding the 2016-2017 budget was very important and he wanted to insure there was enough time for the discussion. This was reinforced by the Executive Director.

There were no changes to the Agenda.

2. MINUTES OF 2014 MEETING

The minutes of the 2014 Finance Committee were approved unanimously without changes. Dr. Buxtorf thanked Prof. Corish for his attending to the minutes in the absence of an Executive Director last year.

3. FINANCE COMMITTEE MEMBERSHIP

The terms of service of the current members are as follows:

Dr. Christoph Buxtorf	2012-2015 (Second Term, retiring)
Prof. Dr. Wolfram Koch	2012-2015 (Second Term, retiring)
Dr. Nobuyuki Kawashima	2012-2015 (First Term, eligible for re-election)
Dr. Pat Confalone	2014-2017 (First Term)

The Treasurer and the Executive Director of IUPAC are *ex officio* members of the Finance Committee without voting power. The current Treasurer will retire at 31/12/2015. Dr. Buxtorf drew attention that the Chair of the Finance Committee would be vacated at the end of his term (2015) and recommendations for his replacement be sent directly to the President for consideration. In addition, Prof. Dr.

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Koch will also complete his term and recommendations for a replacement on the committee should also be suggested via email to the President. There will also be a change in Treasurer for 2016-2019, due to Professor Corish's retirement at the end of his service. A discussion ensued with Dr. Kawashima asking questions regarding the affect, if any, on Finance Committee members and their responsibilities and liabilities. Dr. Soby discussed the legal status of IUPAC in Switzerland.

[Action: Dr. Soby to review and send current documents regarding IUPAC legal status and additional information relevant to his concerns and requests]

Chairman Buxtorf clearly stated to the Finance Committee members to forward their recommendations directly to the President, Mark Cesa, for consideration of new members and Chairperson for 2016-2107.

4. ITEMS FROM MEETINGS OF EXECUTIVE COMMITTEE AND BUREAU

Dr. Buxtorf noted that the minutes of the two most recent Executive Committee Meetings and draft minutes of the Bureau were included in the Agenda Book. There were no actions related to the Finance Committee at this time.

5. FINANCIAL REVIEW

5.1. AUDITED ACCOUNTS – 2013

A copy of the Financial Statement for 2013 and the Auditors' report thereon is in the Agenda Book. Dr. Soby noted that the financial on-site audit work for 2104 is scheduled for March 5 -12th and that documents are being sent for the audit from both the Secretariat and the accountant, Leslie Davis.

5.2. ACCOUNTANT'S REPORTS – 2013

A copy of the external Accountant's final report for the full calendar year 2013 is in the Agenda Book. The corresponding report for the calendar year 2014 is in preparation concurrently with the pre-Audit documentation. When completed, it will be distributed to the Finance Committee via email (as an appendix to the Agenda Book).

5.3. REVIEW OF EXPENSE VS. BUDGET

Up to the current date in the 2014-2015 biennium budget, the Division Total actuals are under spent by \$241,974 while the Standing Committee Totals are under spent by \$73,924. The Project Commitment Report and Project Report are included in the Agenda Book for further details.

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	Commitments (Actual)	% of Total Budget (Guide line : 70 %)	Operations (Actual)	% of Total Budget (Guide line : 30 %)	Total Operations & Commitments (Actual)	Total Operations & Commitments (Budget)	Over/ (Under)	Per Cent Spent
Division I	\$21,910	37.0%	\$16,227	27.4%	\$38,137	\$59,200	-\$21,063	64.4%
Division II	\$14,940	30.7%	\$14,867	30.6%	\$29,807	\$48,600	-\$18,793	61.3%
Division III	\$12,300	25.7%	\$1,250	2.6%	\$13,550	\$47,900	-\$34,350	28.3%
Division IV	\$6,500	13.1%	\$4,776	9.6%	\$11,276	\$49,700	-\$38,424	22.7%
Division V	\$18,500	34.7%	\$6,890	12.9%	\$25,390	\$53,300	-\$27,910	47.6%
Division VI	\$12,500	20.9%	\$9,737	16.3%	\$22,237	\$59,800	-\$37,563	37.2%
Division VII	\$29,700	54.2%	\$12,789	23.3%	\$42,489	\$54,800	-\$12,311	77.5%
Division VIII	\$9,100	12.9%	\$9,740	13.8%	\$18,840	\$70,400	-\$51,560	26.8%
Total Divisions	\$125,450		\$76,276		\$201,726	\$443,700	-\$241,974	45.7%

	Commitments (Actual)	Commitments (Budget)	Over/ (Under)	Operations (Actual)	Operations (Budget)	Over/ (Under)
CCE	\$4,000	\$20,000	-\$16,000	\$10,667	\$35,500	-\$24,833
COCI	\$3,800	\$20,000	-\$16,200	\$3,765	\$37,000	-\$33,235
CHEMRAWN	N/A			\$17,921	\$27,500	-\$9,579
CPCDS	N/A			\$12,403	\$16,200	-\$3,797
ICTNS	N/A			\$1,020	\$3,500	-\$2,480
Total Committees	\$7,800	\$40,000	-\$32,200	\$45,776	\$119,700	-\$73,924

The summary below is the total commitment versus Budget, including the SOF, Project Committee and Financial Support for Conferences.

Summary	Commit.	Budget*	Over (Under)
Division and STC Projects Totals	133,250	350,590	(217,340)
Strategic Opportunities Fund	19,000	183,515	(164,515)
Project Committee	34,910	70,000	(35,090)
FSC	12,700	35,000	(22,300)
	199,860	639,105	(439,245)
External Funded	8,800		
Total Project Commitments (all sources)	208,660		

The Finance Committee expenses for 2014 were \$18,595 versus 2014-2015 budget of \$13,200. The Treasurer explained that this over spending is a result of contracting the former Executive Director, Terry Renner, for assistance with the 2014 Finance Committee meeting and travel. Also included in the actual spend figure was the cost associated with legal advice regarding IUPAC's legal standing in Switzerland and preparation of documents required. The operations of the Secretariat are under spent due to the open Executive Director position, one open position and 4 months of salary gained upon reduction of staff in August. Unusually high (one off) expenses were incurred in 3rd and 4th quarter due to IT infrastructure failures, computer failures and lack of security and implementation of back up procedures (both Website and internal systems).

Finance Committee reviewed the information and is aware of the over budget figures given the status of the Secretariat and the need of the Officers for clarification of Legal Status. No action was needed.

5.4. RESERVES AND SPECIAL FUNDS

The Executive Director reported that the IUPAC portfolio was changed over to an actively managed portfolio late November 2104. A summary of the

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investment performance prior to the changeover is included in the Agenda Book (section 7.1). Up until the changeover, the average income from bonds denominated in USD was 4.40%, while the average income from bonds denominated in EURO was 3.41%. The overall average was 4.03%. Since inception, the BB&T Investment portfolio is estimated to return 3.62% of dividend and income. Capital appreciation is expected to be ~2.4% for a combined return of ~6.0%.

A percentage of **3.5%** was recommended for the Special Funds rate in 2015 given past performance and anticipated future returns.

A summary of the investment performance after changeover is included in the Agenda Book (section 7.2)

[Finance Committee unanimously approved the 3.5% return for the Special Funds Rate]

5.5. FINANCIAL RESULTS FOR CI AND PAC IN 2014

In 2014, CI was published for the full year with our partner, De Gruyter. Overall, IUPAC shares 50% of the Revenue, 50% of Production/Overhead costs and 100% of Distribution costs. The net loss for CI in 2014 was \$40,593 (USD).

IUPAC Costs (USD)	Total IUPAC Payment	
Revenue	40,034	18,454
Production/OH Costs	83,484	41,742
Distribution Costs	18,868	18,868
Total		79,064
Net Loss for CI (Revenue-Costs)	20,017	
	60,610	
2104 Net Loss for CI	(40,593)	

Looking ahead to 2015, it is anticipated that lower costs will result from De Gruyter's hire of staff to replace the freelancer. The Business plan reflects a slight increase in revenue, lower production costs and higher overhead costs (internal staff). The 2014 and 2015 business plans are included in the Agenda Book.

PAC Publication with De Gruyter for 2014 and Plan for 2015:

	2014	2015
	Euro	Euro
IUPAC Share	131,204	201,276
Advance Payment	(72,000)	(100,000)
IUPAC Year-end Payment	59,204	101,276

as of 9/2014

2014 Net IUPAC Publishing Revenue with De Gruyter:

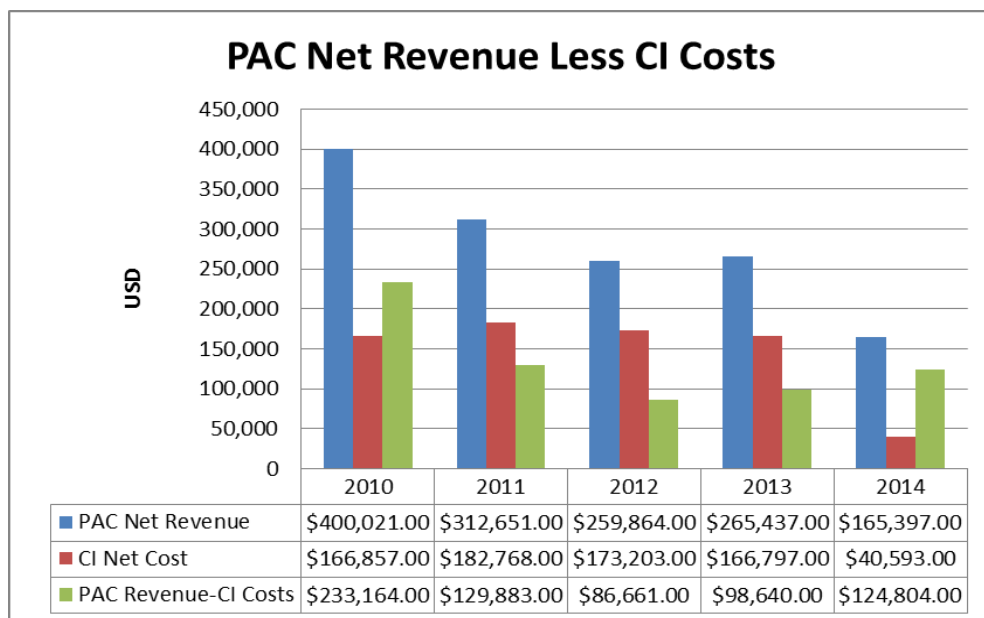
PAC Net Revenue 2014: \$165,397 (from est. 9/2014 Business Plan)

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CI Costs 2014: (\$40,593)
\$124,804

The comparison of PAC Revenue less CI Costs for the past 5 years is shown below. The overall Net Revenue in 2014 is approaching the 2011 value (\$129,883)



6. NATIONAL SUBSCRIPTIONS

6.1. 2014 NATIONAL SUBSCRIPTION PAYMENT STATUS

The Executive Director reported that as of 5 February 2015, National Subscription payments from 19 NAOs were overdue, amounting to USD \$103,667 in missing revenue for the year 2014 (2014 Budget is \$913,000). This number is significantly higher than last report (12) while the financial impact is similar. The Secretariat is pursuing payment from these NAOs, among which most have indicated that they intend to make payment in the first quarter of 2015. One country, Cyprus, has withdrawn from IUPAC (\$~3,000 not paid) while 4 other NAO's were determined from statute S9.2 to be automatically removed from membership. See the Table in the Agenda Book for details.

6.2. 2015 NATIONAL SUBSCRIPTION PAYMENT STATUS

As of 5 February 2015, 11 NAOs have already paid their National Subscriptions for 2015. The total amount paid is USD \$194,900 (2015 Budget is \$940,500). The numbers are the same for 2014, while the value is

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~\$95,000 higher. See the Table in the Agenda Book for details.

7. INVESTMENT PORTFOLIO

7.1. INVESTMENT TRANSACTION HIGHLIGHTS 2014 AND 2013

The Executive Director reported that the Investment Portfolio was transferred in November 2104 to BB&T following a decision of the Executive Committee on advice from the Finance Committee – cf. item 8 below for details. The Agenda Book contains the 2014 closing statements for our two investment accounts at the time at which the transfer took place. As is our standard practice, dividends received up to that time from mutual funds were reinvested, while interest received on bonds was used for operations.

Investment portfolio transactions for 2014 are itemized in the tables below:

Wells Fargo EURO Account 2014

2014	Purchase	Sell/Redeem	Div/Int	Deposits	Withdrawals	Prev. Value+ net purchases	Market Value (NIC)	Gain/(Loss)	Yield
Jan	-	-	0	-	17,000	865,814	846,343	(19,470)	-2.25%
Feb	-	-	6,519	-	-	846,343	864,565	18,222	2.92%
Mar	-	139,021	6,910	-	-	725,544	722,919	(2,625)	0.59%
Apr	-	-	6,737	-	12,475	722,919	725,581	2,662	1.30%
May	-	-	7,375	-	-	725,581	713,039	(12,542)	-0.71%
Jun	-	-	1	-	-	713,039	713,779	740	0.10%
Jul				19,388	33,500	713,779	695,198	(18,581)	-2.60%
Aug	-	-	(299)		-	695,198	682,540	(12,658)	-1.86%
Sep			1			682,540	652,487	(30,053)	-4.40%
Oct			1			652,487	791,363	138,876	21.28%
Nov			1			791,363	-		
Dec	Assets Transferred to BB&T Nov. 18th, 2014								
Total	-	139,021	27,246	19,388	62,975	726,793	713,779	(13,014)	1.96%

Wells Fargo USD Account 2014

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2014	Purchase	Sell/Redeem	Div/Int	Deposits	Withdrawals	Prev. Value+ net purchases	Market Value (NIC)	Gain/(Loss)	Yield
Jan	-	-	3,250	-	33,000	3,031,265	2,992,104	(39,161)	-1.18%
Feb	-	-	3,225	-	-	2,992,104	3,078,293	86,189	2.99%
Mar	8,823	-	15,498	-	-	3,087,116	3,067,783	(19,333)	-0.12%
Apr	-	-	2,525	-	13,208	3,067,783	3,078,254	10,471	0.42%
May	-	-	5,125	-	-	3,078,254	3,118,085	39,831	1.46%
Jun	6,895	-	15,395	-	-	3,124,980	3,143,867	18,887	1.10%
Jul	-	-	3,250	-	19,400	3,143,867	3,098,025	(45,842)	-1.35%
Aug	-	-	3,225	-	-	3,098,025	3,156,490	58,465	1.99%
Sep	5,696	-	12,371	-	3,226	3,162,186	3,103,897	(58,289)	-1.45%
Oct	-	-	9,201	-	-	3,103,897	3,137,498	33,601	1.38%
Nov	-	-	5,125	-	3,135,110	3,137,498	-	-	-
Dec	Account Balances were swept into BB&T accounts.				-	-	-	-	-
	21,414	-	78,356	-	3,203,944	3,052,679	3,103,897	51,218	4.24%
			adj. from statement 11/30/2104						

7.2. PORTFOLIO PERFORMANCE 2014

Portfolio Performance 2014 (Wells Fargo Accounts November 2014)

	2014	Current Market Value	Annual Income	Annual Yield (%)
	Investment Type			
USD				
	Corporate Bonds	1,207,762	52,100	4.31
	Foreign Bonds	115,967	6,500	5.61
	Total Fixed Income	1,332,569	58,600	4.40
	Preferreds/Fixed Rate	0	0	
	Mutual Funds	1,774,295	30,421	1.71
EURO				
	Corporate Bonds	140,000	4,750	3.39
	Foreign Bonds	695,197	23,750	3.42
	Government Bonds	0	0	
	Total Fixed Income	835,197	28,500	3.41
Combined		3,933,221	117,521	2.99
Combined Fixed-Rate Only		2,158,926	87,100	4.03

8. CHANGE IN MANAGEMENT OF INVESTMENTS

8.1 APPOINTMENT OF BB&T AS FINANCIAL ADVISORS

After detailed consideration and discussions with prospective service suppliers the Finance Committee in a statement dated 31st October 2104 recommended to the Executive Committee that a change be made to the union's investor and bank relationships. This recommendation is reproduced in full in the Agenda Book. This recommendation was approved and has been implemented. The December

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2014 investment statements are in the Agenda Book. A summary of the Inception to Date of our investment portfolio, prepared by BB&T/S&S, is included in the Agenda Book.

8.2 UPDATED DRAFT OF IUPAC INVESTMENT POLICY STATEMENT

A draft of the new Investment Policy Statement in the Agenda Book was reviewed and approved by the Committee. This reflects the new arrangements that have been made for the management of the investment portfolio and for reporting of its performance to the Finance Committee.

8.3 IUPAC FUND POLICY STATEMENT

The current IUPAC Fund Policy Statement was included in the Agenda Book and was reviewed and amended by the Committee in line with the changes that had been highlighted.

8.4 FUTURE REPORTING AND REVIEW OF PORTFOLIO

It was agreed that our investment manager, Doug Bray, and the BB&T Investment Team will review progress with the Finance Committee at the end of each quarter and provide monthly summary reports to the Executive Director for distribution to the Finance Committee. Tentative schedules were set as the 1st week in April, 1st week in July, 1st week in September and end of year report in January 2016. If required, monthly investment statements can be sent to the Committee members for informational purposes. The Quarterly reviews will be done via Go To Meetings.

9. REPORT ON OPERATIONAL EXPENDITURES/SAVINGS FOR 2014

The Treasurer reported that the operational finances of the Union, particularly as reflected by the Secretariat had varied from those anticipated at the time when the budget for the current biennium was put in place. There have been extensive changes in the administrative staff with Dr. John Petersen, the former Executive Director, Mr. Paul LeClair and Mr. Bryan Pearson leaving the organization. At this time only one of these has been replaced: Dr. Lynn Soby was appointed as Executive Director on July 24th 2014. Of the officers Dr. Rene Deplanque resigned as Secretary General early in 2014 and Mr. Colin Humphris was subsequently appointed by the Bureau at Coimbra in April as Acting Secretary General. Despite these interruptions and the reduction in personnel all the essential operations have been carried out by the remaining staff and officers and all the financial obligations have been fulfilled, including a successful audit of the accounts for 2013.

The 2014 meeting of the Finance Committee had noted the decline in the income streams from our publishing operations and investment portfolio. The corrective actions recommended by the Committee in these and other areas have been implemented – cf. also item 12 below. In addition the new guidelines for the reimbursement of travel and subsistence expenses, which it is hoped will reduce expenditure in this area and eliminate the type of overrun evident at the General

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Assembly in 2013, were introduced in January 2014 and are working well. Further improvements in the service to our volunteers in this regard are planned. Expenses and costs additional to those set in the budget include an overrun at the General Assembly in 2013 some of which passed over into 2014, the costs of search and appointment of the Executive Director, the upgrade of our accounting software and processes, the move of the Secretariat to new office accommodation in January 2015 and the outsourcing of some IT functions following the resignation of Bryan Pearson. Savings against budget should result from the reduction in the costs of salaries due to temporarily reduced staff numbers, a decision to hold a virtual Bureau Meeting in Spring 2105, savings negotiated at the General Assembly in Busan and reductions on travel and subsistence.

10.

CHANGES IN FINANCIAL MANAGEMENT AND PROCESSES

10.1 NEW ACCOUNTING PRACTICES IN THE SECRETARIAT

The Executive Director reported that a review of the IUPAC financial system, functionality as well as the skills and processes that were in place was done in August 2014 and a determination that QuickBooks was a viable and widely used system that should suit IUPAC's needs (given the number of transactions and size of the business). The key issues were:

- The accounts and processes are not consistent with general accounting principles (GAP), cost accounting rules.
- The use of the multiple currency capability was not used and thus all currency exchanges are manually calculated and recalculated in order to account only in USD.
- Data entry was inconsistent for the recent years due to organizational changes.

Mr. Tom Vipperman, MBA, and Certified QuickBooks Professional and CFO was brought in to review the system and our use. A proposal for complete restructuring was developed and approved by the Officers and is essentially completed. The objective was to have an operational financial system that is GAP compliant and functions for all IUPAC's accounting needs. This will insure a solid financial footing upon which future reporting and business management can be accomplished with confidence and efficiency. The restructured QuickBooks 2015 is currently up and running as of January 30, 2015.

The next phase is to integrate other systems into QuickBooks (financial reports, payroll, expense claims) to enhance our capabilities and reduce data entry time whenever possible.

10.2 FUTURE AUDIT PROCESSES

The Executive Director reported that the Union will continue to engage third party auditors for our financial records as well as filing the required tax documents for maintaining our non-profit status in the US. Our new financial

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accounting information system will be compliant with GAP standards and as such, is expected to require significant less CPA involvement from a third party CPA.

11. REVIEW OF DRAFT BUDGET FOR NEXT BIENNIUM (2016-2017)

The Treasurer reported that the Draft budget proposed to the Finance Committee has been drawn up with the benefits of considerably improved levels of information than has been the case in earlier biennia. On the income side the new arrangements for the investment of our portfolio has provided a definite goal for our income. The budget, as it has done in previous years, includes only income from dividends and interest: gains in the values of securities will not be realized. The experience of the first year working with the new publishing arrangements has also allowed us to make a better estimate of the income from that source although it may prove possible to make further savings on Chemistry International. On the expenditure side the new financial management and control systems recently introduced in the Secretariat means that the estimates of expenditure there can be realistic and that it will also be possible to have real time information of how that expenditure is progressing against the budget provisions so that adjustment and correction will be feasible for the first time.

The budget is based on a 3% year-on-year increase in the total request from National subscriptions. How that will break down for individual members depends also on other factors such as the changes in the chemical turnover in a country and in the exchange rate of its currency against the U.S. dollar. These two latter factors typically have a greater influence in how individual subscriptions change from one biennium to the next. We have also gained some new members since the last biennium which will lessen the burden on existing members but four countries have automatically ceased to be members through default in subscriptions over two years. In view of the generally difficult situation no new expenditures are proposed although it is recognized as the outcome of a detailed costing for 2015 that a more realistic funding must be provided for the Secretariat. Neither have any additional cuts beyond those introduced in the current biennium been introduced so that the programs operated by the Divisions and Standing Committees can continue at the same pace as heretofore. These provisions lead to a draft budget that it is deficit and although it has not been our custom to propose other than balanced budgets it should be possible to cover any deficit, should it arise, by drawing on the unrealized gains from the investment portfolio. The deficit could also be reduced by curtailing expenditures as we have done this year in respect of the meetings of advisory committees and by the increased general use of digital meeting technology to decrease travel costs.

The year just past, 2014, has been our first experience without the ‘cushion’ to our cash-flow of the subscription income to PAC: this is now collected by our publishing partners DeGruyter. Whereas it has been possible to manage it should be recognized that regulation of our cash flow has now largely passed outside of our control as its supply side depends essentially on the rate at which our members pay their subscriptions. It may therefore be worthwhile giving consideration to devising ways to encourage early payments or payments by installments although this would be unlikely to be popular with our NAOs.

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The Finance Committee, while noting and acknowledging the difficult circumstances under which we operated, nonetheless advised that it would be preferable to continue our practice of presenting balanced budgets. This could best be achieved by cutting expenditures and the Committee further advised that activities should be prioritized to allow choices to be made.

12. FUNDRAISING STRATEGIES AND NEW SOURCES OF REVENUE

The Treasurer reminded the Committee that the annual income of the Union used to support its operations comes from three principal sources:

- National Subscription payments from National Adhering Organizations (NAOs);
- Income from publication of *Pure and Applied Chemistry* and *Chemistry International*;
- Income from the investment portfolio.

Following a realization that the income streams from both publications and investments were steadily declining corrective actions have been taken. In the case of our publications both PAC and CI, commencing January 2014, have been published in partnership with DeGruyter. The outcome for 2014 will see a halt in what had been a constant downward slide in the overall level of income from publications and it is anticipated that the marketing power of the publisher as well as cost savings will in future years reverse that trend. A wide-ranging review of *Chemistry International*, which has been a cost to the Union over the years, is attempting to identify and thus better satisfy customer needs and to redress that situation.

High-quality corporate bonds in IUPAC's investment portfolio that were purchased up to ten years ago and which were generating annual yields of about 5-8% have been maturing over the last four years. Upon redemption, it has not proved possible to find new bonds in which to reinvest the proceeds of the original bonds. Currently available yields are on the order of 2 to 4 times lower than previously and, as reported above; the portfolio has now been transferred to BB&T where it will be proactively managed.

If annual income fails to match expenditures, it becomes necessary to utilize capital from maturing bonds to sustain normal operations of the Union. Unfortunately, this has been the case during the past biennia. The consequent reduction in the investment portfolio leads to additional deterioration in the financial position of the Union.

In order to compensate for the decline in income streams from publications and from investments during the past years, the Union must identify new opportunities and sources of income to replace the current losses. Any new sources of revenue must also be evaluated for their possible impacts on the tax status of the Union in both Switzerland and the US.

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13. REVIEW OF TERMS OF REFERENCE OF FINANCE COMMITTEE

The current terms of reference of the Finance Committee were given on the first page of the Agenda Book. The Committee agreed that these should be updated to reflect the changes in the management of the finances of the Union detailed by the meeting.

15. DATE AND LOCATION OF NEXT MEETING

The next meeting will be held on Monday February 8th 2016 in Zurich.

Respectfully Submitted,
Dr. Lynn M. Soby
Executive Director

Date: 17 June 2015

IUPAC Finance Committee Meeting

Monday, 8 February 2016, 09:00 – 17:00 Hours

Offices of Reber Rechtsanwälte, Utoquai 55

CH-8034 Zürich, Switzerland

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Members Present: Prof. John Corish (Chair), Prof. Urs T. Ruegg, Dr. Georg F.L. Wießmeier, Mr. Colin Humphris (Treasurer), Dr. Lynn M. Soby (Executive Director)

Members Absent: Dr. Nobuyuki Kawashima

Remote Members: Dr. Pat N. Confalone (participated by phone)

Secretary: Dr. Lynn M. Soby

1. INTRODUCTORY REMARKS & FINALIZATION OF AGENDA

Prof. Corish welcomed those present at the meeting, and Dr. Pat Confalone who joined by phone at 11:00 am local time and thanked Reber Rechtsanwälte for the excellent arrangements and facilities. He welcomed the new members of the committee, Prof. Urs T. Ruegg, Dr. Georg F.L. Wießmeier and thanked them for serving on the committee. He thanked Dr. Soby, Executive Director and the Treasurer for their excellent work that they had done putting the Detailed Agenda and Agenda Book together for the meeting. All present joined in their appreciation of the work.

Prof. Corish made opening remarks for the committee that stressed the need for good transparency for the FC and explained the role of the Treasurer and Executive Director in management of the operations. In his view the Finance Committee's role was more as an Audit Committee given the change in having an actively managed investment portfolio and as advisors to the budget development. The Treasurer commented that the Finance Committee's time and attention regarding the 2014-2015 biennium results was very important and given the implementation of accrual accounting and processes, he wanted to insure there was enough time for the discussion. This was reinforced by the Executive Director.

Professor Corish recommended a change to the Agenda to include in the footer, a statement regarding financial information for 2015 reported in the Agenda or supporting documents were unaudited and subject to change. Future FC documents should include this statement.

2. FINANCE COMMITTEE MEMBERSHIP

Dr. Soby reported that the terms of service of the current members were as follows:

Prof. John Corish (Chair)	2016-2019 (First Term)
Dr. Georg F.L. Wießmeier	2016-2017 (First Term)
Prof. Urs T. Ruegg	2016-2019 (First Term)
Dr. Nobuyuki Kawashima	2016-2019 (Second Term)
Dr. Pat Confalone	2014-2017 (First Term)

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Professor Corish has begun his first term in 2016 as a member of the Finance Committee and to serve as its Chair.

Dr. Georg F.L. Wießmeier is serving his first term of two years starting in 2016 and is eligible to continue on the Committee until the end of 2017. Prof. Urs T. Ruegg is serving his first term of four years on the Committee starting in 2016; this term expires at the end of 2019.

Dr. Pat Confalone is serving his first term of four years on the Committee starting in 2014; this term expires at the end of 2017 and is eligible for a second term.

Dr. Nobuyuki Kawashima is serving his second term of four years starting 2016 and will expire at the end of 2019. His first term was 2012 through 2015.

3. FINANCE COMMITTEE TERMS OF REFERENCE

The Terms of Reference for the Finance Committee were reviewed by the members and with no suggested change.

4. MINUTES OF 2015 FINANCE COMMITTEE MEETING

A discussion regarding some items in the Finance Committee minutes as well as the current agenda reflected a number of key observations and questions, particularly from the new members on the committee. Prof. Ruegg expressed concerns about the National Adhering Organization payment and cash flow effects. Mr. Humphris reviewed procedures regarding the budget development for 2016-2017 and provided an overview of the Governance structure of IUPAC. Dr. Wießmeier expressed his interest in understanding the cash flow problems and issues related to the exchange rate and effect on the NAO payments. He also was interested in an in depth review of the project system and details. He saw a need for IUPAC to coach the NAO's regarding sources of money and exchange rate management.

The minutes of the 2015 Finance Committee were accepted without changes.

4.1. ITEMS FROM MEETINGS OF EXECUTIVE COMMITTEE AND BUREAU

There were no actions from these meetings related to the Finance Committee at this time.

5. FINANCIAL OPERATIONS BIENNIUM REVIEW

Mr. Humphris discussed the biennium review of the financial operations and the management and financial systems that were put in place during 2015 to allow IUPAC to report financials on an accrual accounting basis. He stated that we now have better capability to track income and expenses for the financial transactions and are in GAAP compliance, both from processes as well as methods.

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5.1. THE PROFIT AND LOSS STATEMENT FOR 2014-2015

The Profit and Loss statement for the full year was discussed stating that IUPAC exceeded revenue projections of \$1.280M by \$138K due to the booking of publication income from PAC. The Treasurer reviewed the noteworthy items that had not been included in the original budgets, such as accrual of earned vacation and that no provision was made in the 2015 budget for CI costs, which totaled \$98K. He stated that the year ended with a net loss of (\$128K) in relation to a \$30K projected net profit.

Professor Corish recommended that future reports be more transparent to the committee. He suggested having an Excel file with the option to view all items, especially given the new capabilities in the Secretariat. Also, that relevant data be marked “subject to audit”. It was noted that the exchange rate effect in 2015 of \$45K was greater than budgeted.

5.2 BALANCE SHEET FOR 2014-2015

The Treasurer and Executive Director reviewed the Balance Sheet statements of Financial Position for 2014 and 2015. Overall, the 2015 cash equivalent position had decreased from \$620,814 in January to \$160,213 on 31 December 2015. The committee discussed the key items reported on the Balance Sheet.

The critical situation regarding cash flow and operation of the union was discussed. Cash flow remains a difficulty in the management of the union, given the uncertainty of payments, payment timing and unpredictable and unforeseen expenses. A discussion ensued regarding ideas to incentivize earlier payments. Prof. Corish explained the challenges given that many of IUPAC’s NAOs receive their monies from National Academies and do not have certainty when their funds will be available.

A recommendation was made by Prof. Corish to include more information regarding sources and uses of funds for discussion with the committee in the future.

5.3 INCOME STATEMENT FOR 2015

5.3.1 NATIONAL ADHERING ORGANIZATIONS SUBSCRIPTIONS FOR 2015-2016

STATUS OF PAYMENTS: The status of payments of the NAO’s was reviewed by Dr. Soby. The withdrawal of Luxembourg and removal of Tunisia, Ethiopia, Colombia (Provisional) and Costa Rica (Provisional) were noted. The financial impact on the 2016 budget were discussed and it was noted that an overall loss

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for 2014-2015 was \$22,395. The status of 2015 National Subscription payments was discussed: the outstanding account receivable was \$85,864.

CASH FLOW ISSUES

The impact of NAO national subscription payments to operating cash flow was discussed and the 2016 receivables compared to 2015 in the time period between Septembers (invoice) to 15 January was 50% lower. (\$62K vs. \$122K). A review of inflows, outflows, net cumulative cash flow and major expenses was presented by Dr. Soby and Mr. Humphris.

5.3.2 OTHER SUBSCRIPTIONS AND INCOME

COMPANY ASSOCIATES: The Company Associate program was outlined for the Finance Committee by Mr. Humphris. The CA program invoice schedule for 2016, the progress of an active review of the program and the relative impact on income were discussed.

AFFILIATE MEMBERSHIP PROGRAM:

A review of the current Affiliate Member program was presented by Mr. Humphris and stated that the membership program and value proposition are under review and pending decisions on future of *Chemistry International*, a key benefit to the AMP individuals. The financial impact of the sponsored individuals and countries was discussed. The value proposition will be evaluated by the Membership Relations Committee in late 2016-early 2017.

5.3.3 FINANCIAL RESULTS FOR *PAC* AND *CI* IN 2014 and 2015

A review of the financial results for *Pure and Applied Chemistry* (PAC) and *Chemistry International* (CI) was presented. The issue of the capability to authenticate users through the new IUPAC website was discussed in order to have AMP members and volunteers gain access to DeGruyter's website.

Mr. Humphris discussed that IUPAC and De Gruyter are working on a new business model for 2017 onwards with an eye toward a zero cost basis, a new digital first model and a re-envisioning of CI as a seasonal print magazine. The PAC financial statements were reviewed along with the 2016 forecast of net revenue and noted that De Gruyter put in place a sales strategy to recoup a significant amount due to the loss of Swets (a large subscription service) to give the current improved forecast.

Further discussion was regarding the new database developed with DeGruyter "IUPAC Standards On-Line" as an added value, subscription bearing tool to facilitate advanced searches of the PAC back catalogue. Mr. Humphris stated

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that the income from this agreement will yield a royalty of 12.5% for IUPAC and will be launched in early 2016. The 2016-2017 budgets reflected the expected income of \$19,300 increasing to \$29,000 in 2017 from this new royalty stream.

5.3.4 PORTFOLIO INTEREST AND DIVIDEND INCOME

The Executive Director reported that during December 2015, income of \$125,000 was drawn from the returns of the investment portfolio to assist with cash flow management. IUPAC has used interest and dividend income from investments in the past and this is normal operating procedure. A line of credit was also opened with BB&T in order to provide cash if outflows exceed inflows. The variable rate of the line of credit is the prime rate +0.5% and credit of \$100,000. The request of \$25,000 from this credit facility on 29 January 2016 was used to cover expected cash flow needs up to 15 February 2016.

Mr. Humphris asked the committee to carefully consider the issue of continuing spending at the current rate (deficit). Professor Corish remarked on the efficient use of funds and how to identify cost savings. He reminded the Executive Director that the Administration needs to spend on or less than allocated budget.

5.4 EXPENDITURES 2015

5.4.1 DIVISIONS AND COMMITTEES

The Executive Director discussed the Financial and Project and Commitment Report (effective date of 31 December 2015). The total expenses of the Divisions were underspent by ~3.4% (\$15,100). The Standing Committees were underspent by 23.3% (\$58,600) while the remaining expense items were under budget by 14.1% (\$64,800). Overall, the actuals versus budget for 2014-2015 were underspent a total of ~12% (\$138,500). The two main items responsible for this total underspend were:

1. Busan General Assembly was under budget by \$49,217
2. The Bureau was under budget by \$47,900 as a result of holding a Virtual Bureau meeting in May 2015.

5.4.2 BUSAN, KOREA GENERAL ASSEMBLY

The Executive Director discussed the details of the underspending of the General Assembly, in Busan, Korea. The Actual expenses to date were \$275,782.92, which translated to \$49,217 underspent. By far, the largest expenses were transportation, \$162,903.87 and subsistence, \$105,936.12.

A number of reasons why the Busan General Assembly was under budget were noted:

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1. Previously, no Claim Forms were requested, whereas since Busan claims are based on receipted expenses, not a per diem. The claim forms were carefully reviewed against allowable expenses.
2. Supported Delegate claims were properly assessed at max \$2,000 and \$700 for support.
3. Planning effectively for the room needs and holding firm on no additional requests.
4. The organizing committee and the city of Busan were generous in their support for many items such as combined Opening and Closing Ceremonies; the Bureau dinner became the Busan City dinner and was paid for by the Mayor of Busan; Bureau members received free Congress registration, which entitled them to lunch throughout the week.

5.4.3 THE SECRETARIAT

The Finance Committee reviewed and discussed the Secretariat's P&L Statement and further discussed the items below:

5.4.3.1 SPECIAL ITEMS OF EXPENSES (INVESTMENTS) OCCURRED IN 2015

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The Secretariat moved from the old location in 31 January 2015 and into “semi-permanent” space 13 March 2015. The moving expenses (\$4,006) incurred were for both moves of mostly possessions and moving over 7,000 books into lower cost warehouse space to reduce the footprint in the new office space. These two moves involved additional IT resource (labor and materials) for installing and removing all IT cabling in the temporary space and installation in the permanent space (\$~7,000).

The move to a significantly smaller office space required the purchase of new furnishings for the space. The furniture costs are being depreciated (\$12,407) as appropriate and the capital investment is \$25,000.

A second significant additional expense within the Secretariat’s budget was the Phase 0 and Phase 1 of the new IUPAC.org Website. Phase 0 was the development of a demonstration site to “launch” to the IUPAC members, Council and others. Phase 1 is for the development of the actual site, to be launched in mid-February. The estimated costs of \$39,700 did not include a demonstration site for showing at Busan. The expense to date for the Phase 1 development was approximately \$40,000.

During the 4th Quarter of 2014 until end of July 2015, a QuickBooks expert consultant was engaged for reconstructing the financial system. This work required a complete change to accrual accounting from cash methods. Upon the hiring of a Financial Controller, Jay Lucido in July, the consultant’s work was completed. This expense was approved at the November 2014 Executive Committee meeting.

The hiring service fee associated with the Financial Controller costs was \$13,200.

5.4.3.2 General Expenses

Having an improved financial accounting system, processes and financial control over expenses, 2015 was the initial year of tracking expenses versus estimated budget figures (in the 2014-2015 budget). This year allowed more accurate forecasts of the financial needs for 2016 and 2017. The approved budget for 2016-2017 was developed from a bottom up financial calculation based on best estimates during January-February 2015. Overall, the general expenses, after exceptional items above are summarized below.

Expense	Actual	Budget	Variance
Fixed Costs-Salaries & Benefits	\$518,115	\$472,098	(\$46,017)
Fixed Costs - Insurance & Taxes	\$44,517	\$45,997	\$1,480

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General & Administrative Expo	\$103,682	\$74,017	(\$29,665)
Contracted Services	\$75,525	\$26,250	(\$49,275)
Accounting Fees - CPA	\$14,375	\$5,900	(\$8,475)
Audit Fees	\$22,973	\$20,350	(\$2,623)
QuickBooks Consultant Fees	\$24,976		(\$24,976)
Robert Half and Associate Fees	\$13,200		(\$13,200)
Facilities and Equipment			
Depreciation Expense	\$12,407	\$10,000	(\$2,407)
Other Expenses	\$5,641	\$8,600	\$2,959
Travel and Meetings	\$1,804	\$15,715	\$13,911
2015 January - February Bottom up Budget	\$761,691	\$652,677	(\$109,014)
From 2014 - 2015 Budget	\$565,000		

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5.4.3.3 2016-2017 Budget Projection

The Secretariat budgets approved by Council for 2016 and 2017 are \$690,700 and \$709,400 respectively. There is no increase in staffing levels in the budgets but they do include staff increases of ~3.0% for performance-based raises and increased employer contributions to health insurance. It does not include additional funds for Phase 2 of the IUPAC Website.

5.4.3.4 Anticipated Cost Savings in 2016

During 2015, the lease costs were lowered by decreasing the footprint, gaining 2 months of “free” space and an inclusive lease for electric costs and other costs that we had been paying. It is expected that the IT services will be significantly reduced and a reduction in IT equipment costs is expected as staff computers were upgraded during the year.

The most significant expected cost savings in 2016 will result from having an internal financial controller who will work directly with the Audit firm for both the Audit and preparation of the federal tax 990 filing. In 2016, improving the banking costs and fees with the providers and use of other technologies will be explored. The Secretariat budget has little room for reductions on the Fixed Costs and better tracking and management of the Variable Costs may lead to some minor savings (phone and IT equipment).

A slight cost increase in the lease is expected due to the square footage increase to 2,525 from the current 2,194 sf due to the office relocation (per the contract) to another space on the current campus. The 2016 secretarial budget with the new building lease contract was reviewed with the Finance Committee.

6. OPERATIONAL MANAGEMENT PROCESSES

6.1. SECRETARIAT CAPABILITIES AND CURRENT STATUS

THE CLAIM FORM PROCESS

Dr. Soby stated that the processing of IUPAC’s Claim forms is a labor-intensive workflow and has increased since a receipted reimbursement policy was put in place. The General Assembly in Busan was the first GA where receipts were required. While the claim forms were optimized to enable a better tracking process, it remains a process that needs focused improvements, both from the Secretariat as well as the claimants and manages to balance cash flow issues. A formal Travel Policy draft for future improvements as well as identifying other process improvements in the Secretariat will be done throughout 2016 (Executive Director and Treasurer). The breakdown of the claims handled in 2105 is below:

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Type	Number
General	156
Allocated	50
Administrative	24
General Assembly	134
Other Organizations	5
Total	369

STATUS OF WEBSITE AND OTHER INFORMATION SYSTEMS

INFORMATION SYSTEMS

Information technology platforms, hardware and software were upgraded during 2014 and 2015. Briefly, compatibility and access has been upgraded in the secretarial office and the remote office at Boston University. The operating systems on 6 key Virtual Machines (offsite at Tranquil hosting) have been updated as they were approaching “end of life” with little available support. This includes www.iupac.org, which was of major concern.

NEW IUPAC.ORG UPDATE

A review of the new website development efforts were discussed in detail during the meeting along with a demonstration of the front-end development and back-end systems. The current soft launch is planned for first quarter 2016 and preferred date of launch as about 20 February 2016.

6.2. 2015 AUDIT PROCESSES

There were no material issues discussed regarding the 2015 Audit process and expectations of reduction of costs and timing.

The Treasurer and Executive Director suggest a review of potential audit firms schooled in the non-profit area of expertise in order to propose a possible change in auditors. This would need Council approval at the General Assembly in São Paulo, Brazil in July 2017 and would be for 2017 and 2018.

7. BUDGET FOR 2016-2017

7.1. COUNCIL APPROVED BUDGET

The 2016/2017 budget process and National Subscription methods were reviewed by Professor Corish, who explained the rationale behind the proposal of an interim model for Council approval. The projected expenditures were determined with the

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benefit of the information on real costs incurred during 2014 and utilizing the new and very much improved financial instruments implemented during the last year in the Secretariat. They were therefore more realistic than heretofore. However, more careful considerations clearly showed that the outcome predicted by this model was rendered unfit for purpose by the changes in exchange rates that had occurred during the years 2014 and 2015..

And so an alternate budget – which was termed the ‘Proposed Interim Budget’, was drawn up and recommended to Council for adoption after it had been carefully considered by the Officers and approved by the Bureau. The expenditure figures in this budget were identical with those in the current model budget, since these were believed to represent accurate and realistic estimates of the costs that would be incurred during the biennium. However, the basis upon which the income from NAO subscriptions were determined had to be changed. This was essential because the effects of the changes in the CEFIC data used in the current model to determine the percentage allocation to each NAO and, more potently, the effects of changes in the exchange rates revealed the second serious difficulty with the current model. Large variations between the subscriptions calculated for 2015 and those calculated for 2016 and 2017 were evident for a number of the NAOs and it was clear that a significant number of members would have faced very substantial increases in their subscriptions.

The principal tenet of the proposed interim model was that all NAOs share the load as equally as is possible and this was realized by requesting the same relative increase from all the NAOs based on the currency in which they had chosen to pay. The model, therefore, maintains the same proportional allocations of the total sum as were used in the 2014/2015 biennium and the proposal was for a 5% increase for each of the years 2016 and 2017 on the subscriptions paid in 2015. The anticipated incomes in US dollars for each of the years at these levels are be expected to show deficits but were nonetheless proposed as a reasonable compromise under the very difficult circumstances. The deficits should be manageable within the overall size of the investment portfolio, which, if necessary, could be utilized to fund operations. It will be essential to also seek to increase the income from other sources to reduce expenditure wherever this is possible to reduce the deficits predicted.

Prof. Corish reiterated that the Proposed Interim Budget was adopted by a very large majority at the Council Meeting at Busan. It was intended that this proposed interim model will operate for the 2016/2017 biennium only when its use will overcome the difficulties evident in the application of the current model which clearly failed in the current financial circumstances. It will also provide an opportunity to reconsider the basis upon which the national subscriptions are calculated and a proposal from the President to set up a Task Force that was accepted by the Council to begin immediately to develop a new model for the calculation of National subscriptions to be adopted at the General Assembly in 2017..

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7.2. NATIONAL SUBSCRIPTION TASK GROUP

Dr. Soby and Mr. Humphris reviewed the status of the National Subscription task force efforts with the committee along with the 2016 planned activities to develop a new model for calculating the National Subscriptions. The Task Force has held one web meeting.

The broad approach of scaling each country's subscription to the national size and impact of its chemical activities was considered reasonable, provided the measure or proxy relates to the value that IUPAC provides; i.e. the value that is perceived by those responsible for paying. In this regard the measure used from 1980s to 2015 based on the national size of the chemical industry has now been demonstrably flawed given the rapid pace of recent industrial globalization and the lack of a direct link to the governments, national academies or chemical societies who are paying the subscriptions. New approaches based on the numbers of chemists active in each country may be more appropriate as a measure of the impact of the chemical community on national wealth, for instance, those publishing in the peer reviewed literature and those patenting. They are directly dependent on IUPAC nomenclature and standards in their work. Data exists for this.

The Task Force also discussed the difficulties IUPAC encounters with payments in national currencies and the timing of payments. In 2015 it is expected that the currency exchange loss will be \$75k against total budgeted subscriptions of \$929k. Payment is due on January 1st but may occur at any time through the year creating major cash flow problems for the administration of the Union. Options will be considered to incentivize early payments and for hedging the currency risk.

The approach agreed will be to engage the member countries in a broad dialogue on these matters by letter, survey and in focal groups. It is felt that it is important to increase member country understanding of the currency and cash flow difficulties whilst soliciting their views on:

- Suitable payment mechanisms and incentives (timing and currency).
- The values they perceive arising from IUPAC membership.
- Suitable surrogates for the size of the chemistry endeavor in their country.

Prof. Corish stated the NSTF should not pay for data and insure that the data sources are sustainable for future calculations. Dr. Confalone commented that the subscription should be tied to the value proposition of the NAO. Dr. Wießmeier commented that GDP could be used and also to consider who else benefits from the work of IUPAC (i.e. patent attorneys, publication companies, industry).

8. INVESTMENT PORTFOLIO

CH/LS

8.1 PORTFOLIO PERFORMANCE FOR 2015

The Investment Portfolio was transferred in November 2104 to BB&T following

IUPAC Finance Committee Meeting 2016
Minutes

a decision of the Executive Committee on advice from the Finance Committee. The return since inception through 15 January was 2.73% relative to a benchmark of -0.7%. A brief discussion regarding the performance and note from the investment manager indicated that the Finance Committee was pleased with the early performance.

8.2 IUPAC INVESTMENT POLICY STATEMENT

The current IUPAC Investment policy statement was reviewed. No changes were suggested at this time.

8.3 IUPAC FUND POLICY STATEMENT

In light of the deficit, budgets and questions arising regarding the requirements, the Chair requested the Finance Committee to review this policy and discuss changes needed. No changes were suggested at this time.

8.4 REPORTING AND REVIEW OF PORTFOLIO

The Finance Committee agreed to hold quarterly reviews with the investment group (BB&T/Scott& Stringfellow) during 2016.

8.5 USE OF FUNDS

The Finance Committee reviewed recommendations based on rate of return of the 2015 investment portfolio performance. A percentage of 3.25% was recommended for the Special Funds rate in 2016. This percentage is applied to the funds in the 4th quarter of 2016.

9. FUNDRAISING STRATEGIES AND NEW SOURCES OF REVENUE

The Treasurer led a discussion pertaining to new sources of revenues and asked for comments and ideas from the committee. Traditionally, the annual income of the Union used to support its operations has come from three principal sources:

- National Subscription payments from National Adhering Organizations (NAOs);
- Income from publication of *Pure and Applied Chemistry* (PAC) and *Chemistry International* (CI);
- Income from the investment portfolio.

Following a realization that the income streams from both, the publications and the investment portfolio were steadily declining due to the changing types of publishing and the ongoing impact of the 2008 financial crisis, corrective actions had been taken.

Both PAC and CI are now published in partnership with De Gruyter in an effort to share costs and increase subscriptions through De Gruyter's marketing ability. We have seen stabilization above the net revenues for these publications.

IUPAC Finance Committee Meeting 2016

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The ongoing costs of CI has led to a fundamental review of the magazine, its content and preparation, production and delivery format (paper versus digital), and the opportunities now available through the new IUPAC website. The objective for CI is to be cost neutral in 2017.

The second action taken was a move to active portfolio management through BB&T to seek to maximize returns whilst managing the investment risk. Traditionally, IUPAC only invested in the bond markets. If annual income fails to match expenditures, it becomes necessary to utilize funds from the portfolio. Unfortunately, this had been the case during past biennia.

In preparing the budget for 2016/17, the Executive Committee was acutely aware that the Union was in a period of transition in need of upgrading its administrative capabilities. It therefore recommended the approved budgets and shortfalls. Clearly, this position is not sustainable and the Union needs to consider carefully, both the efficiency of its operations and possible future new sources of income. It is important to recognize that the administrative cost is highly leveraged as is the work is in support of many hundreds of volunteers. The project costs effectively enable work of much greater value – the volunteers come free but carry a significant administrative effort.

The Union must therefore identify new opportunities and sources of income. Any new sources must also be evaluated for their possible impacts on the tax status of the Union in both Switzerland and the US, together with the independence and scientific integrity of the Union.

The first approach underway is the review of the national subscription formula and the engagement with the NAOs that this will entail to ensure the Union is delivering maximal value to its members. Simultaneously, other membership categories will be reviewed to maximize both benefits and income. The Finance Committee was invited to consider recommendations for new sources of funds.

A number of IUPAC projects already receive external funding for awards, e.g. PhosAgro and Solvay and in direct support of activities such as CRDF support to trainees on the Safety Training program. Pursuit of such opportunities will continue and a good example will be under consideration during 2016. The Finance Committee was invited to evaluate the implications of this for IUPAC's independence and scientific integrity.

A number of ideas were discussed: External funding by companies for projects; offering of fellowships; contacting key industry associations. There were also comments made to perform a Market Needs assessment to systematically analyze and develop a single selling point and IUPAC brand identity. Mr. Humphris noted that the membership Relations Committee is surveying members and volunteers

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Minutes

to assess and develop an IUPAC value proposition for each of the stakeholder groups.

10. DATE AND LOCATION OF NEXT MEETING

Some discussion has occurred regarding a requirement to meet in Switzerland once a year, going back to 1950 files relative to the filing in Switzerland. The current agreement with REBER Law firm was put in place in 2000. From email contact (Christoph Buxtorf to John Jost), there appears a long history of having a board meeting in the country where IUPAC is governed.

Another consideration of the location of the meeting is the membership locations and travel costs relative to the FC Budget. From a logistics point of view, the Secretariat is well established with Reber and the hotel, both of which are very accustomed to the Finance Committee members and the requirements.

The date of the Finance Committee meeting has historically occurred in early February of each year. In 2017, the Finance Committee will be asked to review and approve the 2018-2019 budget and National Subscriptions. In the even years of the biennium, the committee may consider a later date to review the biennium results after the Audit is completed, which is planned for early March this year.

The date of the next meeting was set at 6 February 2017 at the offices of Reber Rechtsanwälte in Zürich, Switzerland.

The meeting was adjourned by Professor Corish, Chairman.

INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

Financial Statements

December 31, 2016 and 2015

(With Independent Auditors' Report Thereon)

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Independent Auditors' Report

The Executive Committee
International Union of Pure and Applied Chemistry:

Report on the Financial Statements

We have audited the accompanying financial statements of International Union of Pure and Applied Chemistry ("IUPAC"), which comprise the statements of financial position as of December 31, 2016 and 2015, and the related statements of activities, functional expenses, and cash flows for the years then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditors consider internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of IUPAC as of December 31, 2016 and 2015, and the changes in its net assets and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Batchelor, Tillery & Roberts, LLP

March 13, 2017

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Statements of Financial Position

December 31, 2016 and 2015

	<u>2016</u>	<u>2015</u>
<u>Assets</u>		
Current assets:		
Cash and cash equivalents	\$ 180,833	154,577
Subscriptions receivable (net of allowance for doubtful accounts of \$25,348 in 2016 and \$50,913 in 2015)	92,017	152,916
Other receivables	1,336	4,797
Inventories	-	34,045
Prepaid expenses	<u>2,382</u>	<u>5,278</u>
Total current assets	276,568	351,613
Investments, at market value	3,889,081	3,818,558
Furniture, fixtures, and equipment, net	187,992	123,906
Deposits	<u>3,565</u>	<u>3,565</u>
	\$ <u>4,357,206</u>	<u>4,297,642</u>
<u>Liabilities and Net Assets</u>		
Current liabilities:		
Accounts payable and accrued expenses	148,610	208,542
Unearned subscriptions	21,823	34,838
Line of credit	<u>100,000</u>	<u>-</u>
Total current liabilities	270,433	243,380
Commitments		
Net assets:		
Unrestricted	3,782,306	3,744,483
Temporarily restricted	100,110	105,422
Permanently restricted	<u>204,357</u>	<u>204,357</u>
Total net assets	4,086,773	4,054,262
	\$ <u>4,357,206</u>	<u>4,297,642</u>

See accompanying notes to financial statements.

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Statements of Activities

Year ended December 31, 2016, with comparative totals for 2015

	2016				
	<u>Unrestricted</u>	<u>Temporarily restricted</u>	<u>Permanently restricted</u>	<u>Total</u>	<u>2015</u>
Support:					
Grants and contributions	\$ 10,000	19,000	-	29,000	43,341
National subscriptions and service charges	891,384	-	-	891,384	930,734
Affiliate membership program	<u>28,225</u>	<u>-</u>	<u>-</u>	<u>28,225</u>	<u>28,207</u>
Total support	<u>929,609</u>	<u>19,000</u>	<u>-</u>	<u>948,609</u>	<u>1,002,282</u>
Other revenue:					
Publications	214,668	-	-	214,668	378,552
Investment return, net	139,510	8,403	-	147,913	(5,053)
Other income	<u>918</u>	<u>-</u>	<u>-</u>	<u>918</u>	<u>3,048</u>
Total other revenue	<u>355,096</u>	<u>8,403</u>	<u>-</u>	<u>363,499</u>	<u>376,547</u>
Total support and other revenue	1,284,705	27,403	-	1,312,108	1,378,829
Net assets released from restrictions	<u>32,715</u>	<u>(32,715)</u>	<u>-</u>	<u>-</u>	<u>-</u>
	<u>1,317,420</u>	<u>(5,312)</u>	<u>-</u>	<u>1,312,108</u>	<u>1,378,829</u>
Expenses:					
Program and publications	519,959	-	-	519,959	716,256
Management and general	<u>759,638</u>	<u>-</u>	<u>-</u>	<u>759,638</u>	<u>794,925</u>
Total expenses	<u>1,279,597</u>	<u>-</u>	<u>-</u>	<u>1,279,597</u>	<u>1,511,181</u>
Increase (decrease) in net assets	37,823	(5,312)	-	32,511	(132,352)
Net assets, beginning of year	<u>3,744,483</u>	<u>105,422</u>	<u>204,357</u>	<u>4,054,262</u>	<u>4,186,614</u>
Net assets, end of year	\$ <u>3,782,306</u>	<u>100,110</u>	<u>204,357</u>	<u>4,086,773</u>	<u>4,054,262</u>

(Continued)

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Statements of Activities, Continued

Year ended December 31, 2015

	<u>Unrestricted</u>	<u>Temporarily restricted</u>	<u>Permanently restricted</u>	<u>Total</u>
Support:				
Grants and contributions	\$ 8,000	35,341	-	43,341
National subscriptions and service charges	930,734	-	-	930,734
Affiliate membership program	<u>28,207</u>	<u>-</u>	<u>-</u>	<u>28,207</u>
Total support	<u>966,941</u>	<u>35,341</u>	<u>-</u>	<u>1,002,282</u>
Other revenue:				
Publications	378,552	-	-	378,552
Investment return, net	(13,776)	8,723	-	(5,053)
Other income	<u>3,048</u>	<u>-</u>	<u>-</u>	<u>3,048</u>
Total other revenue	<u>367,824</u>	<u>8,723</u>	<u>-</u>	<u>376,547</u>
Total support and other revenue	1,334,765	44,064	-	1,378,829
Net assets released from restrictions	<u>35,576</u>	<u>(35,576)</u>	<u>-</u>	<u>-</u>
	<u>1,370,341</u>	<u>8,488</u>	<u>-</u>	<u>1,378,829</u>
Expenses:				
Program and publications	716,256	-	-	716,256
Management and general	<u>794,925</u>	<u>-</u>	<u>-</u>	<u>794,925</u>
Total expenses	<u>1,511,181</u>	<u>-</u>	<u>-</u>	<u>1,511,181</u>
Transfer to permanently restricted	<u>(12,000)</u>	<u>-</u>	<u>12,000</u>	<u>-</u>
(Decrease) increase in net assets	(152,840)	8,488	12,000	(132,352)
Net assets, beginning of year	<u>3,897,323</u>	<u>96,934</u>	<u>192,357</u>	<u>4,186,614</u>
Net assets, end of year	\$ <u>3,744,483</u>	<u>105,422</u>	<u>204,357</u>	<u>4,054,262</u>

See accompanying notes to financial statements.

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Statements of Functional Expenses

Year ended December 31, 2016, with comparative totals for 2015

	2016			
	<u>Program and publications</u>	<u>Management and general</u>	<u>Total</u>	<u>2015</u>
Salaries	\$ -	438,192	438,192	422,629
Travel and subsistence	379,111	5,997	385,108	616,417
Payroll taxes and benefits	-	114,661	114,661	91,457
Office supplies and expenses	-	95,401	95,401	104,319
Contracted services	80,235	-	80,235	105,270
Building operations	-	56,930	56,930	54,279
Prizes and awards	29,000	-	29,000	10,000
Contributions	24,666	-	24,666	24,792
Audit and accounting	-	18,994	18,994	37,348
Depreciation and amortization	-	9,850	9,850	12,407
Insurance	-	7,097	7,097	10,660
Utilities	-	6,284	6,284	7,701
Postage	3,688	-	3,688	4,708
Printing and publications	3,259	-	3,259	4,681
Interest	-	2,349	2,349	-
Bad debt recoveries	-	-	-	(841)
Miscellaneous	-	3,883	3,883	5,354
	<u>\$ 519,959</u>	<u>759,638</u>	<u>1,279,597</u>	<u>1,511,181</u>

(Continued)

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Statements of Functional Expenses, Continued

Year ended December 31, 2015

	Program and <u>publications</u>	Management <u>and general</u>	<u>Total</u>
Travel and subsistence	\$ 604,981	11,436	616,417
Salaries	-	422,629	422,629
Contracted services	67,094	38,176	105,270
Office supplies and expenses	-	104,319	104,319
Payroll taxes and benefits	-	91,457	91,457
Building operations	-	54,279	54,279
Audit and accounting	-	37,348	37,348
Contributions	24,792	-	24,792
Depreciation and amortization	-	12,407	12,407
Insurance	-	10,660	10,660
Prizes and awards	10,000	-	10,000
Utilities	-	7,701	7,701
Postage	4,708	-	4,708
Printing and publications	4,681	-	4,681
Bad debt recoveries	-	(841)	(841)
Miscellaneous	-	5,354	5,354
	\$ <u>716,256</u>	<u>794,925</u>	<u>1,511,181</u>

See accompanying notes to financial statements.

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Statements of Cash Flows

Years ended December 31, 2016 and 2015

	<u>2016</u>	<u>2015</u>
Cash flows from operating activities:		
Increase (decrease) in net assets	\$ 32,511	(132,352)
Adjustments to reconcile increase (decrease) in net assets to net cash used in operating activities:		
Depreciation and amortization	9,850	12,407
Realized (gains) losses on investments	(15,719)	13,372
Unrealized (gains) losses on investments	(64,868)	42,641
Changes in operating assets and liabilities:		
Subscriptions receivable	60,899	(38,095)
Other receivables	3,461	15,213
Inventories	34,045	-
Prepaid expenses	2,896	1,372
Accounts payable and accrued expenses	(59,932)	54,994
Unearned subscriptions	(13,015)	(177,259)
Net cash used in operating activities	<u>(9,872)</u>	<u>(207,707)</u>
Cash flows from investing activities:		
Proceeds from sales and maturities of investments	535,647	1,015,752
Purchases of investments	(525,583)	(1,220,997)
Purchases of furniture, fixtures, and equipment	<u>(73,936)</u>	<u>(126,569)</u>
Net cash used in investing activities	<u>(63,872)</u>	<u>(331,814)</u>
Cash flows used in financing activities -		
proceeds from line of credit	<u>100,000</u>	<u>-</u>
Net increase (decrease) in cash and cash equivalents	26,256	(539,521)
Cash and cash equivalents, beginning of year	<u>154,577</u>	<u>694,098</u>
Cash and cash equivalents, end of year	\$ <u>180,833</u>	<u>154,577</u>
Supplemental disclosure of cash flow information:		
Cash paid for interest	\$ <u>1,986</u>	<u>-</u>

See accompanying notes to financial statements.

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Notes to Financial Statements

December 31, 2016 and 2015

(1) Nature of Organization and Significant Accounting Policies

International Union of Pure and Applied Chemistry ("IUPAC"), founded in 1919, is a voluntary nongovernmental, nonprofit association of fifty-seven national adhering organizations representing the chemists of their countries. Additionally, there is one Associate National Adhering Organization, fifty-nine company associates, and thirty-one associated organizations.

The objectives of IUPAC are to promote continuing cooperation among the chemists of the member countries, to study topics of international importance to pure and applied chemistry which need standardization or codification, to cooperate with other international organizations which deal with topics of a chemical nature, and to contribute to the advancement of pure and applied chemistry in all its aspects.

The significant accounting policies of IUPAC are as follows:

(a) Support, Revenues, and Expenses

IUPAC derives its revenues primarily from national subscriptions, publication income, and investment income. Support, revenues, and expenses are recorded on the accrual basis of accounting, and revenue received for future subscriptions is deferred until the applicable year.

Contributions received are measured at their fair values and are reported as an increase in net assets. IUPAC reports contributions of cash and other assets as restricted support if they are received with donor stipulations that limit the use of the donated assets or if they are designated as support for future periods. When a donor restriction expires, that is, when a stipulated time restriction ends or purpose restriction is accomplished, temporarily restricted net assets are reclassified to unrestricted net assets and reported in the statement of activities as net assets released from restrictions. Donor restricted contributions whose restrictions are met in the same reporting period are reported as unrestricted support.

(b) Endowment Funds

The Executive Committee of IUPAC has interpreted relevant state law as requiring the preservation of the fair value of the original gift as of the gift date of the donor-restricted endowment funds absent explicit donor stipulations to the contrary. As a result of this interpretation, IUPAC classifies as permanently restricted net assets (a) the original value of gifts donated to the permanent endowment, (b) the original value of subsequent gifts to the permanent endowment, and (c) accumulations to the permanent endowment made in accordance with the direction of the applicable donor gift instrument at the time the accumulation is added to the fund. The remaining portion of the donor-restricted endowment fund that is not classified in permanently restricted net assets is classified as temporarily restricted net assets until those amounts are appropriated for expenditure by IUPAC in a manner consistent with the relevant endowment fund. IUPAC considers the following factors in making a determination to appropriate or accumulate donor-restricted endowment funds:

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Notes to Financial Statements, Continued

December 31, 2016 and 2015

(1) Nature of Organization and Significant Accounting Policies, Continued

(b) Endowment Funds, Continued

- (1) The duration and preservation of the fund
- (2) The purposes of IUPAC and the donor-restricted endowment fund
- (3) General economic conditions
- (4) The possible effect of inflation and deflation
- (5) The expected total return from income and the appreciation of investments
- (6) Other resources of the organization
- (7) The investment policies of IUPAC

Funds with Deficiencies

From time to time, the fair value of assets associated with individual donor-restricted endowment funds may fall below the level that the donor requires the organization to retain as a fund of perpetual duration. In accordance with accounting principles generally accepted in the United States of America ("GAAP"), deficiencies of this nature are reported in unrestricted net assets. There were no such deficiencies as of December 31, 2016 and 2015.

Return Objectives and Risk Parameters

IUPAC has adopted investment and spending policies for endowment assets that attempt to provide a predictable stream of funding to programs supported by its endowment while seeking to maintain the purchasing power of the endowment assets. Endowment assets include those assets of donor-restricted funds that IUPAC must hold in perpetuity or for a donor-specified period(s), as well as any board-designated funds. Under this policy, as approved by the Executive Committee, the endowment assets are invested in a manner that is intended to produce results that exceed the price and yield results of a benchmark portfolio and its respective market index, while assuming a moderate level of investment risk. IUPAC expects its endowment funds, over time, to provide an average rate of return of approximately 6.0% annually. Actual returns in any given year may vary from this amount.

Strategies Employed for Achieving Objectives

To satisfy its long-term rate-of-return objectives, IUPAC relies on a total return strategy in which investment returns are achieved through both capital appreciation (realized and unrealized) and current yield (interest and dividends). IUPAC targets a diversified asset allocation for its entire investment portfolio that places an emphasis on mutual funds, bonds and cash equivalents to achieve its long-term return objectives within prudent risk constraints.

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Notes to Financial Statements, Continued

December 31, 2016 and 2015

(1) Nature of Organization and Significant Accounting Policies, Continued

(b) Endowment Funds, Continued

Spending Policy and How the Investment Objectives Relate to Spending Policy

IUPAC has a policy of appropriating for distribution each year the interest income allocated to each of its endowment funds, with such allocation approximating a 3.25% and 3.5% return for 2016 and 2015, respectively. In establishing this policy, management of IUPAC considered the long-term expected return on its endowment. This is consistent with IUPAC's objective to maintain the purchasing power of the endowment assets held in perpetuity or for a specified term as well as to provide additional real growth through new gifts and investment return.

(c) Cash and Cash Equivalents

Cash and cash equivalents include commercial checking and money market accounts. At certain times throughout the year, IUPAC may have on deposit with a financial institution amounts in excess of FDIC insurance limit of \$250,000. IUPAC has not experienced any losses in such accounts and believes it is not exposed to any significant credit risk on cash and cash equivalents.

(d) Allowance for Doubtful Accounts

An allowance is provided for uncollectible receivables equal to the losses that are estimated to be incurred in the collection of all receivables. The allowance is based on historical collection experience combined with a review of the current status of the existing receivables.

(e) Inventories

Inventories, consisting of various publications, are stated at the lower of cost or market, with cost determined on the weighted-average method. Remaining inventory balances were written off during 2016.

(f) Fair Value Measurements

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. Relevant accounting standards establish a fair value hierarchy which requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. Three levels of inputs may be used to measure fair value:

Level 1: quoted prices (unadjusted) in active markets for identical assets or liabilities

Level 2: inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly

Level 3: one or more significant inputs or significant value drivers that are unobservable or based on market assumptions

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Notes to Financial Statements, Continued

December 31, 2016 and 2015

(1) Nature of Organization and Significant Accounting Policies, Continued

(g) Investments

Investments in marketable securities are stated at fair market value. The fair values of equity securities and mutual funds are based on quoted prices in active markets (Level 1). The fair values of bonds and fixed rate securities are based on information from pricing services and yields currently available on comparable securities (Level 2). Investment income (including gains and losses on investments, interest, and dividends) is included in the statements of activities as a change in unrestricted net assets, except for earnings on permanently restricted net assets which are reported as temporarily restricted.

(h) Furniture, Fixtures, and Equipment

Furniture, fixtures, and equipment are recorded at cost if purchased and fair value if contributed. Depreciation and amortization is provided over the estimated useful lives of the assets, ranging from 3 to 7 years, using the straight-line method.

(i) Income Taxes

IUPAC is exempt from federal and state income taxes under Section 501(c)(3) of the Internal Revenue Code and applicable state statutes.

(j) Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of changes in net assets during the reporting period. Accordingly, actual results could differ from those estimates.

(k) Reclassifications

Certain reclassifications have been made to the 2015 financial statements in order to conform to the 2016 presentation. These reclassifications had no impact on net assets or the change in net assets as previously reported.

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Notes to Financial Statements, Continued

December 31, 2016 and 2015

(2) Investments

All investments are held by BB&T Securities as of December 31, 2016 and 2015. The following tables present the fair value of those investments (individual investment representing ten percent or more of net assets is separately identified):

		2016		
		<u>Fair value measurements using:</u>		
	<u>Number of shares/par</u>	<u>Level 1</u>	<u>Level 2</u>	<u>Total</u>
Mutual funds and equities:				
Federated Floating Rate Strategy Income	48,499	\$ 483,532	-	483,532
Other	-	2,404,362	-	2,404,362
		<u>2,887,894</u>	<u>-</u>	<u>2,887,894</u>
Corporate bonds (2.00% - 6.50%), with various maturities through January 2025	994,000	-	1,001,187	1,001,187
	\$	<u>2,887,894</u>	<u>1,001,187</u>	<u>3,889,081</u>
		2015		
		<u>Fair value measurements using:</u>		
	<u>Number of shares/par</u>	<u>Level 1</u>	<u>Level 2</u>	<u>Total</u>
Mutual funds and equities:				
Federated Floating Rate Strategy Income	46,680	\$ 448,597	-	448,597
Other	-	2,326,455	-	2,326,455
		<u>2,775,052</u>	<u>-</u>	<u>2,775,052</u>
Corporate bonds (2.00% - 6.50%), with various maturities through July 2025	1,028,000	-	1,043,506	1,043,506
	\$	<u>2,775,052</u>	<u>1,043,506</u>	<u>3,818,558</u>

The cost of investments totaled \$3,883,770 and \$3,859,674 as of December 31, 2016 and 2015, respectively.

Investment return, net, consists of the following:

	<u>2016</u>	<u>2015</u>
Dividends and interest	\$ 124,646	141,516
Realized gains (losses)	15,719	(13,372)
Unrealized gains (losses)	64,868	(42,641)
Investment management fees	(39,721)	(39,208)
Foreign exchange rate losses	<u>(17,599)</u>	<u>(51,348)</u>
	<u>\$ 147,913</u>	<u>(5,053)</u>

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Notes to Financial Statements, Continued

December 31, 2016 and 2015

(3) Furniture, Fixtures, and Equipment

Furniture, fixtures, and equipment consist of the following:

	<u>2016</u>	<u>2015</u>
Equipment	\$ 25,473	25,473
Furniture and fixtures	33,290	33,290
Website	-	60,930
Construction in progress - website	<u>149,331</u>	<u>75,395</u>
	208,094	195,088
Less accumulated depreciation and amortization	<u>(20,102)</u>	<u>(71,182)</u>
	<u>\$ 187,992</u>	<u>123,906</u>

(4) Leases

IUPAC entered into a lease for new office space beginning in February 2015 for a term of seventy-six months with a five-year renewal option. Building rent expenses totaled \$49,392 and \$47,346 for 2016 and 2015, respectively.

IUPAC leases office equipment under operating lease agreements that expire at various dates through 2020. Equipment lease expense totaled \$7,538 and \$6,933 for 2016 and 2015, respectively.

Future minimum rental payments required under these operating leases are as follows:

<u>Year ending December 31,</u>	
2017	\$ 57,254
2018	58,432
2019	59,656
2020	57,450
2021	<u>24,075</u>
	<u>\$ 256,867</u>

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Notes to Financial Statements, Continued

December 31, 2016 and 2015

(5) Net Assets

Temporarily restricted net assets as of December 31, 2016 and 2015 consist of interest earned on permanently restricted net assets and six grants in 2016 and five grants in 2015 that were not fully expended.

Permanently restricted net assets include donor-restricted endowment funds and consist of the Paulo Fransozini Endowment Fund totaling \$5,659, the CHEMRAWN VII Fund totaling \$48,698, and the Hanwha Total Petrochemical Endowment Fund totaling \$150,000, as of December 31, 2016 and 2015. Income earned by the Paulo Fransozini Endowment Fund is restricted for awards to science students to attend particular IUPAC meetings. Income earned by the CHEMRAWN VII Fund is restricted for awards to support the work of the CHEMRAWN VII Future Actions Committee. Income earned by the Hanwha Total Petrochemical Endowment Fund is restricted for awards to students and researchers in the field of polymer science and support of educational projects of the IUPAC Macromolecular Division. Such income is recorded as temporarily restricted when earned.

The following represents changes in endowment net assets (all donor-restricted endowment funds) for 2016 and 2015 (does not include temporarily restricted net assets of \$37,500 related to six grants as of December 31, 2016 and \$39,823 related to five grants as of December 31, 2015):

	Temporarily <u>restricted</u>	Permanently <u>restricted</u>	<u>Total</u>
Endowment net assets, December 31, 2014	\$ 56,876	192,357	249,233
Investment interest income	8,723	-	8,723
Transfer to permanently restricted	<u>-</u>	<u>12,000</u>	<u>12,000</u>
Endowment net assets, December 31, 2015	65,599	204,357	269,956
Investment interest income	8,403	-	8,403
Appropriation of endowment assets for expenditure	<u>(11,392)</u>	<u>-</u>	<u>(11,392)</u>
Endowment net assets, December 31, 2016	\$ <u>62,610</u>	<u>204,357</u>	<u>266,967</u>

INTERNATIONAL UNION OF PURE
AND APPLIED CHEMISTRY

Notes to Financial Statements, Continued

December 31, 2016 and 2015

(6) Concentrations of Credit and Market Risk

Financial instruments that potentially expose IUPAC to concentrations of credit and market risk consist primarily of cash equivalents, investments, and subscriptions receivable. Cash equivalents are held by Branch Banking & Trust Company, and investments are held by BB&T Securities, and one investment exceeds ten percent of net assets (see footnote 2). Subscriptions receivable are amounts due from national adhering organizations. Management provides for probable uncollectible amounts through a provision for bad debt expense and an adjustment to a valuation allowance based on its assessment of the current status of individual accounts.

National adhering organizations are billed their annual national subscriptions in their national foreign currency. As a result, IUPAC assumes the risk of changes in the foreign currency rates in relation to the United States dollar on these billings. IUPAC has made purchases of certain foreign currency-denominated investments in an effort to reduce the risk of foreign currency exchange losses on these billings when collected.

(7) Retirement Plans

IUPAC has established a defined contribution retirement plan. The plan covers all employees and offers 100% vesting after one year of service. IUPAC made no contributions to the plan in 2016 or 2015.

(8) Line of Credit

On December 10, 2015, IUPAC executed a line of credit agreement whereby IUPAC may borrow up to \$100,000. Borrowings under this agreement bear interest at a variable rate equal to the bank's prime rate plus 0.50% per annum (4.25% as of December 31, 2016). Principal and interest are due in full at maturity on December 10, 2017. The line is secured by the receivables, cash collections, and intangibles of IUPAC. A total of \$100,000 was outstanding as of December 31, 2016.

(9) Subsequent Events

The date to which events occurring after December 31, 2016, the date of the most recent statement of financial position, have been evaluated for possible adjustment to the financial statements or disclosure is March 13, 2017, the date the financial statements were available to be issued.

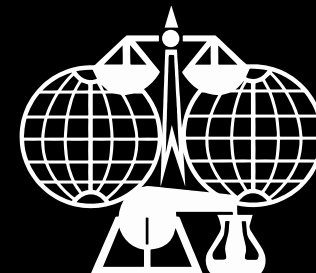
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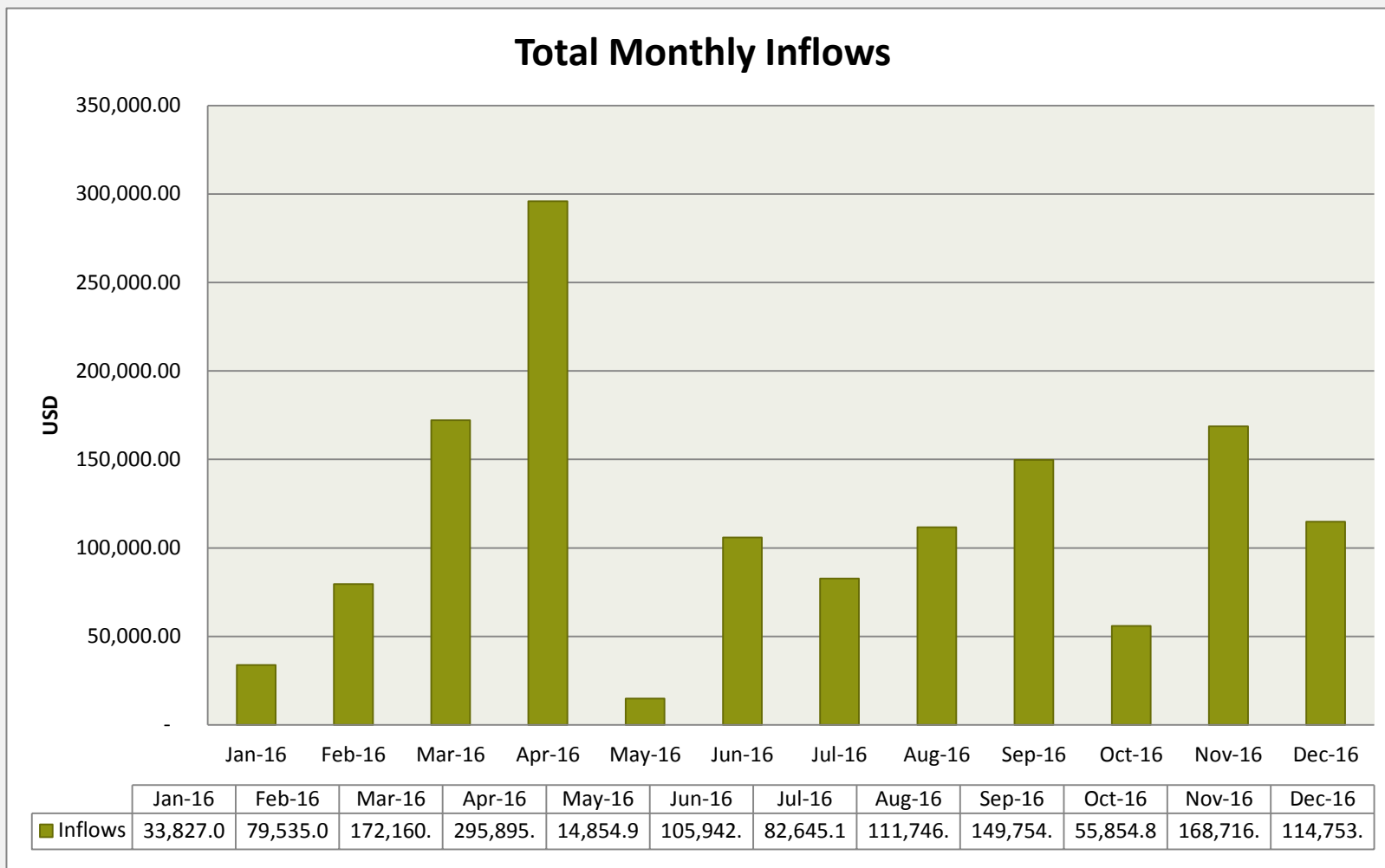
23.3.3: 2016 Year End Cash Flow Summary

1 Jan 2016-31 December 2016

Council 12-13 July 2017

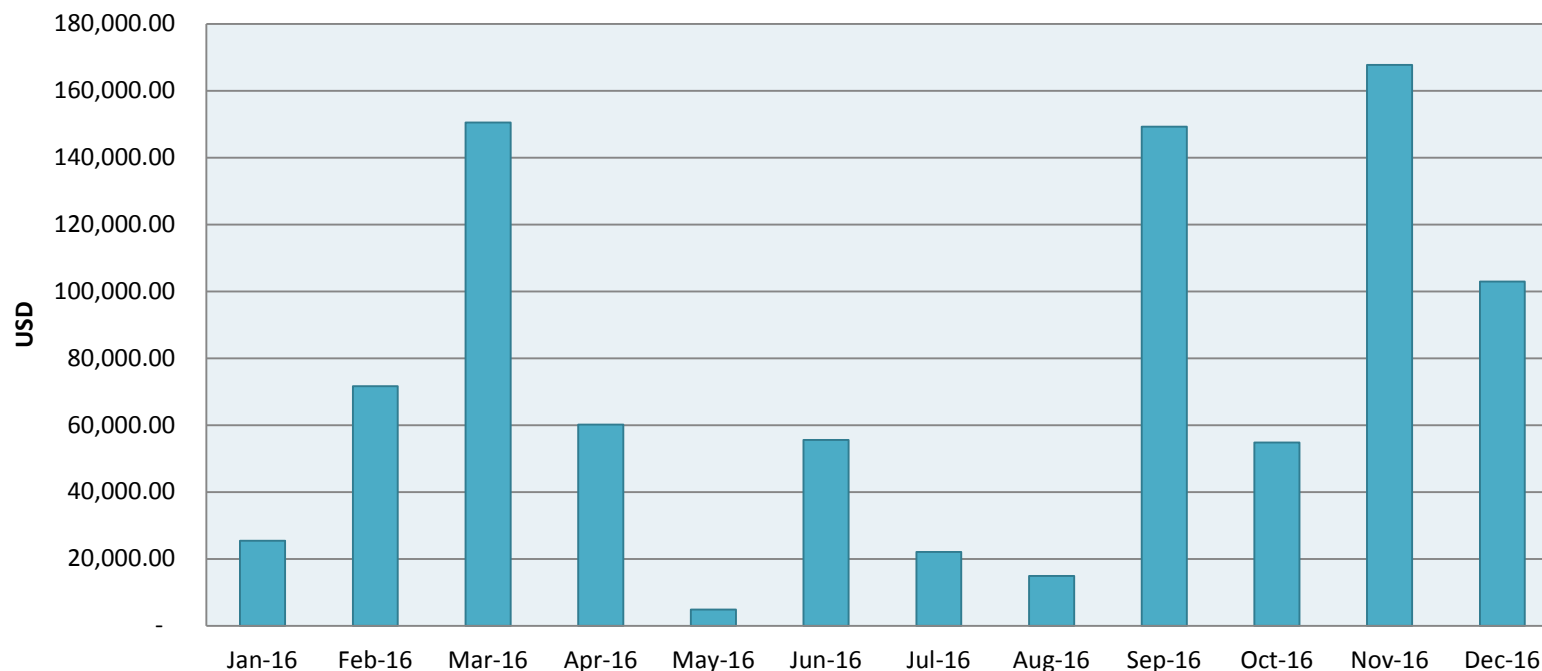
São Paulo, Brazil

Cash Inflow – Amounts In USD



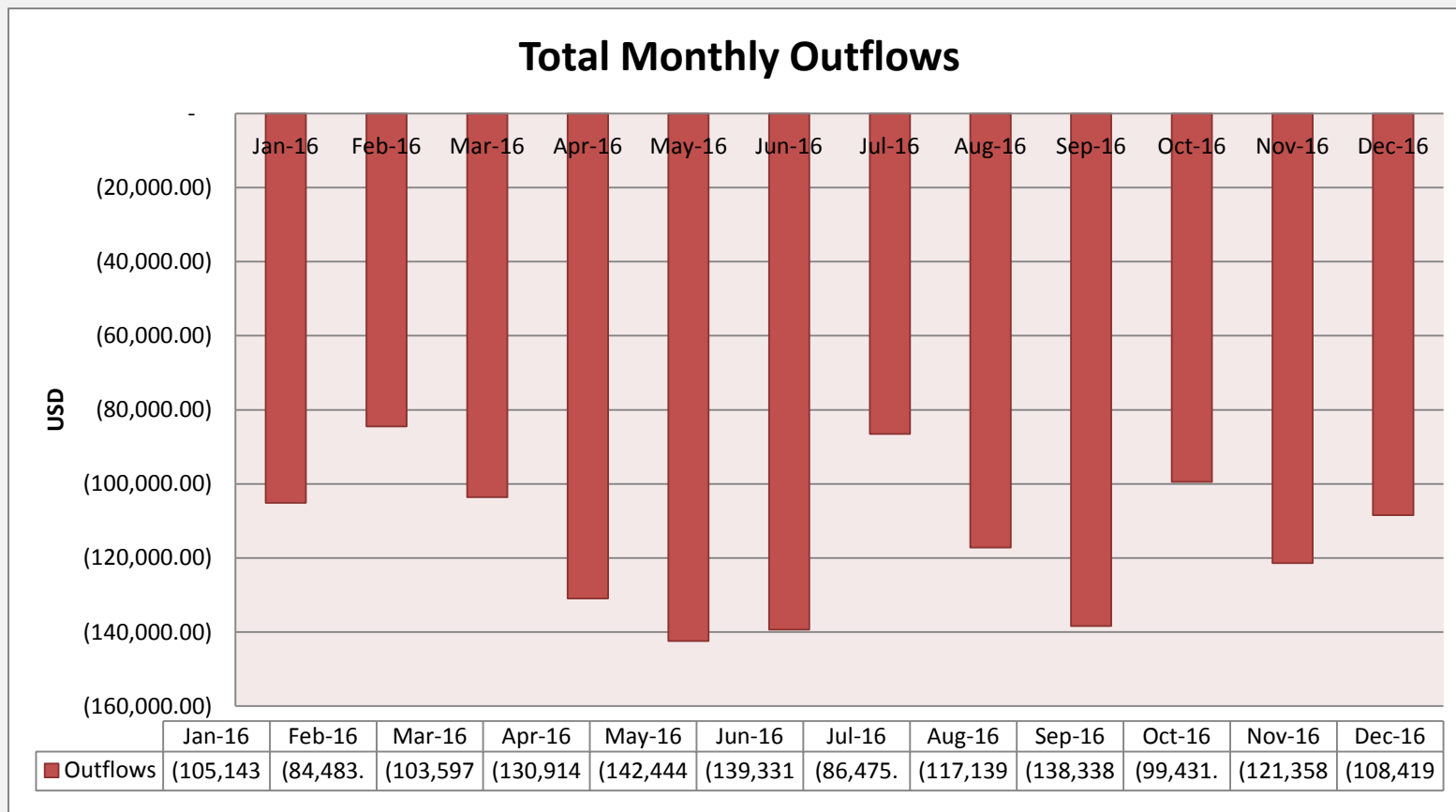
NAO Subscription Payments– Amounts In USD

NAO Subscription Payments 2016



	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
Series1	25,419.3	71,648.6	150,523.	60,180.2	4,822.69	55,553.3	22,092.8	14,884.7	149,275.	54,790.8	167,717.	102,959.

Cash Outflow – Amount in USD



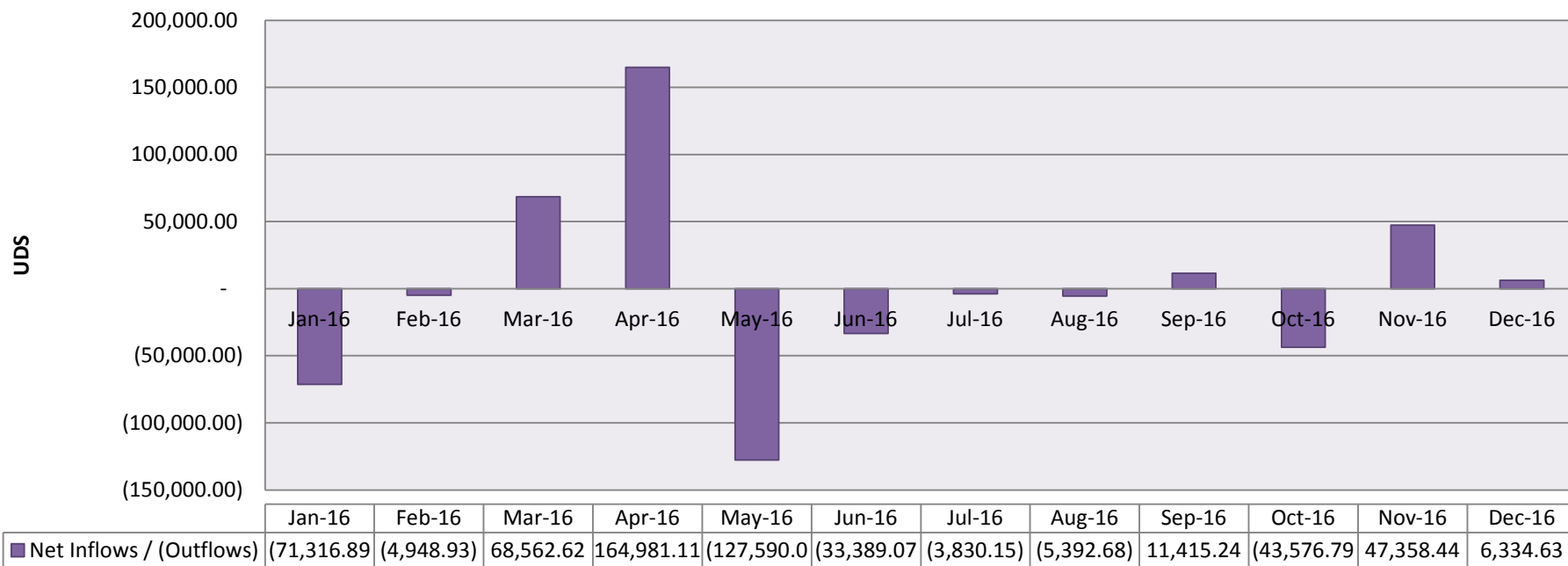
Cummulative Net Cash Flow (USD):

[Cash Balance + Cash In-Cash Out]

Opening Balance (1 Jan)= \$93,061

31 December Balance: \$101,668

Cummulative Net Cash Flow (USD)

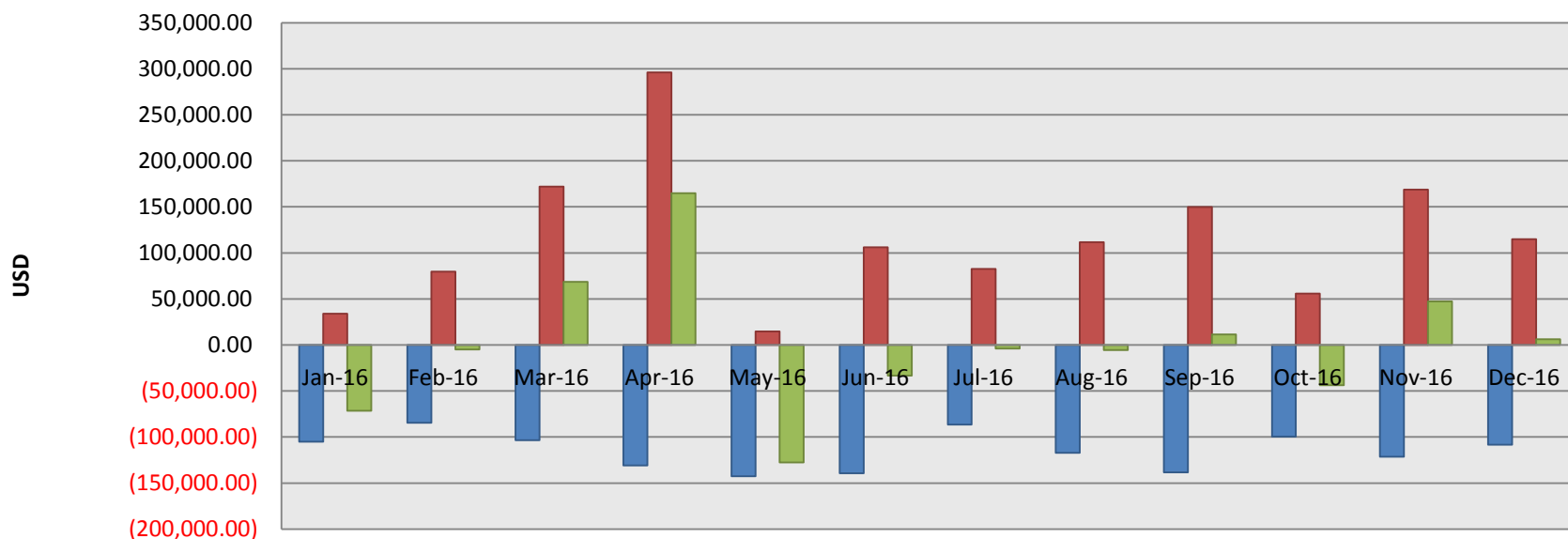


Inflow/Outflow and Net Flow 2016

Opening Balance (1 Jan)= \$93,061

31 December Balance: \$101,668

Monthly Inflow, Outflow and Net



	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
■ Outflows	(105,143.9)	(84,483.99)	(103,597.7)	(130,914.4)	(142,444.9)	(139,331.9)	(86,475.2)	(117,139.)	(138,338.)	(99,431.6)	(121,358.)	(108,419.)
■ Inflows	33,827.04	79,535.06	172,160.3	295,895.5	14,854.94	105,942.8	82,645.12	111,746.8	149,754.2	55,854.85	168,716.6	114,753.7
■ Net Inflows / (Outflows)	(71,316.89)	(4,948.93)	68,562.62	164,981.11	(127,590.0)	(33,389.07)	(3,830.15)	(5,392.68)	11,415.24	(43,576.7)	47,358.44	6,334.63

National Subscription Payment Status
2016-2017

NAO's 2017	2017 Paid (USD)	2017 Due (~USD)
Argentina		\$5,123.28
Australia	\$10,779.18	\$11,068.24
Austria	\$6,680.81	\$6,995.71
Bangladesh		\$1,984.50
Belgium		\$19,223.16
Brazil		\$39,277.92
Bulgaria		\$1,943.07
Canada	\$15,156.40	\$16,723.22
Chile	\$9,000.00	\$9,483.18
China/Beijing		\$153,688.91
China/Taipei		\$30,880.52
Croatia		\$1,102.50
Cuba		\$1,102.50
Czech Republic		\$5,684.96
Denmark		\$4,659.25
Egypt		\$3,539.94
Ethiopia		\$1,102.50
Finland	\$6,360.79	\$6,387.49
France		\$35,761.54
Germany		\$53,510.15
Greece	\$3,320.80	\$3,402.47
Hungary	\$4,363.16	\$4,571.43
India		\$29,661.21
Ireland	\$5,243.19	\$5,400.40
Israel		\$10,703.91
Italy	\$26,281.27	\$26,932.35
Jamaica		\$860.20
Japan	\$45,873.60	\$43,436.16
Jordan		\$1,106.04
Kazakhstan		\$1,102.50
Korea, Republic of		\$45,845.87
Kuwait	\$1,012.62	\$1,024.57
Luxembourg		\$938.63
Malaysia		\$6,524.09
Mozambique		\$1,102.50
Nepal	\$1,078.00	\$1,102.50
Netherlands	\$25,466.10	\$25,804.79
New Zealand	\$3,313.56	\$3,617.17
Nigeria	\$1,103.00	\$1,102.50
Norway	\$5,420.98	\$5,974.68
Pakistan		\$4,599.10
Poland		\$10,445.67
Portugal	\$4,857.29	\$4,830.58
Puerto Rico		\$22,035.54
Russia	\$28,340.00	\$28,369.72
Senegal	\$1,103.00	\$1,102.50
Serbia	\$1,103.00	\$1,102.50
Slovakia	\$2,908.38	\$2,908.95
Slovenia	\$2,286.12	\$2,343.56
South Africa	\$6,797.46	\$7,399.30
Spain		\$21,227.00
Sri Lanka	\$949.85	\$1,078.79
Sweden	\$7,096.94	\$7,389.95
Switzerland	\$12,295.14	\$12,016.92
Thailand	\$11,260.00	\$11,260.92
Tunisia		\$2,359.82
Turkey		\$8,178.03
UK	\$24,244.87	\$30,169.97
Uruguay	\$777.84	\$859.11
USA	\$122,668.00	\$122,668.03
*Total	\$397,141.35	\$931,802.48
Outstanding AR		\$534,661.13
2017 Budget		\$931,802.00
Adjusted NS Expect		\$916,576.16
Loss of Status Amt.		\$15,226.32

*Total excluding Bank Fees

-\$355.35

NAO's 2016	2016 Paid (USD)	2016 Due (~USD)
Argentina		\$4,879.32
Australia	\$9,774.02	\$10,541.19
Austria	\$6,783.91	\$6,662.58
Bangladesh	\$1,890.00	\$1,890.00
Belgium	\$17,471.30	\$18,307.77
Brazil	\$37,408.00	\$37,407.54
Bulgaria	\$1,779.08	\$1,850.54
Canada	\$14,847.54	\$15,926.87
Chile	\$9,000.00	\$9,031.60
China/Beijing	\$133,549.89	\$146,370.39
China/Taipei	\$28,509.03	\$29,410.02
Croatia	\$1,050.00	\$1,050.00
Cuba		\$1,050.00
Czech Republic	\$5,461.25	\$5,414.24
Denmark	\$4,151.46	\$4,437.39
Egypt	\$1,409.09	\$3,371.37
Ethiopia		\$1,050.00
Finland	\$6,101.70	\$6,083.32
France	\$31,103.00	\$34,058.61
Germany	\$51,035.72	\$50,962.05
Greece	\$3,258.15	\$3,240.45
Hungary	\$4,184.63	\$4,353.75
India	\$28,199.00	\$28,248.78
Ireland	\$5,254.88	\$5,143.24
Israel	\$10,586.97	\$10,194.20
Italy	\$26,120.31	\$25,649.86
Jamaica	\$740.04	\$819.24
Japan	\$44,153.46	\$41,367.77
Jordan	\$1,047.89	\$1,053.37
Kazakhstan		\$1,050.00
Korea, Republic of	\$43,663.00	\$43,662.74
Kuwait	\$942.38	\$975.78
Luxembourg		\$893.94
Malaysia	\$8,601.90	\$6,213.42
Mozambique	\$1,050.00	\$1,050.00
Nepal	\$1,050.00	\$1,050.00
Netherlands	\$24,369.32	\$24,575.99
New Zealand	\$3,017.18	\$3,444.92
Nigeria	\$1,050.00	\$1,050.00
Norway	\$5,328.25	\$5,690.17
Pakistan		\$4,380.10
Poland	\$9,556.48	\$9,948.26
Portugal	\$4,684.52	\$4,600.55
Puerto Rico	\$20,986.00	\$20,986.22
Russia	\$27,019.00	\$27,018.78
Senegal	\$1,050.00	\$1,050.00
Serbia	\$1,050.00	\$1,050.00
Slovakia	\$2,799.32	\$2,770.43
Slovenia	\$2,203.61	\$2,231.96
South Africa	\$5,715.74	\$7,046.95
Spain	\$20,273.49	\$20,221.00
Sri Lanka	\$916.07	\$1,027.42
Sweden	\$6,938.93	\$7,038.05
Switzerland	\$11,894.21	\$11,444.68
Thailand	\$9,792.34	\$10,724.68
Tunisia		\$2,247.45
Turkey	\$6,200.00	\$7,788.60
UK	\$27,214.00	\$28,733.31
Uruguay	\$721.02	\$818.20
USA	\$116,827.00	\$116,826.69
*Total	\$849,784.08	\$887,435.74
Outstanding AR		\$37,651.66
2016 Budget		888,784.81
Loss of Status Amt.		\$14,500.80

*Total excluding Bank Fees

		A		2018			2019			B		B – A = C
		2016 / 17								2018 / 19		Delta
		Total Budget	% Change	Total	Oper	Projects	Total	Oper	Projects	Total Budget	% Change	
Division												
I	Physical and Biophysical	59,200	0.00%	15,260	4,578	10,682	41,440	12,432	29,008	56,700	–4.22%	(2,500)
II	Inorganic	48,600	0.00%	12,080	3,624	8,456	34,020	10,206	23,814	46,100	–5.14%	(2,500)
III	Organic and Biomolecular	47,900	0.00%	11,870	3,561	8,309	33,530	10,059	23,471	45,400	–5.22%	(2,500)
IV	Polymer	49,700	0.00%	12,410	3,723	8,687	34,790	10,437	24,353	47,200	–5.03%	(2,500)
V	Analytical	53,300	0.00%	13,490	4,047	9,443	37,310	11,193	26,117	50,800	–4.69%	(2,500)
VI	Chemistry and the Environm	59,800	0.00%	15,440	4,632	10,808	41,860	12,558	29,302	57,300	–4.18%	(2,500)
VII	Chemistry and Human Healt	54,800	0.00%	13,940	4,182	9,758	38,360	11,508	26,852	52,300	–4.56%	(2,500)
VIII	Chemical Nomenclature and Structure Representation	70,400	0.00%	18,620	5,586	13,034	49,280	14,784	34,496	67,900	–3.55%	(2,500)
Total Divisions		443,700	0.00%	113,110	33,933	79,177	310,590	93,177	217,413	423,700	–4.51%	(20,000)
Standing Committees												
A	Executive	44,000	0.00%	22,000	22,000		22,000	22,000		44,000	0.00%	–
A	Bureau	39,800	–46.79%	55,000	55,000		–	–		55,000	38.19%	15,200
O	CHEMRAWN	27,500	0.00%	20,000	20,000		–	–		20,000	–27.27%	(7,500)
A	CPCDS	16,200	0.00%	22,200	22,200		–	–		22,200	37.04%	6,000
O	CCE	35,500	0.00%	37,000	11,100	25,900	–	–	–	37,000	4.23%	1,500
O	COCI	37,000	0.00%	35,000	10,500	24,500	–	–	–	35,000	–5.41%	(2,000)
A	Finance	13,200	0.00%	16,000	16,000		–	–		16,000	21.21%	2,800
A	ICTNS	3,500	0.00%	3,500	3,500		–	–		3,500	0.00%	–
A	Evaluation Comm	–	0.00%	–	–	–	–	–	–	–	0.00%	–
O	ICGCSD	–	0.00%	10,500	10,500	–	10,500	10,500	–	21,000	0.00%	21,000
Total Standing Committees		216,700	–13.91%	221,200	170,800	50,400	32,500	32,500	–	253,700	17.07%	37,000
P	Project Committee (Reserve)	70,000	0.00%	35,000		35,000	35,000		35,000	70,000	0.00%	–
P	FSC	30,000	–14.29%	15,000		15,000	15,000		15,000	30,000	0.00%	–
A	ON	20,000	0.00%	10,000	10,000		10,000	10,000		20,000	0.00%	–
OT	Chemistry Olympiad	2,500	0.00%	2,500	2,500		2,500	2,500		5,000	100.00%	2,500
OT	IUPAC – Solvay Prize	10,000	0.00%	–	–		10,000	10,000		10,000	0.00%	–
OT	General Assembly	405,000	24.62%	5,000	5,000		385,000	385,000		390,000	–3.70%	(15,000)
OT	Centenary	–	0.00%	–	–		50,000	50,000		50,000	0.00%	50,000
OT	International Years	–	0.00%	–	–		–	–		–	0.00%	–
OT	ICSU/IMU/IUPAC Grant	11,000	0.00%	11,000	–	11,000	11,000	–	11,000	22,000	100.00%	11,000
Total Other Commitments		548,500	19.24%	78,500	17,500	61,000	518,500	457,500	61,000	597,000	8.84%	48,500
Total Commitments		1,208,900	4.63%	412,810	222,233	190,577	861,590	583,177	278,413	1,274,400	5.42%	65,500

Proposal for discussion- IUPAC and Applied Chemistry
Engaging with Industry in a more Meaningful Way

Context

Chemistry is typically *applied* through the work of industry. Industry and industrial chemists have and continue to make a valuable contribution to IUPAC in a number of ways:

- The work of elected industrial scientists within the Divisions and Committees.
- As Affiliate members (AMP).
- Through the Company Associates (CA) programme and the work of the Committee of Chemistry and Industry (COCI) that focuses on areas of interest to industry such as HSE, Responsible Care, chemistry's contribution to international chemicals policy.
- Corporate sponsorship of specific activities and IUPAC prizes.

The Company Associates programme is an area of concern. It was established in the 1960s to improve collaboration between the Chemical Industry and the Union. Organisations such as industrial companies, research and development institutions and laboratories, scientific societies or any other bodies interested in and with a contribution to make to the activities of the Union may become associated with it as Company Associates. This broad definition is intended throughout this paper.

COCI is responsible for developing and maintaining, in collaboration with the NAOs, an active programme to recruit guide and inform CA's on IUPAC programme and policies. We have however seen a progressive fall in the numbers of CA's (CA's decreased from 83 in 2013 to 48 in 2017-a 58% decrease). Many factors may underlie this reduction including – industry restructuring, organisational change within companies and the trend away from free standing research departments, the loss of some benefits to companies when IUPAC publishing was outsourced to DeGruyter. Today the only direct contact between IUPAC and the CA is often only with an accounting department.

The subscriptions paid as AMPs or CAs are unchanged for very many years. AMPs pay \$35 per annum but receive financial benefits potentially in excess of this. In NAO countries, just \$50 of the CA subscription is remitted to IUPAC of the minimum annual subscription of \$450. The remaining amount remains with the NAO to use as they wish. In the past the benefit of a 25% reduction on IUPAC publications and PAC (value alone >\$500 p.a.) significantly exceeded the subscription. In effect IUPAC was paying interested companies to be CA's.

A COCI survey of IUPAC units regarding engagement with industry reported that IUPAC Committees and Divisions were interested in interacting more with industry to collaborate on projects and identify common or relevant projects. Participation of industrial chemists in projects and governance was cited as a benefit more often than sponsorship from industry. Their engagement would expand the "A" in IUPAC. In addition, the dissemination of IUPAC outputs, including project outputs, nomenclature and standards, technical recommendations and publications, outreach and workshops to industry was viewed as favourable by survey participants. The conclusion was that a redesign of the CA programme

was urgently needed that should focus on engaging individual industrial chemists and companies much more effectively throughout IUPAC.

As IUPAC approaches its second century and is starting to focus on new strategic programmes such as Green Chemistry and Sustainable Development and on Big Data, it is also important to recognise the potential interest and contribution that could arise from a re-engaged industry.

Additionally as many countries find it increasingly difficult to fund national subscriptions we need to ensure that we have sustainable income streams from the our other membership categories rather than simply subsidising their membership.

To achieve a more valuable and meaningful we therefore face three principle challenges:

1. Helping industry recognise the potential unique international value of IUPAC activities. We must sell our global contribution to chemistry more effectively.
2. Achieving greater direct involvement of industrial scientists in the applied work of IUPAC. We have to find ways of attracting the best industrial chemists from around the world to be an integral part of our work.
3. Setting subscription levels that reflect the value of being part of the IUPAC community whilst providing meaningful IUPAC income (>\$50,000 overall per annum) that can be reinvested into IUPAC work and activities.

A Renewed Approach

A renewed approach was supported by the Executive Committee at its meeting in Beijing in November 2016 when the COCI work on a revised CA programme was discussed. This has been built on since the EC meeting and the proposals are below. It was noted that this revised programme could have implications for governance if we want to encourage the active participation of the best industrial scientists in IUPAC from all countries; not just those with NAOs. The objective would be to bring new proposals to Council in 2017 for implementation in 2018 onwards. The 2018/19 budget would also reflect an increased financial contribution from the revised membership schemes.

The proposed renewed approach is fourfold at the level of the individual industrial chemist, CAs (as defined above), creation of a new corporate endowment fund and fourthly formalising the relationship with international industry representative associations and relevant intergovernmental organisations (IGOs e.g. OPCW) through Memoranda of Understanding.

Specific proposals are as follows:

1. Individual Industrial Chemists could be part of a revised AMP programme. If they agree they would be identified as industrial chemists within the IUPAC membership database facilitating COCI management of the industrial network. The annual subscription is proposed at \$50 including digital CI with a premium of \$25 if members wish paper copies. AMP members would receive 10% discounts on IUPAC

publications and to IUPAC endorsed conferences. They would be entitled to be nominated for election to non-titular positions in IUPAC Divisions and Standing Committees irrespective of the country of residence.

2. Company Associates would pay a minimum annual Subscription of \$2500 per annum. NAOs will have the right to opt to manage a national programme and would remit \$1500 to IUPAC using remaining subscription income as they deem most appropriate. Company Associates will nominate a membership scientist or staff member as the point contact for IUPAC activities and who can manage the rights and benefits to CAs:
 - The right to nominate company scientists to Associate member positions in Divisions and Standing Committees irrespective of the country of residence.
 - The right to nominate company scientists too Titular and Associate member positions in COCI irrespective of the country of residence.
 - A discount of 25% for a single subscription or purchase of IUPAC publications including PAC and the PAC database to a nominated corporate library.
 - A 10% discount for one company scientist per IUPAC endorsed Conference
3. A Corporate Endowment Fund (proposal attached) that would allow for significant donations (at \$250,000 and \$50,000 levels) in support of core strategic IUPAC activities in Green Chemistry for Sustainable Development, Big Data and capacity building in the Developing World. Donors would be suitably acknowledged on the IUPAC website and become lifelong CA's (benefits as 2. above).
4. IUPAC will seek to establish Memoranda of Understanding with the key Industry Associations for work and activities of mutual interest especially where these involve partnership with other IGOs such as UN bodies and OPCW. This will provide for far greater understanding of IUPACs unique role at the industry and international level.

Next steps

The Executive Committee and Bureau should be consulted on these proposals with the intention of sign off by Bureau in April. The 2018/19 budget also needs approval by Bureau and currently incorporates models of the revised subscription rates. Proposals for changes in standing orders for eligibility for election should go to Council 2017 for approval so that new election processes can be implemented for Council 2019.

C. Humphris & B. West

For consideration By Bureau

An IUPAC Corporate Endowment Fund for Sustainable Development

IUPAC

The International Union of Pure and Applied Chemistry was founded in 1919 and is responsible for the development of a common language of chemistry, technical standards for chemistry, and ethical guidelines for professional chemists, worldwide. It operates through a project system rooted in the main disciplines of chemistry including Divisions for “Chemistry and the Environment” and “Chemistry and Human Health”. It promotes global chemistry education through its Education Committee, Safety Training and responsible use of chemistry through its Industry Committee, and organizes conferences on world issues through its committee for chemistry for real world needs (ChemRAWN). IUPAC is a science participant in the Strategic Approach to International Chemicals Management process (SAICM) for global regulation of chemicals organised jointly by UNEP and WHO, and provides science support to the Organisation for the Prohibition of Chemical Weapons (OPCW) for the operation of the Chemical Weapons Convention.

IUPAC is funded through its 54 member countries, and its publications. It works with a number of organisations in support of awards for excellence in chemistry. An endowment fund to help deepen and broaden its current activities and programmes is a new venture for IUPAC.

Proposal

The fund will be established to finance IUPAC projects and activities in support of Sustainable Development and the 2015 UN millennium goals, and advances in Big Data. It will accept contributions and sponsorship from legitimate sources. Those supporting the fund will be highlighted on the IUPAC website and through IUPAC publications in ways proportionate to:

\$250,000.	Strategic Partners
\$50,000	Corporate Sponsors

Scope of work supported

The fund will have four principal uses:

1. Multi-divisional/committee IUPAC science projects on Green and Sustainable Chemistry including those generated by the new IUPAC interdivisional Committee on Green Chemistry and Sustainable Development.
2. Promotion of chemistry for Sustainable Development through IUPAC education, training and capacity building programmes in emerging countries.

3. Ensuring standards and nomenclature are implemented through “Big Data” initiatives to the benefit of world wide chemistry including industrial research.
4. Facilitating the development of chemistry in emerging countries through IUPAC financially sponsored conferences in these countries and financial support to chemists from emerging countries to attend IUPAC conferences, Congresses and General Assemblies around the world.

Administration

Responsibility for selection of projects and activities supported by the fund will rest with the IUPAC Project Committee. It is anticipated that a proportion of the funding received would be used to fund chosen programmes of work directly. That remaining would be invested to create an income stream to help sustain IUPAC work on the four strategic priority areas into the future. The IUPAC Finance Committee would be responsible for the oversight of this endowment investment programme. Financial administration will be performed through IUPAC Secretariat for compliance with all regulations of operations.

Reporting

The Officers of the IUPAC will organise a bilateral annual meeting with the Strategic Partners to review the priorities of the work programmes supported by the fund and its financial performance. Additionally Company Sponsors will be invited as a group to a review meeting at IUPAC General Assemblies.

C.J. Humphris
IUPAC Treasurer

NAO's 2017	2017 Due (NC 10^3)	Currency	2017 Due (USD)	2018 Due (USD)	2019 Due (USD)
Australia	14.149	AUD	\$11,068.24	\$11,068.24	\$11,068.24
Austria	6.393	EUR	\$6,995.71	\$6,995.71	\$6,995.71
Bangladesh	1.985	USD	\$1,984.50	\$1,984.50	\$1,984.50
Belgium	17.568	EUR	\$19,223.16	\$19,223.16	\$19,223.16
Brazil	39.278	USD	\$39,277.92	\$39,277.92	\$39,277.92
Bulgaria	3.471	BGN	\$1,943.07	\$1,943.07	\$1,943.07
Canada	20.399	CAD	\$16,723.22	\$16,723.22	\$16,723.22
Chile	5801.412	CLP	\$9,483.18	\$9,483.18	\$9,483.18
China/Beijing	936.042	CNY	\$153,688.91	\$153,688.91	\$153,688.91
China/Taipei	951.318	TWD	\$30,880.52	\$30,880.52	\$30,880.52
Croatia	1.103	USD	\$1,102.50	\$1,102.50	\$1,102.50
Cuba	1.103	USD	\$1,102.50	\$1,102.50	\$1,102.50
Czech Republic	142.299	CZK	\$5,684.96	\$5,684.96	\$5,684.96
Denmark	31.778	DKK	\$4,659.25	\$4,659.25	\$4,659.25
Egypt	26.927	EGP	\$3,539.94	\$3,539.94	\$3,539.94
Finland	5.838	EUR	\$6,387.49	\$6,387.49	\$6,387.49
France	32.682	EUR	\$35,761.54	\$35,761.54	\$35,761.54
Germany	48.903	EUR	\$53,510.15	\$53,510.15	\$53,510.15
Greece	3.110	EUR	\$3,402.47	\$3,402.47	\$3,402.47
Hungary	1258.786	HUF	\$4,571.43	\$4,571.43	\$4,571.43
India	29.661	USD	\$29,661.21	\$29,661.21	\$29,661.21
Ireland	4.935	EUR	\$5,400.40	\$5,400.40	\$5,400.40
Israel	41.798	ILS	\$10,703.91	\$10,703.91	\$10,703.91
Italy	24.613	EUR	\$26,932.35	\$26,932.35	\$26,932.35
Jamaica	97.475	JMD	\$860.20	\$860.20	\$860.20
Japan	5191.056	JPY	\$43,436.16	\$43,436.16	\$43,436.16
Jordan	0.781	JOD	\$1,106.04	\$1,106.04	\$1,106.04
Korea, Republic of	45.846	USD	\$45,845.87	\$45,845.87	\$45,845.87
Kuwait	0.309	KWD	\$1,024.57	\$1,024.57	\$1,024.57
Malaysia	41.151	MYR	\$6,524.09	\$6,524.09	\$6,524.09
Mozambique	1.103	USD	\$1,102.50	\$1,102.50	\$1,102.50
Nepal	1.103	USD	\$1,102.50	\$1,102.50	\$1,102.50
Netherlands	23.583	EUR	\$25,804.79	\$25,804.79	\$25,804.79
New Zealand	4.773	NZD	\$3,617.17	\$3,617.17	\$3,617.17
Nigeria	1.103	USD	\$1,102.50	\$1,102.50	\$1,102.50
Norway	46.113	NOK	\$5,974.68	\$5,974.68	\$5,974.68
Poland	38.437	PLN	\$10,445.67	\$10,445.67	\$10,445.67
Portugal	4.415	EUR	\$4,830.58	\$4,830.58	\$4,830.58
Puerto Rico	22.036	USD	\$22,035.54	\$22,035.54	\$22,035.54
Russia	28.370	USD	\$28,369.72	\$28,369.72	\$28,369.72
Senegal	1.103	USD	\$1,102.50	\$1,102.50	\$1,102.50
Serbia	1.103	USD	\$1,102.50	\$1,102.50	\$1,102.50
Slovakia	2.658	EUR	\$2,908.95	\$2,908.95	\$2,908.95
Slovenia	2.142	EUR	\$2,343.56	\$2,343.56	\$2,343.56
South Africa	88.969	ZAR	\$7,399.30	\$7,399.30	\$7,399.30
Spain	19.404	EUR	\$21,227.00	\$21,227.00	\$21,227.00
Sri Lanka	140.673	LKR	\$1,078.79	\$1,078.79	\$1,078.79
Sweden	62.985	SEK	\$7,389.95	\$7,389.95	\$7,389.95
Switzerland	12.68	CHF	\$12,016.92	\$12,016.92	\$12,016.92
Thailand	369.019	THB	\$11,260.92	\$11,260.92	\$11,260.92
Turkey	21.985	TRY	\$8,178.03	\$8,178.03	\$8,178.03
UK	19.976	GBP	\$30,169.97	\$30,169.97	\$30,169.97
Uruguay	22.299	UYU	\$859.11	\$859.11	\$859.11
USA	122.668	USD	\$122,668.03	\$122,668.03	\$122,668.03
Total			\$916,576.65	\$916,576.65	\$916,576.65

25.1 Proposed new Terms of Reference

EVALUATION COMMITTEE (EvC)

Composition and Terms of Office

- (i) There shall be an Evaluation Committee composed of five Members of the Bureau.
- (ii) The President, in consultation with the Executive Committee, shall appoint the members and designate one of them as Chair.
- (iii) The period of service of the members shall be two years.
- (iv) The Executive Director shall act as Secretary for the Committee.

Terms of Reference

- (i) To monitor statistical data on the nature and breadth of project portfolio and the geographical spread of Task Group participation.
- (ii) To examine project completion reports, identify lessons to be learned, and liaise with the Project Committee.
- (iii) To collect and analyze reports from Task Group Chairs, Divisions, and Committees on responses to strategic initiatives of the Union
- (iv) *To evaluate the roles and contributions of Divisions and Committees with respect to the mission and strategic initiatives of the Union.*
- (v) To report to the Bureau, in writing, annually on the results of the evaluations done.
- (vi) To inform, after discussion in the Bureau, the National Adhering Organizations of the completed evaluations.

Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD)

Aims

To assist in advancing the objectives set out in the strategic plan adopted by IUPAC in 2015 this Interdivisional Committee will initiate, promote and coordinate the work of the Union in the area of green and sustainable chemistry. It supersedes the sub-committee on Green Chemistry/Division III.

Terms of Reference

To be responsible for advancing the strategic plan of the Union for green and sustainable chemistry and for coordination of all the work of the Union in this area to develop a coherent programme of action.

To initiate and coordinate projects in green and sustainable chemistry and to encourage activities in these areas from across the Divisions and Standing Committees.

To organise the series of IUPAC International Conferences on Green Chemistry and manage IUPAC participation in the PhosAgro/UNESCO/IUPAC Green Chemistry for Life awards programme and the IUPAC Prize in Atmospheric and Green Chemistry and any other related awards that may be established. To also seek additional sponsorship and support from industrial sources for its work.

To work actively with COCI and CCE to stimulate and increase interest in green and sustainable chemistry in the theory and practice of industrial chemistry and chemistry education, through their external industrial and institutional relationships. To listen to and be aware of the external industrial and institutional perspectives and priorities.

To be responsible, after consultation with all the relevant bodies of IUPAC, for advice to the President and Executive Committee on matters relating to harmonisation, regulation and standardisation in green and sustainable chemistry.

To be responsible for the promulgation of the work of the Union in green and sustainable chemistry through interaction with other relevant organisations with a common interest.

To ensure that any considered IUPAC view on Green Chemistry shall carry the fullest possible weight among other international organisations and to advise the Executive Committee as to our standing in these matters.

To advise the President and the Executive Committee on suitable persons for appointment as Representatives of IUPAC on other bodies concerned with green chemistry for Sustainable Development Goals.

Composition and Terms of Office (ICGSD)

(i) There shall be a standing Interdivisional Committee on Green Chemistry for Sustainable Development, composed of a Chair, a Secretary, up to three Titular Members and up to three Associate Members as a “core” membership and one Representative Member from each interested Division and Standing Committee.

(ii) The President, in consultation with the Executive Committee, shall appoint the Chair and the Secretary, the Titular Members and the Associate Members. ICGSD and the Division Presidents and Standing Committees Chairs may propose names of persons suitably qualified for appointment.

(iii) The period of service of the core Titular Members and Associate Members shall be two years, renewable for a further term of two years. The period of service for Representatives from the Divisions and Standing Committees shall be two years, renewable up to a total of eight years.

(iv) The period of service of the Chair and of the Secretary shall be two years, renewable for a further term of two years. The sum of the years of service as a Titular Member or as an Associate Member and as the Chair or the Secretary shall not exceed ten years.

(v) The following organizations shall be invited to attend meetings of ICGSD:

United Nations Educational, Scientific Cultural Organization (UNESCO)

International Council for Science Unions (ICSU)

Organization for the Prevention of Chemical Weapons (OPCW)

Strategic Approach to International Chemicals Management (SAICM)

United Nations Industrial Development Organization (UNIDO)

International Council of Chemical Associations (ICCA)

Organization for Economic Co-operation and Development (OECD)

The Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD)

REPORT FOR THE COUNCIL

The Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD) was established by the President of IUPAC and the Executive Committee in November 2016 and details may be viewed on the webpage on the IUPAC website: <https://iupac.org/body/041>. ICGCSD now replaces the previous Subcommittee on Green Chemistry - Division III and its Membership is reinforced by the formal participation of all Divisions and Standing Committees (except for Division VIII). The Full Committee Membership will be finalized with the participation of NAO representatives, following ratification of ICGCSD by the Council in São Paulo in July. Since its foundation in July 2001, as at April 2016, the previous Subcommittee on Green Chemistry had 42 completed and 25 ongoing projects to its credit since its foundation in 2001.

Taking for granted the list of projects already implemented within Division III and those on Green and Sustainable Chemistry already approved within IUPAC, this report refers to the following ongoing and future projects on which we expect to have extensive collaboration with all Divisions and Standing Committees.

PROJECTS (already submitted):

Postgraduate Summer School on Green Chemistry

Task Group Chair: Pietro Tundo

Task Group Members: Jan Labuda, Christine Luscombe, Mehmet Mahramanlioglu, Janet Scott, Supawan Tantayanon

The School will be held in **Venice in September 2018** and has the aim to teach post-graduate students and post-doctoral researchers in chemistry from all over the world, from academia and industry, on how to approach pollution prevention from a chemical standpoint.

Scholarships to attend The Summer School will be offered to young talented chemists from academia, or industry, from developing countries not yet affiliated with IUPAC. This addresses the important aim of facilitating a profitable and continuous exchange of ideas and information among the students, the instructors and the different stakeholders, in particular, members from IUPAC Divisions and Committees interested in Green Chemistry, for the establishment of long lasting scientific relationships. As an added value, it will give rise to new research projects and collaborations, which will be effectively carried out by the exchange of young researchers, particularly students coming from developing nations, who will be ambassadors of Green Chemistry in their institutions, in their countries, and to their peers. This will introduce the work of IUPAC to new countries, showing the value of being IUPAC members and potentially assist in persuading them to become NAOs.

Workshop on Green Chemistry and Water Treatment & Preparation of Manual for Sustainable and Cost-effective Solutions to Water Quality Challenges

Task Group Chair: R. K. Sharma and V. S. Parmar - (GCNC, Department of Chemistry, University of Delhi, India)

The project aims at advocating the significance of improving water quality for human consumption and finding cost-effective solutions for the associated problems. The workshop will focus on finding sustainable solutions for crucial water challenges such as water contamination due to heavy metal poisoning, pesticides, etc. Topics include:

1. Discussion on emerging water contamination issues (identifying the problems and root causes).
2. Proposing sustainable, innovative and cost-effective solutions to water quality challenges that could be implemented at the ground level and potentially replicated in other areas of the World, including developing countries that face such severe challenges.
3. Formulating appropriate action plans for executing/implementing the suggested solutions on a large scale.
4. Preparation of a manual on effective Green Chemistry solutions for water pollution that would be of considerable interest to the targeted stakeholders.

PROJECT (already completed)

Alongside the above-mentioned projects, we would like to report, as an example of the sort of projects that we would expect to see submitted to the ICGCSD in the future, the book ***Chemistry Beyond Chlorine*** (608 pages) published by Springer in 2016, as a research publication in issues of general interest. The book was an outcome of the Division III Subcommittee on Green Chemistry, now absorbed into the newly formed ICGCSD. Task group Members and editors of the project are: Pietro Tundo, Liang-Nian He, Ekaterina Lokteva, Claudio Mota. This project will return a profit to IUPAC, as the royalties from publication of the book will go to IUPAC instead of to the Editors.

PROJECTS WITH INDUSTRY (to be submitted):

ICGCSD seeks to open a dialogue on Green Chemistry and Sustainability with relevant international Chemical Industry and related chemical organizations through the establishment of an **Industrial Green Chemistry Panel**. This is a **bottom-up approach**, since IUPAC will provide the opportunity to establish a panel to which industries will be welcomed, in order to:

- Identify areas in which Green Chemistry does, or could, offer solutions in both processes and products, based on their own experience;
- Directly present their suggestions and ideas;
- Propose solutions, that would therefore come directly from those who work in the sector.
- Develop, elaborate and finally submit, project proposals to IUPAC for evaluation and realization.

This project would constitute a key milestone for the IUPAC Green Chemistry platform. Some industries, present at the 6th International Conference on Green Chemistry held in Venice in 2016, have already shown their interest in the proposal and have expressed a willingness to help develop the best practices in relevant manufacturing fields (chemicals, processes, products, etc.) They expressed their support for the opportunity to take advantage of IUPAC's international reputation and broad reach in order to improve the worldwide visibility of industrial Green Chemistry innovation and for dissemination of ideas focused on advancing greener production, products and protocols worldwide. The partners will operate through emails, GoTo meetings, co-financed Summer Schools and collaborative Projects under IUPAC supervision, which will guarantee wider international visibility to the team involved and the greener processes and products highlighted, thus improving the uptake and spread of sustainable processes in industry.

Two special meetings will be organized: one at the IUPAC General Assembly in Sao Paulo, Brazil in July 2017 and a second at the 8th International IUPAC Conference on Green Chemistry in Bangkok, Thailand in 2018.

Subsequently, annual meetings will take place associated with the General Assembly in odd years and during the IUPAC Conferences on Green Chemistry in even years.

The **sharing of common objectives** will:

1. Support and accelerate the achievement of sustainability goals in the chemical industrial context;
2. Propose challenging R&D themes of green chemistry and green engineering;
3. Qualify green chemistry and green engineering responsible innovation in industry;
4. Help coordinate efforts in the framework of Industrial Ecology and Industrial Symbiosis; and
5. Ensure cross fertilization of green solutions in different industrial contexts.

These activities will be under the guidance and supervision of ICGCSD and will be expected to constitute a series of programmed meetings for the future.

COLLABORATIONS WITH INTERNATIONAL BODIES:

Organization for the Prohibition of Chemical Weapons (OPCW)

ICGCSD will actively participate in the preparation and organization of the workshop that OPCW/ICAA is planning to hold in November 2017. The workshop, which is dedicated to Green Chemistry for non-toxic substitutes, will be held at the OPCW Headquarters in The Hague. This event will involve the participation of different stakeholders from industry, academia and other backgrounds, providing a useful opportunity to further discuss this important matter from different perspectives, highlight case studies and to explore to what extent Green Chemistry can contribute to the objectives of the Convention, in particular, on chemical safety and security.

OPCW actively participated as a sponsor in the 6th International IUPAC Conference on Green Chemistry with a self-organized session entitled "Chemistry for a More Secure and Sustainable World: the OPCW's role" and by covering the participation costs for 7 scientists coming from less developed countries. In recognition of this important contribution, OPCW has been invited (and has willingly accepted) to prepare a paper/introduction in the Special Issue of PAC dedicated to the outcomes of the conference talks.

UN: Sustainable Programme

UN Technology Facilitation Mechanism and the upcoming Science, Technology and Innovation Forum for the Sustainable Development Goals

<https://sustainabledevelopment.un.org/TFM/STIForum2017/OnlineDiscussion>

ICGCSD participated with two important contributions in the forum on the following topics:

TOPIC 1: Science, technology and innovation for the SDGs 1, 2, 3, 5, 9 and 14

<https://sustainabledevelopment.un.org/forum/?forum=88c>

TOPIC 2: STI plans, policies and capacity building

<https://sustainabledevelopment.un.org/forum/?forum=89>

The discussion aims to mobilize all stakeholders to share information on trends in the deployment of science, technology and innovation for the Sustainable Development Goals, specific solutions and achievements, state of the art expertise on specific issues and practice areas, emerging priorities, critical knowledge and innovation gaps, as well as their views on ways of mobilizing science, technology and innovation responses to address these gaps. The discussion will feed directly into the 2017 STI Forum.

Two **UN Initiatives** should be taken into consideration for future collaborations:

1) Sustainable Development Knowledge Platform – SDGs Partnerships

An important UN initiative is the opportunity to register initiatives to the platform (<https://sustainabledevelopment.un.org/partnerships/>) that provides global engagement for multi-stakeholder partnerships and voluntary commitments from all stakeholders devoted to support the implementation of the Sustainable Development Goals.

ICGCSD would like to register **the Summer School Series proposal on the platform**: the project has been considered eligible for submission by the Permanent Mission of Italy to the UN in New York and UN/DESA, the Department of Economic and Social Affairs of the United Nations Secretariat, which were contacted for advice.

2) (UNEA-2) United Nations Environment Assembly of the United Nations Environment Program – Second edition held in Nairobi in 2016. (<http://www.unep.org/unea/about-unea>)

Point 20 of the resolution document on **Sound Management of Chemicals and Waste** (http://wedocs.unep.org/bitstream/handle/20.500.11822/11183/K1607167_UNEPEA2_RES7E.pdf?sequence=1&isAllowed=y) *“Invites countries, international organizations and other interested stakeholders, including the private sector, having relevant experience with the issue of sustainable chemistry to submit to the United Nations Environment Program secretariat, by 30 June 2017, best practices, indicating how these may enhance the sound management of chemicals, inter alia through*



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the implementation of the 2030 Agenda for Sustainable Development, as well as the Strategic Approach to International Chemicals Management and chemicals- and waste-related multilateral environmental agreements.”

Following UNEA’s resolution, mentioned above, IUPAC through the ICGCSD would like to submit some initiatives where we propose that Green and Sustainable Chemistry could make a significant contribution to the achievement of UN 17 SDGs.

Organization for Economic Co-operation and Development (OECD)

OECD has had a longstanding interest in the opportunities offered by the application of Green and Sustainable Chemistry.

OECD’s past and present commitment and projects in the Green and Sustainable Chemistry field can be viewed at the link: <http://www.oecd.org/chemicalsafety/risk-management/sustainablechemistry.htm>.

In 1998 IUPAC co-sponsored with OECD a Workshop on Sustainable Chemistry that was held in Venice (<http://old.iupac.org/publications/ci/1999/january/oecd1.html>) and subsequently the outcomes of the workshop were approved at the OECD meeting in Paris, June 6th, 1999.

OECD is looking to build links with a range of organizations representing chemistry worldwide and ICGCSD is now in dialogue with OECD in order to understand how an effective collaboration could be conducted with the aim of working together on common fields of interest including proposing future co-financed projects, as illustrated in OECD document “Synthesis report From the OECD workshop on alternatives assessment and Substitution of harmful chemicals” (Link: [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono\(2015\)53&dclanguage=en](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2015)53&dclanguage=en)).

International Sustainable Chemistry Collaborative Centre (ISC3, Federal Environmental Agency UBA - Germany)

ICGCSD was invited to participate in the ISC3 meeting on 17-18 May 2017 in Berlin: a Platform, financed by the German Government.

ISC3 was launched on the occasion of the conference “Mainstreaming Sustainable Chemistry”. Link: <https://isc3.org/events/mainstreaming-sustainable-chemistry-launch-isc3-iscnet/?mo=5&yr=2017>.

The conference provided an opportunity to meet members of the ISC3 global network, which is open to everyone engaged in sustainable chemistry. The program of the conference covered international political and economic issues of importance for the development of sustainable chemistry.

It is expected that ISC3 will propose collaboration with ICGCSD on common projects.

21st St. Petersburg International Economic Forum (SPIEF 21)

IUPAC members: Prof. Christopher Brett (IUPAC Executive Committee), Prof. John Corish (IUPAC former treasurer), Nicole Moreau (former President of IUPAC), Prof. Natalia Tarasova (IUPAC President) and Prof. Pietro Tundo (IUPAC Bureau Member) will attend the 21st St. Petersburg International Economic Forum that will be held in St Petersburg on 2-3 June 2017. The event encompasses the award-giving-ceremony (on 2 June) and the International Seminar (Symposium) on Green Chemistry for Life, the Environment and Sustainable Development (on 3 June).

Over the last 20 years, the Forum has become a leading global platform for representatives of the business community to meet and discuss the key economic issues facing Russia, emerging markets, and the world as a whole. The 2016 St. Petersburg International Economic Forum was attended by over 12,000 participants from 133 countries, including heads of state and government from emerging economies, heads of major corporations, and the world's leading experts in the fields of science, the media, and civil society. SPIEF 21 is scheduled for June 1-3, 2017. Foreign government and business leaders, as well as representatives of civil society, academic and media circles are invited to take part in the Forum. The International Seminar will be hosted by St Petersburg State Mining University.

CONFERENCES ON GREEN CHEMISTRY:

PAC Special Issue arising from 6th IUPAC Conference on Green Chemistry, Venice – Italy 2016.

Following the IUPAC 6th Conference on Green Chemistry held in Venice in September 2016, the most talented participants were invited to submit a manuscript based upon their authoritative lectures presented at the conference for consideration as a publication in a Special Conference-related Issue of the IUPAC journal, Pure and Applied Chemistry, PAC. Thirty authors have accepted the invitation to contribute scientific papers.

7th IUPAC Conference on Green Chemistry, Moscow - Russia, 2-5 October 2017

Link: <https://iupac.org/event/7th-iupac-international-conference-green-chemistry/>

The theme of the 7th ICGC is the development of chemistry within planetary boundaries. The main topics of this conference are:

- 1) Sustainable Development Goals (SDG) and Green Chemistry
- 2) Green Materials
- 3) Green Industrial Processes (Cleaner production and Green Nanotechnologies)
- 4) Green nature-like technology (Supramolecular systems and life-sustaining functions of non-living organic matter)
- 5) Capacity-building and technical cooperation (Education)

8th IUPAC Conference on Green Chemistry, Bangkok - Thailand, September 2018

AWARDS:

Participation in the Jury of the PhosAgro/UNESCO/IUPAC Partnership in Green Chemistry for Life Grant Programme

Link: <http://www.unesco.org/new/en/natural-sciences/science-technology/basic-sciences/chemistry/green-chemistry-for-life/how-to-apply/>

Members of the jury, including Prof. Pietro Tundo, met for two days to judge nominations on 30, 31 March in Paris. Other members of the Jury well known in IUPAC are Nicole Moreau and Sean Corish, the latter is the Chair of the Jury. This year 150 applications were received, an increase of 25% on the previous award. This elevated number of applications clearly show the success of the initiative and all this has positive repercussions not only on the young scientists involved, but also on the networks that support the program financially. Six winners from a range of countries were selected – each will receive \$30k to fund their research.

CHEMRAWN VII Prize for Atmospheric and Green Chemistry

Link: <https://iupac.org/chemrawn-vii-prize-for-green-chemistry-call-for-nominations/>

The CHEMRAWN VII Prize was first announced in August 2008 and since, has been awarded every two years at the IUPAC International Conference on Green Chemistry. The Prize of USD 5000 is granted to a young investigator (less than 45 years of age) from an emerging region who is actively contributing to research in Green Chemistry. Ali Maleki was Awarded the 2016 IUPAC-CHEMRAWN VII Prize for Green Chemistry.

MEETINGS:

World Chemistry Leadership Meeting (WCLM)

ICGCSD members will attend the WCLM workshop to be held on 11 July 2017 in Sao Paulo, Brazil to answer queries from Young Observers (YOs) at the WCLM meeting: *“Following a workshop with ISMC and ICGCSD representatives, the YO teams will work IUPAC volunteers to develop their ideas into a presentation for the WCLM plenary session.”* The current WCLM is focused on inter-disciplinary research – and sponsored by the new Committee on Green Chemistry and Materials. This will provide opportunities to work with multiple divisions. Workshop topics will include: Green Chemistry, Nanotechnology, and Toxicology. The last event of WCLM is the plenary lecture and panel presentation from young observers, who are sponsored by NAOs, as well as those receiving sponsorship to attend the World Congress. Brazil could be a great platform to poll a large audience on how to craft the WCLM in Paris.

IUPAC 100:

IUPAC100 Project: Providing Essential Tools For the Next Century

The whole working group, coordinated by Mary Garson, will help with the event organization in coordination with Laura McConnell on the following three topics:

- Evolution of Green Chemistry
- IUPAC Connections through ICGCSD: 1. OPCW, 2. OECD and 3. UNESCO
- Awards: UNESCO-PhosAgro IUPAC Award – Green Chemistry of Life Grants and CHEMRAWN Prize for Atmospheric and Green Chemistry.

**IUPAC 100 FOR AFRICA: Postgraduate Summer School on Green Chemistry
(to be agreed and submitted)**

The School, inspired by IUPAC Centenary Celebrations in 2019, aims to teach Green Chemistry to young graduate and post graduate chemists from all over the world, in particular to those from African countries. Discussions on hosting the school are underway with the Department of Chemistry at Addis Ababa University with final agreement expected to be reached within May.

The main objectives of the School are:

- Dissemination of the culture of chemistry, with particular attention to the role of communications understood as ensuring access both to IT resources and to scientific knowledge in Africa, where the enormous physical distances and the problematic economic and political conditions make the provision of information and technology extremely difficult.
- Enhancing the awareness of how developments in chemistry are strictly connected with the economic and social development of a specific country.
- Favoring research and teaching in the field of Green Chemistry in Africa, where it is still in its infancy. In particular, reinforcing and improving the chemical research areas in which African countries already operate: analytical and natural products chemistry.
- Constitution of a working team made up of talented young African chemists to collaborate in the field of Green Chemistry applied to the production of food, provision of clean water, affordable medicines and natural product extraction.
- Offering scholarships for young talented chemists either from academia or industry from African countries.
- Gaining wider consensus from disadvantaged countries in Africa, not yet affiliated with IUPAC (NAO), and thus eventually leading to new NAOs.
- Teaching how to approach the sound management of chemicals and waste from the perspective of the 17 UN Goals.

The collaboration between ICGCSD and other IUPAC Divisions and Committees with other connected international networks ICSU, UNESCO, OPCW, OECD, etc. will support African academia and Industries.



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These with other specific research networks for Africa, in particular: the World Academy of Sciences (TWAS), the United Nations Industrial Development Organization (UNIDO) and the Federation of African Societies of Chemistry (FASC) will be invited to participate in the Summer School planning process and scientific sessions and, moreover, to make a financial contribution to the scholarships for the talented students from African countries who will attend the School.

STATUTES, BYLAWS, AND STANDING ORDERS: 2017

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Preamble

P1 The Statutes and Bylaws should be read in the context of the following statements that reflect the core values of the International Union of Pure and Applied Chemistry (IUPAC).

P1.1 The Union will observe the basic policy of political nondiscrimination and affirms the rights of chemists of any country to adhere to or to associate with international activity in the field of chemistry without regard to race, religion, or political philosophy.

P1.2 Scientific excellence and objectivity are the cornerstones of all IUPAC work.

P1.3 IUPAC will value collaboration and communication among all our stakeholders.

P1.4 IUPAC will strive for diversity and inclusiveness in all forms.

P1.5 IUPAC members will respect each other and the Union.

P1.6 IUPAC members will uphold the highest standards of transparent, responsible and ethical behavior.

Comment [RH1]: Statute 2.5 has been removed and amplified with material from our strategic plan to produce this preamble.

Statutes

S1 Definition of the Union

The International Union of Pure and Applied Chemistry (IUPAC) (hereafter referred to as “the Union”) is a voluntary, nongovernmental, nonprofit association of organizations each representing the chemists of a member country, a member country being a country whose Adhering Organization has joined the Union.

S2 Objectives

The objectives of the Union are as follows:

S2.1 to promote continuing cooperation among the chemists of the member countries;

S2.2 to study topics of international importance to pure and applied chemistry which need standardization or codification;

S2.3 to cooperate with other international organizations that deal with topics of a chemical nature;

S2.4 to contribute to the advancement and understanding of pure and applied chemistry in all its aspects.

S3 Membership

S3.1 A country may join the Union through only one national organization representing its chemists. This Adhering Organization may be a national chemical council, a national society representing chemistry, a national academy of science, or any other institution or association of institutions representative of national chemical interests.

S3.2 The Adhering Organizations are the Members of the Union.

S3.3 A country requesting admission to the Union shall provide full information about its proposed Adhering Organization.

S3.4 An Adhering Organization may withdraw from the Union provided that it has fulfilled its financial obligations, or may be removed from the Union for failure to fulfill such obligations.

4 STATUTES, BYLAWS, AND STANDING ORDERS 2017

S4 Organization

- S4.1 The organization of the Union comprises its Council, a Bureau, an Executive Committee, Standing Committees, Divisions, Commissions, and other appropriate bodies as determined by the Council.
- S4.2 A General Assembly of the International Union of Pure and Applied Chemistry shall be held normally each second year, and shall consist of a set of meetings of the Council and such other bodies of the Union as the Bureau shall decide. Where the duration of office of Officers of the Union, Elected Members of the Bureau, and Titular Members and Associate Members of Division Committees, Commissions, or other bodies of the Union is referred to in these Statutes, it shall begin on 1 January of the year following their election at a General Assembly and shall end on 31 December of the year when the appointment is due to terminate. In the filling of casual vacancies the Bureau may authorize an appointment to Division Committees, Commissions, and other bodies of the Union except for the Executive Committee and Bureau to begin at an intermediate date. Any such appointment should be regarded as dating from 1 January of the year following the previous General Assembly in respect of the period of office for Division Committees, and Commissions. No person shall hold more than three appointments to bodies of the Union, except at the discretion of the Bureau in respect of membership of a subcommittee or acting as an official representative within or outside the Union.
- S4.3 The official headquarters of the Union shall be in Zürich (Switzerland) until otherwise decided by the Council. Any change in location requires the approval of two-thirds of the total number of votes assigned to the Adhering Organizations.
- S4.4 The legal domicile of the Union is accepted by Finanzdirektion des Kantons Zürich as an Association under Swiss Law and for legal purposes the Union will act in accordance with Articles 60 and following of the Swiss Civil Code and by the present Statutes.

S5 Council

- S5.1 The Council, to which the Bureau, Executive Committee, Standing Committees, Divisions, Commissions, and all other bodies of the Union are responsible, is composed of the Delegations of the Adhering Organizations. Each Delegation shall be assigned a specific number of votes/Delegates (1–6) according to principles decided by the Council. Each Adhering Organization shall appoint its Delegates for every Council meeting.
- S5.2 Regular meetings of the Council shall take place every two years as part of a General Assembly; special meetings may be convened by the President of the Union and shall be convened by the President at the request of one-third of the total number of Adhering Organizations, which shall specify the reason for such requests.

- S5.3 No decision of the Council shall be valid unless taken at a meeting of the Council at which at least one-half of the maximum number of votes is represented.
- S5.4 For all voting by the Council, abstentions shall not be recorded as votes.
- S5.5 The voting procedure to be adopted is different according to whether a proposal is a scientific or nonscientific matter. The Presiding Officer shall decide whether for the purpose of voting a matter shall be considered to be of a scientific or nonscientific nature, and that decision shall be final. The method of voting shall be specified in the Bylaws.
- S5.6 There shall be no voting by proxy.
- S5.7 Functions of the Council not mentioned in other Articles of these Statutes shall be as follows:
- S5.7.1 to elect the Officers of the Union and the Elected Members of the Bureau;
 - S5.7.2 to discuss and determine the general policy of the Union;
 - S5.7.3 to approve the Statutes and Bylaws of the Union and changes therein;
 - S5.7.4 to approve the terms of reference of the Bureau, Executive Committee, Standing Committees, Divisions, Commissions, and all other bodies of the Union as prescribed in the Statutes and Bylaws;
 - S5.7.5 to determine every four years, the one language in which the official records of the meetings of the Council, Bureau, and Executive Committee shall be kept and published;
 - S5.7.6 to receive and consider reports
 - (i) By the President on the state of the Union,
 - (ii) By the Bureau, Executive Committee, Division Presidents, and other bodies of the Union;
 - S5.7.7 to ratify decisions taken by the Bureau and Executive Committee between General Assemblies;
 - S5.7.8 to consider and adopt or reject the accounts of the Union;
 - S5.7.9 to examine and establish the budget of the Union for the next two financial years;
 - S5.7.10 to determine the dates and place of General Assemblies;
 - S5.7.11 to take such other actions as are required in the exercise of its authority under the Statutes and Bylaws.
- S5.5 The official text of a report shall be in the official language of the Union.

S6 Officers

- S6.1 The Officers of the Union shall be the President, the Vice-President, the Past-President, the Secretary General, and the Treasurer.
- S6.2 The President shall hold office for two years and shall not be reelected.
- S6.3 The President is the administrative head of the Union shall preside at the meetings of the Council, of the Bureau, and of the Executive Committee and shall be *ex officio* a member of all bodies of the Union. The President may delegate power as chief representative of the Union and to preside at meetings to the Vice-President, to another Officer of the Union, or to an Elected Member of the Bureau. When neither the President nor the Vice-President is able to perform the functions of the office of President, the immediate Past-President or, if absent, an Elected Member of the Bureau, chosen by the Bureau, shall assume temporarily the office of President.
- S6.4 The President shall submit to each regular meeting of the Council a report on the general state of the Union.
- S6.5 The Vice-President, designated as President-Elect, shall assume the office of President in the event of the President being unable to perform the functions of that office, without prejudice to the forthcoming period of office as President.
- S6.6 The Vice-President shall submit to the Bureau a critical assessment of the programs and the projects of all IUPAC bodies.
- S6.7 The Secretary General shall carry out the business of the Union as specified by the Council, by the Bureau, by the Executive Committee, or by the President, and be responsible for keeping its records and for the administration of the Secretariat.
- S6.8 The Secretary General shall be elected for four years and be eligible for reelection up to a maximum of a further four years.
- S6.9 The Treasurer shall be responsible for the accounts of the Union, shall prepare a budget for approval by the Bureau and the Council, shall approve expenditures from the funds of the Union, and, subject to the approval of the Executive Committee, shall be responsible for the investment and custody of the funds of the Union. The Treasurer shall ensure that an appropriate record of all financial authorities and transactions is maintained.
- S6.10 The Treasurer shall be elected for four years and be eligible for reelection up to a maximum of a further four years.
- S6.11 To assist in the administration of the business of the Union, the Executive Committee shall appoint an Executive Director responsible to the President and Executive Committee (Bureau, Council) through the Secretary General and in financial matters through the Treasurer.
- S6.12 The Secretariat shall consist of an Executive Director and any such other staff as approved by the Executive Committee.
- S6.13 The Council shall establish a Bureau to act for the Union during intervals between meetings of the Council, except on matters specifically excluded from its delegated authority.
- S6.14 The Council shall establish Standing Committees to advise the President and the Executive Committee; such bodies shall include a Finance Committee.

S7 Bureau

- S7.1 The Bureau shall normally meet once a year and at other times when the President considers it to be desirable. In a year when the General Assembly meets, a meeting of the Bureau shall take place during the General Assembly.
- S7.2 The Bureau shall consist of the President, the Vice-President, the Secretary General, and the Treasurer, the immediate Past-President, and Presidents of Divisions, together with not less than ten other members elected by the Council who shall be known as Elected Members. The period of service of these Elected Members of the Bureau shall be four years. The periods of service shall be arranged in such a way as to ensure continuity. These Elected Members are eligible for reelection to the same office for one more period of four years. No President of a Division may be simultaneously an Elected Member of the Bureau. Unless exceptional circumstances are established and special permission of the Council is granted, no Adhering Organization shall have more than one Elected Member on the Bureau, and the principle of fair geographical representation of Members shall be taken into account. The Council shall specify those bodies of the Union whose Chairs shall also be designated Members of the Bureau; such Members shall have full voting powers.
- S7.3 In case of an emergency which prevents the holding of elections, the Officers of the Union, the Elected Members of the Bureau, and the Presidents of the Divisions will continue to serve until statutory elections can be held.
- S7.4 The principal duties of the Bureau and its members, subject always to the Statutes and Bylaws, are as follows:
- S7.4.1 to ensure the strict observance of Statutes and Bylaws;
 - S7.4.2 to prepare the agenda for meetings of the Council and in particular to make provisions for elections;
 - S7.4.3 to make recommendations thereon to the Council;

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- S7.4.4 to attend the meetings of the Council;
- S7.4.5 to implement the decisions of the Council and execute the program of the Union as directed by the Council;
- S7.4.6 to take steps to ensure that IUPAC World Chemistry Congresses are held;
- S7.4.7 to take decisions about the holding of scientific meetings as proposed by Divisions and Standing Committees;
- S7.4.8 to take all other steps necessary for the good conduct of the affairs of the Union.

S7.5 The Bureau may neither elect Officers of the Union nor admit nor remove Members of the Union, but it may fill temporarily vacancies among the Officers pending the next regular meeting of the Council, when the Council shall fill such vacancies.

S7.6 The Bureau may fill casual vacancies in accordance with Statute 4.2.

S7.7 The Bureau shall establish an Executive Committee to act for it in ensuring an orderly discharge of the functions of the Union.

S8 Executive Committee

S8.1 The Executive Committee may formulate standing orders to facilitate its discharge of the foregoing functions.

S8.2 The Executive Committee shall be limited to eight members and shall include the President, the Vice-President, the Secretary General, the Treasurer, and the immediate Past-President. The other members shall be elected by the Bureau from among its Elected Members. The period of service of an Elected Member shall be four years or until the end of the term as a Bureau Member, whichever is the shorter. An Elected Member is eligible for reelection to the same office for one more period of four years. Terms of office shall be arranged such as to ensure continuity.

S9 Finance

S9.1 Each Adhering Organization shall pay an annual subscription to the Union, due 1 January and payable before 31 December in each year. The minimum amount of this annual subscription shall be decided from time to time by the Council.

S9.2 Any Adhering Organization in arrears with its subscription for a period of twelve months from the due date, shall be warned, shall be deprived of its voting rights, and all publications of the Union shall be withheld from it. Any Adhering Organization in arrears for a period of twenty-four months from the due date shall automatically cease to be a Member of the Union. Partial payment of the subscription shall be regarded as nonpayment, unless the Union exceptionally waives the outstanding subscription. Membership of bodies of the Union of all persons belonging to an Adhering Organization, which ceases to be a Member, shall continue at the discretion of the Bureau to the end of the period of service.

S9.3 Any Adhering Organization that shall withdraw (see also Statute 3.4) or cease for any reason to be a Member of the Union shall forfeit claims upon the funds of the Union.

S9.4 In addition to the annual subscription, the Union may receive financial contributions from other sources, such as gifts, bequests, and legacies. The Executive Committee may set up any auxiliary bodies to the Union that will enable such financial contributions to be received.

S9.5 None of the constituent bodies of the Union (e.g., a Division) may solicit funds for Union purposes from organizations other than the Union until the specific approval of the Bureau of the Union has been obtained. The disposal of any such funds shall be only with the approval of the Bureau.

- S9.6 Any expenditure from the funds of the Union shall require authorization from the Treasurer, acting on behalf of the Bureau. The Treasurer may delegate to the Executive Director the expenditure of funds of the Union according to the budget approved by Council.
- S9.7 Members of IUPAC bodies may receive contributions towards travel and subsistence expenses from funds of the Union, as authorized by the Treasurer. The Bureau shall establish procedures and guidelines for the approval of such expenses.

DRAFT

S10 Divisions and Commissions

- S10.1 The scientific work of the Union shall be undertaken by the Divisions, which shall be responsible to the Bureau and which shall represent within the Union the branches of chemistry indicated by their Divisional titles, and by such other bodies as are appointed by the Council.
- S10.2 Divisions may be created and existing ones may be dissolved or modified by the Council. The initial Members of Division Committees shall be appointed by the Council.
- S10.3 The procedures of each Division shall be governed by the Bylaws but a Division may also adopt rules which shall be in accord with the general policy of the Union, its Statutes and Bylaws, and which shall be subject to the approval of the Council.
- S10.4 Each Division may include such Commissions as are approved by the Council.
- S10.5 Joint Commissions between Divisions and/or Joint Commissions between the Union and other international scientific bodies may be attached to one of the Divisions or to the Bureau of the Union as decided by the Council. Rules for such joint bodies shall, if necessary, be set up by the Division Committee or by the Bureau, as the Bureau shall decide.
- S10.6 A Division Committee may appoint such subcommittees as are appropriate to the work of the Division and its Commissions.

S11 Standing Committees

Standing orders for these committees shall be determined by the Council. Members shall be appointed by the President of the Union.

S12 Attendance at meetings

Attendance at meetings of bodies of the Union shall be restricted to members of those bodies and observers as approved by the meeting Chair. The names of approved observers shall be communicated to the Secretary General via the Secretariat.

S13 Associated Organizations

The Council may decide to associate with existing international organizations whose aims and activities are in harmony with those of the Union. Their international scope of activities, with no a priori limitation to a part of the world, shall be explicit in their title or statutes. In the case of apparent competition with another international organization already associated with IUPAC, the Council shall make a choice and decide with which organization IUPAC wishes to be associated, while avoiding to associate with both at the same time. These organizations shall then be known as Associated Organizations of the Union.

S14 Company Associates

Organizations such as industrial companies, research and development institutions and laboratories, scientific societies, or any other bodies interested in the activities of the Union may become associated with it as Company Associates. The conditions under which such association shall occur or continue, including the determination of the minimum amount of annual subscription or donation shall be decided by the Council on the recommendation of the Bureau.

S15 Congresses and Other Scientific Meetings

- S15.1 At suitable intervals, World Chemistry Congresses shall be organized under the auspices of the Union. These Congresses shall comprise one or more branches of chemistry represented by the Divisions of the Union. The Council shall approve the scope of each Congress on the recommendation of the host country, with a view to achieving, by suitable rotation, the coverage of all branches of pure and applied chemistry. The Council shall also decide upon the place and dates of the Congress. The arrangements for such a

Congress shall be entrusted to a committee set up in the host country. This committee shall cooperate with the Bureau, the Officers of the Union, and the appropriate Divisions and Standing Committees.

- S15.2 Cooperation of the Union in the organization of a Congress shall not involve the Union in financial responsibility.
- S15.3 The Council may organize other scientific meetings or may offer the collaboration of the Union in the planning and arrangement of scientific meetings initiated by other organizations.

S16 Adoption, Changes, and Interpretation of Statutes

- S16.1 The Statutes shall take effect immediately after their adoption by the Council.
- S16.2 The English text of the Statutes shall be used exclusively as the authorized text for the interpretation of the Articles of the Statutes and Bylaws, but the Council may approve the Issue by the Union of versions in other languages.
- S16.3 Changes in the Statutes may be proposed by the Bureau or any Adhering Organization. Notice of changes so proposed shall reach the Secretary General via the Secretariat in writing at least six months before the meeting of the Council at which the proposal is to be considered. No change shall be made except at a meeting of the Council and with the approval of two-thirds of the total number of votes assigned to the Adhering Organizations.
- S16.4 In all cases where the Statutes are not clear or do not give a decision, the President's ruling shall be decisive.

S17 Duration

The Union shall not be dissolved except at a meeting of the Council convened specifically for this purpose by notice given three months in advance. At such a meeting, more than three-quarters of the maximum possible number of votes of the Adhering Organizations must be represented and cast, and two-thirds of the votes recorded shall be required for dissolution. If three-quarters of the maximum possible number of votes are not represented, the Council shall be convened again after a period of at least six months and at this second meeting the Union may be dissolved if the proposal for dissolution receives two-thirds of the votes recorded. In the case of dissolution of the Union, the Council shall appoint three trustees to carry out the liquidation of the assets of the Union. The net assets shall be transferred to one or more international scientific organizations

Bylaws

B1 Membership (cf. Statute 3)

A request of a country for admission to the Union can be received in writing, together with the appropriate documentation, by the Secretary General via the Secretariat at any time. It will then be considered by the Executive Committee, Bureau, or Council, whichever meets next after the application has been received, and if approved, membership shall begin on 1 January of the following year, provided that payment of that year's dues are received. The admission of a new Member approved by the Executive Committee or Bureau must be ratified by the Council at its next regular meeting. If payment has been received of the dues for the current year, the Council may allow a newly admitted National Adhering Organization to vote at the current Council meeting, on all items after the ratification of membership.

B2 Voting Procedure in Council (cf. Statute 5)

B2.1 Scientific Matters

B2.1.1 Recommendations of a scientific nature received from Divisions, or other bodies of the Union, shall be the responsibility of the Council. The Council may adopt them by a simple majority of personal votes cast by the Delegates present at a regular meeting. Between such meetings, the Bureau may act on behalf of the Council in these matters. The Bureau shall establish procedures for approval of recommendations in nomenclature, symbols, terminology, and conventions.

B2.1.2 Postal and electronically submitted ballots on scientific matters may be conducted in accordance with a procedure to be determined by the Bureau for each ballot.

B2.2 Nonscientific Matters

Voting on nonscientific matters shall be by Delegations, each Delegation being entitled to cast the number of assigned votes. All the votes to which the Adhering Organization is entitled shall be cast in the same sense.

B2.2.1 Admission and Removal of Members

Admission of Members shall be by a simple majority of votes recorded at a regular meeting of the Council. Removal of an Adhering Organization shall be valid only if at least three-quarters of the votes recorded at a regular meeting of the Council are cast in favor of such removal. Any reassignment approved by the Council shall become effective on 1 January of the following year.

B.2.2.2 Elections

For election of Officers of the Union and Elected Members of the Bureau the following rules shall apply:

- B2.2.2.1 Nominations may be made by the Adhering Organizations. These nominations must be received in writing by the Secretary General via the Secretariat at least two months before the beginning of the meeting of the Council at which the elections will take place. They must indicate clearly the position for which each candidate is nominated and shall be accompanied by a biographical note on each candidate.
- B2.2.2.2 The Bureau shall discuss the nominations made by the Adhering Organizations at a meeting prior to the meeting of the Council at which the elections are to take place. It has the right to make additional nominations for which information shall be provided. When the number of nominations exceeds the number of vacancies, the Bureau may make recommendations to the Council for filling the vacancies. These recommendations are not binding on the Council.

The officers of the Union and the Elected Members of the Bureau, as defined by the Statutes, shall be elected at a regular meeting of the Council by a written and secret ballot, a simple majority of the votes recorded being required for election. The election for each officer shall be held separately. If no nominee receives a majority on the first ballot, the nominee receiving the smallest number of votes shall be eliminated from the next ballot and successive ballots shall be held until a nominee receives a simple majority of the votes recorded or there are only two nominees on which to vote. If two nominees get an equal number of votes, the Presiding Officer, after consultation with the Executive Committee, shall cast the deciding vote.

For election of Elected Members of the Bureau, the nominees receiving the highest number of votes shall be elected to the vacancies, provided that the number of votes cast for each such nominee shall be a majority of the total votes cast per vacancy. If fewer nominees than the vacancies receive a majority of such votes cast, then those receiving a majority shall be declared elected and a second ballot conducted among the remaining nominees for the remaining vacancies. If, in this second ballot, no nominee receives a majority, the nominee receiving the smallest number of votes shall be eliminated from the next ballot and successive ballots conducted until all vacancies are filled. In each ballot, the number of names on ballot papers submitted by each Delegation shall be no more and no less than the number of vacancies outstanding at the conclusion of the previous ballot.

B2.2.3 Other Nonscientific Matters

Proposals on other nonscientific matters, after consideration, may be adopted without a formal vote unless objections are raised, when a vote shall be taken. Unless specifically stipulated otherwise in the Statutes and Bylaws, a simple majority of the votes recorded shall be required for adoption.

B2.2.4 Postal and Electronically Transmitted Ballots

Postal and electronically transmitted ballots on nonscientific matters may be conducted in accordance with a procedure described below, each Adhering Organization being entitled to cast the number of assigned votes, provided always that decisions on admission and removal of Members [(B2.2.1) above] and elections [(B2.2.2) above], the location of the official headquarters of the Union, changes in Statutes and Bylaws, and the dissolution of the Union are excluded from such postal and electronically transmitted ballots. Decisions reached by postal and electronically submitted ballot on nonscientific matters shall be subject to ratification by the Council at its next meeting. In postal and electronically submitted ballots on nonscientific matters, only those votes shall be valid which are received within one month from the date of mailing of the request for voting. Action shall only be taken if more than one-half of the maximum possible number of votes has been received at that date. A simple majority of the votes shall be required for a decision.

Comment [RH2]: Four months seems excessive, given the speed of modern electronic communication.

B2.2.5 Additions to Council Agenda

Matters to be considered at a meeting of the Council must appear on the agenda of that meeting, which shall be sent to the Adhering Organizations at least four months before the meeting is to be held. However, in case of urgency, a question may be added to the agenda with the consent of at least three-quarters of the Delegates present at the meeting. Modification of the Statutes or Bylaws, admission or removal of Members, and elections of Officers or Elected Members of the Bureau, are excluded from this procedure.

B3 Divisions and Commissions (cf. Statute 10)

B3.1 Division Committees

B3.1.1 Each Division shall be administered by a Division Committee consisting of Titular Members, Associate Members, and National Representatives with appropriate expertise.

B3.1.2 The Titular Members, Associate Members, and National Representatives of a Division Committee and of Commissions within a Division shall together form the Membership of the Division.

B3.1.3 The Division Committee shall be the organ of liaison between the Bureau on the one hand and the various bodies constituting the Division on the other hand.

B3.1.4 Nominations to the position of Titular Member may be made by Adhering Organizations or by members of the Nominating Committee. Titular Members must be from a member country. The Nominating Committee for each Division will be established before each election and will consist of not more than five people, of whom at least three must be from outside the Union. The Titular Members of each Division Committee shall be chosen by an electorate comprising the Titular Members, Associate Members, and National Representatives on the Division Committee, together with the members or officers of such other bodies within the Division that the Bureau may specify (currently the Chairs, Secretaries and Titular Members of Commissions associated with the Division, Task Group Chairs of active projects, and members of the current and previous Nominating Committee). The number of Titular Members shall not exceed ten unless otherwise determined by the Bureau. Titular Members are elected for two year terms. The term of service of a Titular Member shall be not more than four consecutive years, but shall cease on election as an Officer. If a Titular Member is unable to take up their post, it shall be offered to the highest polling unsuccessful candidate in the election. The Vice-President and the President of a Division shall not hold these respective offices for more than four consecutive years; the Secretary of a Division shall serve for four consecutive years and be eligible for re-election up to a maximum of a further four years. Exceptional circumstances must be established and special permission of the Bureau granted for Titular or Associate Membership of the same or more than one Division Committee beyond a total of twelve years of total Titular and Associate Membership, whether the Memberships are consecutive or not.

The immediate Past-President of the Division shall be one of the Titular Members of the Division Committee for a period of two years. In addition to these Titular Members, the President, Vice-President, Past-President, Secretary General, and Treasurer of the Union shall be *ex officio* Members of all Division Committees.

Nominations to the position of Associate Member may be made by Adhering Organizations, by members of the Nominating Committee, or by Company Associates. Associate Members must be from a member country or be an Affiliate Member of the Union. The number of Associate Members, who shall have full voting rights, shall not exceed six. The term of service of an Associate Member shall be two years, with the possibility of re-election consecutively for two more years only.

A newly elected Titular Member, Associate Member, or National Representative of a Division Committee shall assume office only after approval by the Bureau or Executive Committee. The Adhering Organization with which the Titular Member or Associate Member is connected shall be notified of the appointment.

A Division Committee may elect no more than ten National Representatives on the nomination of Adhering Organizations, with no more than one representative from a given Adhering Organization. The term of a National Representative, who shall have full voting rights, shall be two years, with the possibility of re-nomination and re-election consecutively for only two more years. Exceptional circumstances must be established and special permission obtained from the Bureau for the election of a National Representative from a country already represented on the Committee by a Titular or Associate Member.

B3.1.5 The Division Committee shall elect from among its existing and, subject to confirmation, new Titular Members, a President, a Vice President designated as President-Elect and a Secretary. These elections shall be subject to approval by the Council.

Comment [RH3]: This reflects practice during recent elections.

Comment [RH4]: This has been adopted as a unified approach for the 2017 elections, following detailed consultation with the Divisions.

Comment [RH5]: The current reconfirmation approach is messy in that it splits the ballots and raises questions of what should happen if a TM is not reconfirmed. Easier to simply have the shorter term with the possibility of re-election for a second term.

Comment [RH6]: This makes a current practice explicitly part of the bylaws.

Comment [RH7]: Reflects current practice and, in the case of Company Associates and Affiliate Members, a recommendation made by the 2017 Bureau.

- B3.1.6 The Division Committee may form a Division Executive Committee, consisting of the President, the Vice-President designated as President-Elect, and the Secretary of the Division, to carry out the necessary administrative duties between meetings of the Division Committee.
- B3.1.7 The functions of the Division Committee shall be as follows:
- B3.1.7.1 to initiate, approve, and manage projects;
 - B3.1.7.2 to plan and organize scientific meetings and engage in other activities that are deemed useful in furthering the objectives of the Division; this includes the approval of Union sponsorship of scientific meetings;
 - B3.1.7.3 to manage a budget for a Division in accordance with a procedures prescribed by the Treasurer;
 - B3.1.7.4 to advise the Bureau for recommendations to the Council on scientific matters;
 - B3.1.7.5 to propose to the Council through the Bureau the establishment of Commissions to be attached to it and to appoint the membership and the initial officers of these, the appointments having to be approved by the Council;
 - B3.1.7.6 to propose to the Council through the Bureau the dissolution of existing Commissions when required;
 - B3.1.7.7 to supervise the work of its Commissions and other bodies.
- B3.1.8 The Division Committee shall meet at least every two years, during a General Assembly.
- B3.1.9 Decisions of the Division Committee must receive the approval of the Bureau when they would have financial consequences involving the budget of the Union. In addition, in order to ensure the fullest coordination between the activities of all the Divisions, the Secretary General via the Secretariat shall be informed of all other decisions taken by the Division Committee.
- B3.1.10 At a General Assembly, the Division President shall report to the Council on the activities of the Division since the last General Assembly. In a year in which a General Assembly is not held, the Division President shall present to the Division Committee and to the Bureau a written report on the activities of the Division since the last General Assembly.
- B3.1.11 Each Division shall make provision for the conduct of the work of its Commissions and other bodies. Such provision, which must receive the approval of the Bureau, may be incorporated in Divisional rules.

B3.2 Annual Meeting of Division Presidents

A meeting of the Division Presidents shall be held each year. At this meeting, topics that are of interest for cooperation between the Divisions or between the Divisions on the one hand and the Council, the Bureau, and the Executive Committee on the other hand shall be discussed and the meeting may make recommendations to the Bureau.

The meeting shall be presided over by one of the Division Presidents elected for this task at the previous meeting. The Secretary General shall be invited to attend.

B3.3 Commissions

B3.3.1 On the recommendation of a Division Committee, through the Bureau, the Council may create a Commission of the Division. Each Commission shall have as its objective the study of topics of international scientific or technical significance requiring agreement, standardization, or codification in some aspect of pure or applied chemistry. The terms of reference of a new Commission shall be clearly described and approved by the Council. If a Division Committee wishes to create a Commission, it must apply to the Bureau for the appointment of an ad hoc committee of three persons who shall study the question and then report back to the Bureau. This report, if favorable to the creation of a new body, shall contain an indication as to the probable duration of the life of the new body and an estimate of its annual cost.

B3.3.2 At each General Assembly, the Council shall, in the light of the Division President's report and on the recommendation of the Bureau, decide whether or not to continue each Commission.

B3.3.3 Each scientific and technical Commission shall be composed entirely of specialists. They may consist of Titular Members, Associate Members, and National Representatives, who all shall have full voting rights.

Each Commission shall elect from among its existing and, subject to confirmation, new Titular Members by a simple majority a Chair, a Secretary, and, if desired also a Vice-Chair. These elections are subject to approval by the Bureau.

B3.3.4 The Membership of each new Commission is determined by the Council. Thereafter, both Titular Members and Associate Members may be nominated by the Commission but shall assume office only after approval by the Division Committee and by the Bureau or Executive Committee. The terms of service of Titular Members and Associate Members shall be two years, with the possibility of re-election for two years of Membership up to a maximum of eight years. The sum of the years of service as a Titular Member, including service as Chair, Vice-Chair, or Secretary, shall not exceed a total of ten years, whether these are consecutive or not, and further appointment thereafter as an Associate Member shall be for two years only. The rotation of a person through alternate periods of Titular and Associate Membership may be permitted to a total of twelve years. Exceptional circumstances must be established and special permission of the Bureau granted for:

- (i) the reappointment as a Titular Member of a person who has served eight years as a Titular Member, whether these are consecutive or not. The extension shall be for a period of two years.
- (ii) the rotation of a person through alternate periods of Titular and Associate Membership beyond a total of twelve years, whether these are consecutive or not. The extension shall be for a period of two years.
- (iii) membership in any capacity, other than that of National Representative, of one or more Commissions of a Division or of different Divisions beyond a total of

twelve years, whether these are consecutive or not. The extension shall be for a period of two years.

- (iv) the replacement by a Division President between General Assemblies of a Member of a Commission.

The number of Titular Members, Associate Members, and National Representatives of each Commission shall not exceed eight. Titular Members, Associate Members, and National Representatives shall be authorities in the field covered by the Commission and shall be so recognized by their Adhering Organizations. Before submitting their names for election, the Chair of the Commission shall explain to them their duties, and they shall agree to undertake them if they are elected.

The choice of a Titular Member or an Associate Member by a Commission may take place either during a meeting of the Commission or by correspondence. The nomination shall then be submitted via the Division Committee to the Secretary General via the Secretariat for approval by the Bureau or Executive Committee. The Adhering Organization with which the Titular Member or Associate Member is connected shall be notified of the appointment.

- B3.3.5 National Representatives may be nominated by the various Adhering Organizations and approved by the Commission; such representation shall not be permitted if the Commission already has a Titular or Associate Member from that Organization, unless exceptional circumstances are established and special permission is granted by the Bureau. Such representation shall lapse at the conclusion of the next General Assembly unless the person is re-nominated by his/her Adhering Organization and re-approved by the Commission. Re-appointment of National Representatives beyond a total of twelve years' service, whether these are consecutive or not, requires that special circumstances should be established by the Adhering Organization. The names of these National Representatives shall be communicated to the Secretary General via the Secretariat by the Chair of the Commission concerned.

- B3.3.6 The Division President shall be *ex officio* a member of all the Commissions attached to the Division.
- B3.3.7 A Commission may propose to the Division Committee the establishment of subcommittees with responsibility for designated functions within the scope of the Commission.
- B3.3.8 A meeting of a Commission can be financed only upon authorization of the Treasurer after recommendation by the appropriate Division Committee.
- B3.3.9 The Chair of a Commission shall each year present to the Division Committee a written report on the activities of the Commission, outlining the results obtained and indicating any new work that is to be undertaken.
- B3.3.10 All reports of Commissions shall be forwarded via the Division Committee to the Bureau, and then submitted to the Council if required by Bylaw 2.11.

B4 Associated Organizations (cf. Statute 13)

- B4.1 The Bureau, having satisfied itself that the claims and activities of an organization seeking to become an Associated Organization of the Union are in accordance with Statute 13, may recommend acceptance to associate membership by the Council provided that:
 - (i) the period of existence of the applicant organization has been adequate to establish its stability and the quality of its activities;
 - (ii) the statutes and bylaws of the organization do not conflict with the Statutes and Bylaws;
 - (iii) the activities of the organization neither duplicate nor are in conflict with the legitimate functions of the Union, such as standardization, codification, or other matters of scientific importance.
- B4.2 The Union shall invite Associated Organizations to send representatives to its General Assembly and to relevant meetings of IUPAC bodies when joint sponsorship of meetings or other joint activities may be discussed.
- B4.3 The Union shall offer assistance in publicizing meetings of Associated Organizations.

B4.4 The Union shall present to Associated Organizations such particulars as are decided by the Officers of the Union to be relevant to joint activities.

B4.5 The continuation of membership of each Associated Organization shall be reviewed by the Council every four years.

B5 Adoption, Changes, and Interpretation of Bylaws

B5.1 The Bylaws shall take effect immediately after their adoption by the Council.

B5.2 Changes in the Bylaws may be proposed by the Bureau or by any Adhering Organization. Notice of changes so proposed shall reach the Secretary General via the Secretariat in writing at least six months before the meeting of the Council at which the proposal is to be considered. A change shall be made only if more than one-half of the total number of votes assigned to the Adhering Organizations is cast in favor of such a change.

B5.3 In all cases where the bylaws are not clear or do not give a decision, the President's Ruling shall be decisive.

Standing Orders for Standing Committees

FINANCE COMMITTEE (FC) Composition and Term of Office

- (i) There shall be a standing Finance Committee, composed of a Chair and up to four other Titular Members. In addition, the Treasurer and Executive Director (to act as Secretary) shall be *ex officio* Members, but without voting power.
- (ii) The President, in consultation with the Executive Committee, shall appoint the Chair. The Finance Committee may propose candidates.
- (iii) The period of service of the Chair shall not exceed eight years. The sum of the years of service as a Titular Member and as the Chair shall not exceed ten years.
- (iv) The President, in consultation with the Executive Committee, shall appoint the Titular Members. The Finance Committee may propose names of persons suitably qualified for appointment.
- (v) The period of service of the Titular Members shall be normally be four years, renewable for a further term of four years.
- (v) The Membership shall be reviewed every two years by the incoming President, in consultation with the Executive Committee.

Terms of Reference

- (i) To advise the President and the Executive Committee on financial matters.
- (ii) To make financial recommendations for decision by the President and/or the Executive Committee.
- (iii) To review the IUPAC securities at least annually and to make such changes as appear appropriate.
- (iv) The Finance Committee shall not have executive functions, except with respect to dealings in securities. The Finance Committee shall have executive authority with respect to selection, purchases, and sales of securities held by IUPAC, provided that the Treasurer concurs with the decisions of the Finance Committee.

COMMITTEE ON PUBLICATIONS AND CHEMINFORMATICS DATA STANDARDS (CPCDS)

Composition and Terms of Office

- (i) There shall be a Standing Committee on Publications and Cheminformatics Data Standards composed of a Chair, a Secretary, and at least five and not more than eight other Titular Members. With the approval of the President, in consultation with the Executive Committee, up to three Associate Members may also be appointed.
- (ii) The President, in consultation with the Executive Committee, shall appoint the Titular Members and the Associate Members. The Committee on Publications and Cheminformatics Data Standards may propose names of persons suitably qualified for appointment and should conduct elections, according to the pattern for Divisions, in order to inform the advice that they give to the President.
- (iii) The period of service of a Titular Member and of an Associate Member shall be four years, renewable for a further term of four years.
- (iv) The Membership shall be reviewed every two years by the incoming President, in consultation with the Executive Committee.
- (v) The President, in consultation with the Executive Committee, shall appoint the Chair. The Chair shall appoint a Secretary. The Committee on Publications and Cheminformatics Data Standards may propose candidates.
- (vi) The period of service of the Chair shall not exceed eight years. The sum of the years of service as a Titular Member or an Associate Member and as the Chair shall not exceed ten years.
- (vii) The period of service of the Secretary shall not exceed eight years. The sum of the years of service as a Titular Member or an Associate Member and as the Secretary shall not exceed ten years.
- (viii) The Scientific Editor of *Pure and Applied Chemistry* shall be an *ex officio* Member of the Committee. The Scientific Editor shall have all the rights of a Titular Member but is not counted as one of the Titular Members defined in (i).

Comment [RH8]: This includes the democratic element, but still allows the President to retain oversight and ensure that wider concerns of the Union are considered. A similar change is made for several other committees, below.

Terms of Reference

- (i) To advise the President, Executive Committee, other Standing Committees, Divisions, and Commissions on all aspects of the design and implementation of printed and electronic publications, including computerized databases of all sorts, and to promote the compatibility of the storage, and management of digital content through the development of standards for the creation of a consistent, global framework for human and machine-readable chemical information.
- (ii) To make recommendations to the President and the Executive Committee on matters of policy and procedures related to the production and dissemination of printed and electronic publications.
- (iii) To advise the Secretary General and the Executive Director on hardware and software requirements for the Secretariat and on the development and operation of its computer systems.
- (iv) Subject to approval by the President and the Executive Committee, to establish Advisory Boards, Subcommittees, and Task Groups as needed to carry out specific functions of the Committee.

PURE AND APPLIED CHEMISTRY EDITORIAL ADVISORY BOARD (PAC-EAB)

Composition and Terms of Office

- (i) There shall be an Editorial Advisory Board (EAB) for the IUPAC journal *Pure and Applied Chemistry* (PAC), comprising the Secretary-General (*ex officio*), the President of each Division or his/her nominated representative (*ex officio*), the Chair of the Committee for Publications and Cheminformatics Data Standards or his/her nominated representative (*ex officio*), the Chair of the Interdivisional Committee for Terminology, Nomenclature and Symbols or his/her nominated representative (*ex officio*), the Scientific Editor (*ex officio*), and up to six invited members.
- (ii) The *ex officio* members shall serve for the duration of their IUPAC appointments, subject to confirmation at each General Assembly. Invited members shall be nominated by the President and appointed in consultation with the Executive Committee. Their period of service shall be four years, renewable for a further term of four years.
- (iii) The Secretary-General shall Chair any meetings of EAB members, and the Secretariat shall maintain records of such meetings.

Terms of Reference

- (i) The EAB shall monitor scientific and editorial standards of PAC, and advise and assist on all aspects of planning, implementation, and evaluation of publication policy and practice.
- (ii) The EAB shall respond to requests for critical evaluation of PAC activities and initiatives.
- (iii) The *ex officio* members of the EAB shall be responsible for reporting back to their respective IUPAC constituencies on relevant PAC matters.

INTERDIVISIONAL COMMITTEE ON TERMINOLOGY, NOMENCLATURE AND SYMBOLS (ICTNS)

Composition and Terms of Office

- (i) There shall be a standing Interdivisional Committee on Terminology, Nomenclature and Symbols, composed of a Chair, a Secretary, up to three Titular Members and up to three Associate Members as a “core” membership and one Titular Member from each Division.
- (ii) The President, in consultation with the Executive Committee, shall appoint the Titular Members and the Associate Members. ICTNS and the Division Presidents may propose names of persons suitably qualified for appointment.
- (iii) The period of service of the core Titular Members and Associate Members shall be four years, renewable for a further term of four years. The period of service for Titular Members from the Divisions shall be two years, renewable up to a total of eight years.
- (iv) The President, in consultation with the Executive Committee, shall appoint the Chair and the Secretary. ICTNS may propose candidates.
- (v) The period of service of the Chair and of the Secretary shall be four years, renewable for a further term of four years. The sum of the years of service as a Titular Member or as an Associate Member and as the Chair or the Secretary shall not exceed ten years.
- (vi) The following organizations shall be invited to attend meetings of ICTNS:
 - Bureau International des Poids et Mesures
 - International Organization for Standardization
 - International Union of Biochemistry and Molecular Biology
 - International Union of Crystallography
 - International Union of Nutritional Sciences
 - International Union of Pharmacology
 - International Union of Pure and Applied Physics

Comment [RH9]: No election is included here, because of the importance of retaining an appropriate level and distribution of experience in this committee, one which is vital for quality assurance within IUPAC.

Terms of Reference

- (i) To be responsible for submission to the Bureau/Council, in accordance with Bylaw 2.1.1, for publication or otherwise, any IUPAC document concerned with terminology, nomenclature, symbols, and other conventions.
- (ii) Before recommending any material for publication as an IUPAC document, to ensure that full consultations have taken place, and the widest possible consensus has been reached among all Divisions and other bodies of the Union, and between IUPAC and other ICSU bodies, the international standardizing organizations, and Conférence Générale des Poids et Mesures (CGPM) and its Committees.

- (iii) To ensure, via each Division's Titular Member on ICTNS, that all documents for publication emanating from that Division have been subject to a satisfactory level of review of substantive material by the Division Committee.
- (iv) To ensure that any considered IUPAC view shall carry the fullest possible weight among other international organizations, all negotiations on matters concerned with nomenclature and symbols with other ICSU bodies, with the international standardizing organizations, and with CGPM and its Committees, shall be conducted through ICTNS, which shall advise the Executive Committee accordingly.
- (v) To be responsible, after consultation with all relevant bodies of IUPAC, for the official IUPAC comments on all documents on nomenclature, symbols, terminology and conventions sent to the Union for comment.
- (vi) To advise the President and the Executive Committee on suitable persons for appointment as representatives of IUPAC on other bodies concerned with nomenclature, symbols, and terminology.

PROJECT COMMITTEE (PC)

Composition and Terms of Office

- (i) There shall be a Project Committee composed of a Chair and five Elected Members of the Bureau. In addition, the Vice President shall be an *ex officio* voting member.
- (ii) The President, in consultation with the Executive Committee, shall appoint the members.
- (iii) The Chair shall not be a member of any other IUPAC body.
- (iv) The period of service of the Chair and members shall be two years.
- (v) The Chair shall not serve for more than six years.
- (vi) The Executive Director, or designee, shall act as Secretary for the Committee.

Terms of Reference

- (i) To make funding decisions on interdivisional projects.
- (ii) To make funding decisions on projects judged to be too large for the financial resources of a Division or Standing Committee.
- (iii) To make funding decisions on projects from Standing Committees that does not have project budgets.
- (iv) To recommend projects for submission for external funding.
- (v) To operate within the project budget determined by the Treasurer and approved by the Council and to keep the Treasurer informed of its actions.
- (vi) To act in a timely fashion on approval requests so project schedules can be met.
- (vii) To make funding decisions on support for Conferences in Developing Countries and for Conferences on New Directions in Chemistry.

EVALUATION COMMITTEE (EvC)

Composition and Terms of Office

- (i) There shall be an Evaluation Committee composed of five Members of the Bureau.
- (ii) The President, in consultation with the Executive Committee, shall appoint the members and designate one of them as Chair.
- (iii) The period of service of the members shall be two years.
- (iv) The Executive Director shall act as Secretary for the Committee.

Terms of Reference

- (i) To monitor statistical data on the nature and breadth of project portfolio and the geographical spread of Task Group participation.
- (ii) To examine project completion reports, identify lessons to be learned, and liaise with the Project Committee.
- (iii) To collect and analyze reports from Task Group Chairs, Divisions, and Committees on responses to strategic initiatives of the Union
- (iv) To report to the Bureau, in writing, annually on the results of the evaluations done.
- (v) To inform, after discussion in the Bureau, the National Adhering Organizations of the completed evaluations.

CHEMRAWN COMMITTEE (CHEMICAL RESEARCH APPLIED TO WORLD NEEDS)

Composition and Terms of Office

- (i) There shall be a standing CHEMRAWN Committee, composed of a Chair, a Secretary, six Titular Members, up to six Associate Members and up to ten National Representatives. In addition, the Treasurer shall be an *ex officio* Member, but without voting power.
- (ii) The President, in consultation with the Executive Committee, shall appoint the Titular Members and the Associate Members. The CHEMRAWN Committee may propose names of persons suitably qualified for appointment and should conduct elections, according to the pattern for Divisions, in order to inform the advice that they give to the President.
- (iii) The period of service of a Titular Member and of an Associate Member shall be four years, renewable for a further term of four years.
- (iv) The Membership shall be reviewed every two years by the incoming President in consultation with the Executive Committee.
- (v) The President, in consultation with the Executive Committee, shall appoint the Chair and the Secretary. The CHEMRAWN Committee may propose candidates.
- (vi) The period of service of the Chair and of the Secretary shall not exceed eight years. The sum of the years of service as a Titular Member or an Associate Member and as the Chair or the Secretary shall not exceed ten years.

Terms of Reference

On behalf of the President and the Executive Committee:

- (i) To identify human needs amenable to solution through chemistry with particular attention to those areas of global or multinational interest.
- (ii) To serve as an international body and forum for the gathering, discussion, advancement, and dissemination of chemical knowledge deemed useful for the improvement of humans and their environment.
- (iii) To serve as an international, nongovernmental source of advice for the benefit of governments and international agencies with respect to chemistry and its application to world needs, and to be responsible for organizing IUPAC activities in these areas as approved by the President and the Executive Committee. The Treasurer is to be kept informed through plans, budgets, and audited accounts of activities that have financial implications. Payments from IUPAC funds must be approved by the Treasurer.

COMMITTEE ON CHEMISTRY EDUCATION (CCE)

Composition and Terms of Office

- (i) There shall be a standing Committee on Chemistry Education (CCE), composed of a Chair, a Secretary, six other Titular Members, and an Associate Member from each of the Divisions. Each Adhering Organization not represented among the Titular and Associate Members may nominate a National Representative to the CCE.
- (ii) The President, in consultation with the Executive Committee, shall appoint the Chair, Secretary, and Titular Members. The CCE may propose names of persons suitably qualified for appointment and should conduct elections, according to the pattern for Divisions, in order to inform the advice that they give to the President.
- (iii) The Associate Members shall be nominated by the relevant Division President from the Titular Members of the Division Committee, and be appointed by the President of the Union, in consultation with the Executive Committee.
- (iv) The period of service of Titular Members shall be four years, renewable for a further term of four years. The period of service of Associate Members shall be two years, renewable to a total period of eight years. The period of service of National Representatives shall be two years, subject to re-nomination and reappointment to a maximum period of service of twelve years.
- (v) The sum of the years of service as a Titular Member and as the Chair or the Secretary shall not exceed ten years.

Terms of Reference

- (i) To advise the President and the Executive Committee on matters relating to chemistry education, including the public appreciation of chemistry.
- (ii) To maintain a portfolio of educational projects and to coordinate the educational activities of IUPAC.
- (iii) To monitor chemistry education activities throughout the world and to disseminate information relating to chemical education, including the public appreciation of chemistry.
- (v) To develop liaisons with international organizations such as UNESCO, national and regional chemical societies, chemical education committees, and organizations concerned with the public appreciation of science.

COMMITTEE ON CHEMISTRY AND INDUSTRY (COCI)

Composition and Terms of Office

- (i) There shall be a standing Committee on Chemistry and Industry, composed of a Chair, a Secretary, six other Titular Members and up to six Associate Members. In addition, each NAO representing a country having more than one Company Associate may propose a National Representative to COCI. By mutual agreement, two or more NAOs in a given geographic region that has more than three Company Associates may jointly propose a National Representative from that region.
- (ii) The President, in consultation with the Executive Committee, shall appoint the Chair, the Secretary, the Members and the National Representatives. The President may, at his/her option, designate one of the Titular Members as Vice-Chair. Candidates may be proposed by the Committee on Chemistry and Industry, by National Adhering Organizations having Company Associate programs, or by Company Associates. The Committee should conduct elections, according to the pattern for Divisions, in order to inform the advice that they give to the President.
- (iii) The period of service for all categories of Members and National Representatives shall be four years, renewable for a further term of four years, subject to (iv), below.
- (iv) The Membership shall be reviewed every two years by the incoming President, in consultation with the Executive Committee.
- (v) The sum of the years of service as a Member and as the Chair or the Secretary shall not exceed ten years.

Comment [RH10]: The addition of Company Associates as a nominating body results from a recommendation of the 2017 Bureau.

Comment [RH11]: Included so that the President can make changes if needed or desired, and noting that otherwise (iii) and (iv) are in conflict.

Terms of Reference

- (i) To advise the President and Executive Committee of the potential impact on IUPAC programs of trends and developments in the international chemical industries, including pharmaceutical, agrochemical and related industries. Also, to advise on options and actions by which IUPAC could become more attractive to increased participation by scientists in industry.
- (ii) In collaboration with National Adhering Organizations, to develop and maintain an active program to recruit, guide and inform Company Associates on IUPAC programs and policies. To convey to IUPAC management at all levels relevant information from Company Associates that may assist in developing IUPAC programs and projects.
- (iii) To develop liaisons with (a) national and international associations that represent industries based on the chemical sciences; (b) national and regional chemical societies; and (c) international bodies such as UNESCO and UNIDO.
- (iv) In cooperation with other IUPAC bodies, to initiate and maintain a portfolio of projects with implications for industry and to help develop good relations between IUPAC and industry. To advise IUPAC bodies on the potential for participation and/or funding of relevant projects by industry and to coordinate overtures to industry on such funding.

INTERDIVISIONAL COMMITTEE ON GREEN CHEMISTRY FOR SUSTAINABLE DEVELOPMENT (ICGCSD)

Composition and Terms of Office

- (i) There shall be a standing Interdivisional Committee on Green Chemistry for Sustainable Development, composed of a Chair, a Secretary, up to three Titular Members and up to three Associate Members as a “core” membership and one Representative Member from each interested Division and Standing Committee.
- (ii) The President, in consultation with the Executive Committee, shall appoint the Chair, Secretary, Titular Members, and Associate Members. The ICGCSD, Division Presidents and Standing Committee Chairs may propose names of persons suitably qualified for appointment and should conduct elections, according to the pattern for Divisions, in order to inform the advice that they give to the President.
- (iii) The period of service of Titular Members and Associate Members shall be two years, renewable for a further term of two years. The period of service of Representatives from the Divisions and Standing Committees shall be two years, subject to re-nomination and reappointment to a maximum period of service of eight years.
- (iv) The period of service of the Chair and of the Secretary shall be two years, renewable for a further two years. The sum of the years of service as a Titular Member or Associate Member and as the Chair or the Secretary shall not exceed ten years.
- (v) The following organizations shall be invited to attend meetings of ICGCSD:
 United Nations Educational, Scientific Cultural Organization (UNESCO)
 International Council for Science Unions (ICSU)
 Organization for the Prevention of Chemical Weapons (OPCW)
 Strategic Approach to International Chemicals Management (SAICM)
 United Nations Industrial Development Organization (UNIDO)
 International Council of Chemical Associations (ICCA)
 Organization for Economic Co-operation and Development (OECD)

Terms of Reference

- (i) To be responsible for advancing the strategic plan of the Union for green and sustainable chemistry and for coordination of all the work of the Union in this area to develop a coherent program of action.
- (ii) To initiate and coordinate projects in green and sustainable chemistry and to encourage activities in these areas from across the Divisions and Standing Committees.
- (iii) To organize the series of IUPAC International Conferences on Green Chemistry and manage IUPAC participation in the PhosAgro/UNESCO/IUPAC Green Chemistry for Life awards program and the IUPAC Prize in Atmospheric and Green Chemistry and any other related awards that may be established.
- (iv) To also seek additional sponsorship and support from industrial sources for its work..
- (v) To work actively with COCI and CCE to stimulate and increase interest in green and sustainable chemistry in the theory and practice of industrial chemistry and chemistry education, through their external industrial and institutional relationships.
- (vi) To listen to and be aware of the external industrial and institutional perspectives and priorities.
- (vii) To be responsible, after consultation with all the relevant bodies of IUPAC, for advice to the President and Executive Committee on matters relating to harmonization, regulation and standardization in green and sustainable chemistry.
- (viii) To be responsible for the promulgation of the work of the Union in green and sustainable chemistry through interaction with other relevant organizations with a common interest.

- (ix) To ensure that any considered IUPAC view on Green Chemistry shall carry the fullest possible weight among other international organizations and to advise the Executive Committee as to our standing in these matters.
- (x) To advise the President and the Executive Committee on suitable persons for appointment as Representatives of IUPAC on other bodies concerned with green chemistry for Sustainable Development Goals.

Comment [RH12]: Subject to approval of this new committee by Council

Chemistry in a Multidisciplinary, Interdisciplinary World

World Chemistry Leadership Meeting 2017, 49th General Assembly

2017 July 7-13, São Paulo – Brazil

Chemistry is an essential element of modern society, providing vital solutions in a sustainable fashion to such basic societal needs as food, energy and water for the world's populations. Chemistry enables solutions in healthcare that detect and cure disease and will do so increasingly. Even the most sophisticated forms of computation and communication depend on chemistry to provide its materials and devices. At the same time that chemistry has never been more important to the solution of so many societal needs, there is an air of uncertainty as to future steps the discipline must take. Palermo, in her report on the future of chemistry for RSC, emphasizes the need for an even greater role by chemists in solving challenges of significant societal need.¹ As noted in their commentary in *Nature Chemistry*, Matlin and colleagues report that chemistry in general has not identified grand challenges the way other disciplines have. For example, the Human Genome Project depends on advances in chemistry, but is driven by biology, genetics and medicine.² They suggest that "chemistry must go beyond 'being a science' and embrace the concept of 'being a science for the benefit of society'. Chemistry should be multidisciplinary, interdisciplinary and even transdisciplinary, "recognizing that valuable knowledge can be found in the spaces between defined disciplines, addressing the complexity of problems and the diversity of perceptions of them".

These areas in chemistry between disciplines are forefront research topics and often the career focus of the younger scientist community. Chemistry does not work alone in addressing these challenges. Whitesides in his perspective in *Angew. Chem. Int. Ed.* states that chemistry is limited by its traditional organization into specialities and needs to break down those barriers.³ The problems that chemistry must address are increasingly multidisciplinary and interdisciplinary as they also depend closely on chemistry in its broadest sense, and other scientific (e.g. physics, biology) and engineering disciplines to tackle problems of socio-economic importance. New tools in computation and data mining promise to revolutionize our approach to chemistry and discovery. It is the objective of WCLM2017 that these multidisciplinary and interdisciplinary themes will now be developed in depth. This work will be facilitated through the inter-divisional committee on sustainable green chemistry and the inter-divisional sub-committee on materials chemistry using them as a launch pad for developing shared languages and activities.

This WCLM follows in the tradition established in 2011, to prepare groundwork for a debate on the future of chemistry, its role in sustainable development and the IUPAC's part in advancing this future. Attendance is for IUPAC members at large, including members of

¹ A. Palermo, "Future of the Chemical Sciences", *RSC Report*, 2015, <http://www.rsc.org/globalassets/04-campaigning-outreach/campaigning/future-chemical-sciences/future-of-the-chemical-science-report-royal-society-of-chemistry.pdf>.

² Stephen A. Matlin, Goverdhan Mehta, Henning Hopf and Alain Krief, "One-world chemistry and systems thinking", *Nature Chemistry* 2016, 8, 393

³ G. Whitesides, "Reinventing Chemistry", *Angew. Chem. Int. Ed.* 2015, 54, 3196 – 3209

Divisions and Standing Committees, NAOs and Associate NAOs and their delegates, representatives of Company Associates and Associated Organizations. WCLM2017 aims to facilitate the specific involvement of Young Observers (YOs), by targeting and furthering interdisciplinary topics and cross divisional/committee collaboration.

The YOs and invited leaders will have the opportunity to discuss and identify gaps in existing knowledge and practice of chemical science and how to address them. The YOs will assess the future of chemistry in breakout sessions in the morning and present their findings to a panel of experienced leaders of the global chemical community. The outcome should become the base for the generation of new projects in line with IUPAC's strategic vision. We ask the NAOs in particular to invite YOs to participate in the WCLM programme.

The programme will begin with a workshop in which the different IUPAC divisions and committees will introduce themselves to participants using a "speed dating" concept. This will be followed with a program in which YOs will assemble and work on projects in line with the themes of the WCLM. Finally a symposium featuring outstanding speakers will be capped with a panel discussion and a report by the YOs on possible IUPAC projects. The programme will be as follows:

Monday Evening, July 10:

Reception for YOs hosted by IUPAC Divisions and Committees to introduce WCLM activities. This will be done in a speed-networking format in which we will have a round table discussion at each station with representatives from each Division/Committee and up to 10 YOs in each discussion.

Tuesday Morning, July 11:

Following a workshop with ISMC and ICGCSD representatives, the YO teams will work with IUPAC volunteers to develop their ideas into a presentation for the WCLM.

Wednesday Morning, July 12:

Plenary presentations will be presented by noted leaders in the academia and industry. Presentations from YO Teams will be given to the assembled audience. Group discussions and identification of highest priority tasks will take place.

Post-GA Activities

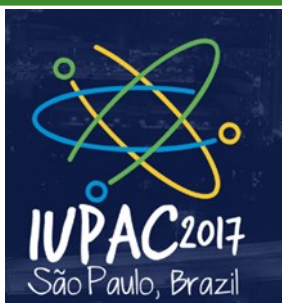
Outcomes from the WCLM will be as a means to develop interdisciplinary projects. YOs will be encouraged to participate in this working group and in newly formed project teams.

WORLD CHEMISTRY LEADERSHIP MEETING

Sponsored by
International Union of Pure and Applied Chemistry at
the 49th General Assembly, July 7-13, 2017
São Paulo – Brazil



INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY



WCLM Theme:

IUPAC's role in developing interdisciplinary/collaborative work in the chemistry community and beyond.

IUPAC serves to advance worldwide aspects of the chemical sciences and to contribute to the application of chemistry in the service of mankind.

The WCLM is an integral part of the IUPAC General Assembly. It offers a platform for representatives from National Adhering Organizations (NAOs) to meet and discuss emerging and pressing issues of global concern.

It has been universally recognized that chemistry is an essential discipline and as a pre-eminent science it plays a vital role in many rapidly developing technical areas with vital societal impact. These interdisciplinary areas in chemistry are forefront research topics and often the career focus of the younger scientist community.

Chemistry is increasingly becoming multidisciplinary and interdisciplinary as it also depends closely on other scientific disciplines (e.g. physics, biology) to tackle problems of socio-economic importance. This has been highlighted in the role that chemistry plays in contributing to the UN Sustainable Development Goals, which was the theme of WCLM2015. It is hoped that the multidisciplinary and interdisciplinary themes can now be developed in depth in WCLM2017.

WCLM2017 aims to facilitate the specific involvement of Young Observers (YOs), targeting and furthering interdisciplinary topics and cross divisional/committee collaboration. This will be facilitated through work with the inter-divisional sub-committees of Materials Chemistry (ISMC) and the interdivisional committee of Green Chemistry for Sustainable Development (ICGCSD), using them as a launch pad for developing shared languages and activities.

The YOs and invited leaders will have the opportunity to discuss and identify gaps in existing

knowledge and practice of chemical science and how to address them.

We call on the NAOs to invite YOs to participate in the WCLM programme which will be as follows:

Monday Evening, July 10:

Reception for YOs hosted by IUPAC Divisions and Committees to introduce the WCLM activities. This will be done in a speed-dating format in which we will have a round table discussion at each station with 2 representatives from each Division/Committee and up to 10 YOs in each discussion.

Tuesday Morning, July 11:

Following a workshop with ISMC and ICGCSD representatives, the YO teams will work IUPAC volunteers to develop their ideas into a presentation for the WCLM plenary session.

Wednesday Morning, July 12:

- Plenary presentation from leaders in the academia and Industry.
- Presentations from YO Teams.
- Group discussion and identification of highest priority tasks.

Post-GA Activities:

Outcomes from the WCLM will be used to drive the actions of a newly formed IUPAC-UN SDG Working Group as a means to develop interdisciplinary projects.

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World Chemistry Leadership Meeting