I. Highlights and/or Executive Summary:

As usual, Division VII has been very active during the past biennium, and will be during the ongoing one, on issues that deal with human health.

They had their annual meeting by teleconference on January 24th.

There is a partial rejuvenation of the Division Committee for the biennium 2020 – 2021. All members are actively involved in projects. The membership represents diversity in gender, geography, and expertise in accordance with the goals of the three subcommittees.

The three subcommittees (SC) of Division VII:

- Drug Discovery and Development (DDD), Chair Gerd Schnorrenberg
- Toxicology and Risk Assessment (TRA) (Chair Vincenzo Abbate, succeeding John Duffus)
- Nomenclature for Properties and Units in Clinical Chemistry (NPU) Chair Ulla Magdal Petersen, succeeding Helle Johannessen

not only gave proof of major progress in all ongoing projects, but also produced notable milestones. The membership of the 3 subcommittees has been updated and new members joined. They are listed on the iupac.org site, Division VII.

The status of the projects (total 14 + 2 interdivisional projects with Divisions V & VI) in each subcommittee are given under IV. They contribute to IUPAC’s goal to provide an indispensable worldwide resource for chemistry.

The royalties of all books, past and new publications, contribute to the revenue of IUPAC, be it in a modest way. The quality of these books is outstanding and the amount of work the authors have put into these volumes is impressive.

Another gem of our Division VII and more particularly of the DDD subcommittee is the attribution of the 2020 IUPAC-Richter Prize in Medicinal Chemistry to John Macor, PhD, Global Head Integrated Drug Discovery, Sanofi, for the development of drugs for the treatment of migraine.

Division VII attributed Emeritus Fellowship to Mike Schwenk for his outstanding contributions to IUPAC over more than a decade.

II. Plans and priorities for the remainder of this biennium, and beyond

The three subcommittees plan to continue work on existing projects and submit new ones in line with their specific objectives.

To illustrate this, note some highlights, albeit that this enumeration is by far not exhaustive.
DDD continues with their series ‘Successful Drug Discovery’ (Editors: Janos Fischer, Wayne E. Childers and Christian Klein). Each issue has 15 chapters. Its structure follows that of the first volume consisting of three parts: I. General Aspects, II. Drug Class Studies and III. Case Studies.

DDD initiates a Newsletter.

Within NPU John Duffus, Doug Templeton and Mike Schwenk finalized their major work: the book “Glossary of terms on molecular toxicology”, now at RSC Publisher.

Linda Johnston, in cooperation with Division VI, organized a successful symposium on the risk of engineered nanoparticles and published an interesting article about it in the NanoImpact.

NPU further elaborate a coding system to ensure that in clinical chemistry and laboratory medicine, there is a common understanding of what is being measured in a biological system, and how the results are expressed.

Members are and will be encouraged to spread the news about the achievements of IUPAC, to come up with new projects and to recruit new participants who want to contribute to the core business of IUPAC, and more particularly to that of Division VII.

It is worthwhile to highlight following interdisciplinary activities within IUPAC:
- CCE: Sharon Teh
- COCI: Carolyn Ribes accepted to have Gerd Schnorrenberg and Balu Balasubramanian as representatives of Division VII within COCI. Whereas Gerd would be present at the COCI meetings in Europe, Balu would do so in USA and Asia.
- ICTNS: Rita Cornelis. She informed the members that the President of ICTNS Jürgen Stohner states that all manuscripts, be it in PAC or as a book, need approval of the Division prior to submission to ICTNS. This may in principle be extended to videos. Draft manuscripts may also be available on the IUPAC.org site (world leaders) for public scrutiny.
- Mike Schwenk represents Division VII on the Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD). He is involved in describing the role of toxic chemicals and in sustainable development.
- Vladimir Gubala plays an important role in elaborating IUPAC’s role in developing interdisciplinary/collaborative work in the chemistry community and beyond.
- Janos Fischer is a member of the Committee on Chemical Research Applied to World Needs (CHEMRAWN)

Cooperation with Other Organizations read as follows:
- ACS (American Chemical Society): Tom Perun
- IFCC (International Federation of Clinical Chemistry): Helle Møller-Johannessen
- RSC (Royal Society of Chemistry): Vincenzo Abbate in the near future
- OPCW (Organization for the Prohibition of Chemical Weapons): Mike Schwenk and Vladimir Gubala
III. An overall report of Division/Committee activities and achievements during 2018-2019 biennium organized by the Goals and Objectives laid out in the current IUPAC Strategic Plan

The success of the books and publications produced by the members of Division VII (see section IV) contribute to the scientific expertise worldwide in the specialized field of DDD, TRA and NPU, as can be gauged from their citation impact.

By organizing symposia and by sponsoring young scientist from developing countries, Division VII provide scientific expertise, and improve the vitality, effectiveness and efficiency of IUPAC.

All members of Division VII will be regularly encouraged to spread the news about the major role IUPAC is playing in advancing chemistry worldwide.

IV. Tabular material

Completed projects and achievements of each subcommittee during the past biennium

**DDD**


- **Project 2018-006-1-700**: Symposium Medicinal Chemistry in Drug Discovery and Development, India 2019, The project leader: Balu Balasubramanian, said this event was very successful, and counted 200 participants.

- A crown jewel of DDD is the 2018 **IUPAC-Richter Prize** in Medicinal Chemistry, attributed to Peter D.J. Grootenhuis in recognition of his outstanding contributions to the invention, discovery and development of ivacaftor, which was a transformational event in the treatment of fibrosis.

**TRA:**


- **Project 2016-045-2-700**: Safety of Engineered Nanomaterials and **Project 2017-035-2-600**: Consideration of nano-enabled pesticides for industry and regulators. The article "Key challenges for evaluation of the safety of engineered nanomaterials" published by L.J. Johnston, N. Gonzalez-Rojano, K.J.Wilkinson and Baoshan Xing,
gives the perspective by the 4 authors, based on the workshop input about Safety of engineered nanomaterials), The Workshop was held in Queretaro, Mexico on September 28-29, 2017.

NPU


- **Project 2019-009-1-700**: Chair: H. Johannessen, What is the NPU terminology – and how is it used; The project is finished, and the Chair is working on a notice for the CI. The resulting video was accepted for the Jubilee IUPAC conference in Paris. It can be viewed on https://www.youtube.com/watch?v=7Qw4d0uhxqQ. It is suggested that the video technique may be useful for explanations and demonstrations of the more difficult NPU concepts.
### IV. Current Projects

<table>
<thead>
<tr>
<th>SC</th>
<th>Project number</th>
<th>Chair</th>
<th>Title</th>
<th>Comments</th>
<th>Planned End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDD</td>
<td>2000-009-1-700</td>
<td>P. Erhardt</td>
<td>Metabolism terms</td>
<td>P. Erhardt has submitted his manuscript on metabolism terms to ICTNS for publication in PAC.</td>
<td>31-Dec-2019 30-Jun-2020</td>
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<tr>
<td></td>
<td>2011-018-1-700</td>
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<tr>
<td>DDD</td>
<td>2003-044-1-700</td>
<td>A. Ganesan</td>
<td>Glossary of terms used in combinatorial chemistry</td>
<td>Ganesan has submitted a final draft. It is now under scrutiny by ICTNS.</td>
<td>31-Dec-2018</td>
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<tr>
<td>DDD</td>
<td>2019-018-2-700</td>
<td>M. Liebman</td>
<td>D3 SC Newsletter</td>
<td>First issue planned in July 2020</td>
<td>31-Dec-2022</td>
</tr>
<tr>
<td>DDD</td>
<td>2019-019-2-700</td>
<td>M. Liebman</td>
<td>Impact of objective analysis of clinical trial failures on drug discovery and development processing</td>
<td>In development</td>
<td>31-Dec-2022</td>
</tr>
<tr>
<td>DDD</td>
<td>2019-021-1-700</td>
<td>J. Fischer</td>
<td>Book: Successful Drug discovery, Volume 5</td>
<td>New drug discoveries: small-molecule-, peptide- and protein-based drugs. This will include both pioneer drugs (first in class drugs) and drug analogues (follow on drugs) in a range of therapeutic areas. Editors: Janos Fischer, Wayne E. Childers, Christian Klein, Kazumi Kondo.</td>
<td>31-Dec-2021</td>
</tr>
<tr>
<td>SC</td>
<td>Project number</td>
<td>Chair</td>
<td>Title</td>
<td>Comments</td>
<td>Planned end date</td>
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<tr>
<td>TRA</td>
<td>2014-019-1-700</td>
<td>V. Abbate</td>
<td>The emerging problems of novel psychoactive substances</td>
<td>First manuscript published; second manuscript: synthetic cathenones in progress.</td>
<td>31-Dec-2020</td>
</tr>
<tr>
<td>TRA</td>
<td>2016-045-2-700</td>
<td>L. Johnston</td>
<td>Safety of engineered nanomaterials</td>
<td>Manuscript resubmitted, under review</td>
<td>31-Dec-2020</td>
</tr>
<tr>
<td>TRA</td>
<td>2017-012-1-700</td>
<td>D. Templeton</td>
<td>Glossary of terms in molecular toxicology</td>
<td>The project is completed. The book is now with the publisher.</td>
<td>30-Jun-2019</td>
</tr>
<tr>
<td>TRA joint</td>
<td>2017-035-2-600</td>
<td>L. Johnston &amp;</td>
<td>Human health risk consideration of nano-enabled pesticides for industry and regulators</td>
<td>Two workshops held with members of the project team and invited guests.</td>
<td>31-Dec-2020</td>
</tr>
<tr>
<td>with Division VI</td>
<td></td>
<td>R. Kookana</td>
<td></td>
<td></td>
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<tr>
<td>TRA</td>
<td>2017-040-1-700</td>
<td>V. Gubala</td>
<td>Chemistry in the classroom</td>
<td>Planned work on the videos is completed, four animations were prepared. The last step is to insert IUPAC logos in the animations and convert it to YouTube friendly format. This was supposed to be done by 31-Mar-2020, due to the coronavirus, it may be delayed until 30-Sep-2020.</td>
<td>30-Sep-2020</td>
</tr>
<tr>
<td>TRA joint</td>
<td>2017-005-3-500</td>
<td>J. Labuda</td>
<td>Analytical chemistry of nanomaterials - critical evaluation</td>
<td>In progress</td>
<td>open</td>
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<tr>
<td>with Division V</td>
<td></td>
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<tr>
<td>NPU</td>
<td>Project number</td>
<td>Chair</td>
<td>Title</td>
<td>Comments</td>
<td>Planned end date</td>
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<tr>
<td>NPU</td>
<td>permanent</td>
<td>H. Johannessen</td>
<td>NPU permanent H. Johannessen</td>
<td>Work on the international NPU terminology on behalf of the terminology owners, IFCC and IUPAC. The NPU Terminology is intended for communication, storage and presentation of laboratory data in health care records and other electronic media in the field of healthcare.</td>
<td></td>
</tr>
<tr>
<td>NPU</td>
<td>2010-035-3-700</td>
<td>H. Johannessen</td>
<td>Establishing definitions for non-referenced terms in the NPU terminology</td>
<td>‘Final Drafts’ have been circulated, and should be ready for publication very soon. Should not be difficult to finalize, but it is very important to do it right as it will be an increasingly important part of the NPU terminology work.</td>
<td>31-Dec-2020</td>
</tr>
<tr>
<td>NPU</td>
<td>2014-017-1-700</td>
<td>D. Karlsson</td>
<td>Piloting NPU-SNOMED CT mapping</td>
<td>The practical part has been finalized, and the report is close to publication.</td>
<td>31-Dec-2019</td>
</tr>
<tr>
<td>NPU</td>
<td>2016-044-2-700</td>
<td>Young Bae Lee Hansen</td>
<td>Online Dynamic NPU Manual</td>
<td>The project is not finished yet, but about 80% of the main content of concepts (kind-of-properties) are listed. Links to the general NPU concept model is not completed. A review group consisting of members of the 3 release centres is considered.</td>
<td>31-Mar-2020</td>
</tr>
</tbody>
</table>
Division Presentations

104th Bureau

25 April 2020
Div VII Chemistry and Human Health

Rita Cornelis
Activities and Achievements Aligned with the IUPAC Strategic Plan

• Listing of:
  – completed projects during the last biennium
  – current projects
SC Drug Discovery and Development completed project

Project 2016-027-1
Book “Successful Drug Discovery, Volume 3”
Editor(s): János Fischer, Wayne E. Childers,
Wiley hardcover and e-book
SC Drug Discovery and Development completed project

Project 2018-006-1-700

Symposium Medicinal Chemistry in Drug Discovery and Development, India 2019

Chair: Balu Balasubramanian
- very successful event
- 200 participants
SC Drug Discovery and Development completed project

2018 **IUPAC-Richter Prize**, Medicinal Chemistry, P.D.J. Grootenhuis

- *contributions to the invention, discovery and development of ivacaftor*
  treatment of fibrosis
SC Drug Discovery and Development current project

Project 2000-009-1-700 & 2011-018-1-700
Chair: P. Erhardt
Metabolism terms

- manuscript submitted to ICTNS for publication in PAC
- number of entries: about 240
- accompanied by brief tutorials directed toward enhancing communication among the wide range of interdisciplinary scientists engaged in drug discovery team efforts.
- In addition, three appendices provide white paper type summaries pertaining to terms which are either controversial or may be undergoing significant expansion
SC Drug Discovery and Development
current project

Project 2003-044-1-700
Chair: A.Ganesan
Glossary of terms used in combinatorial chemistry
- final draft under scrutiny by ICTNS
- number of entries: about 200
SC Drug Discovery and Development current project

Project 2018-001-3-700
Chair: J. Fischer
Book: Successful Drug Discovery, Volume 4
- New drug discoveries: small-molecule-, peptide- and protein-based drugs
SC Drug Discovery and Development current project

Project 2019-018-2-700

Chair: M. Liebman

D3 SC Newsletter

First issue planned in July 2020
SC Drug Discovery and Development current project

Project 2019-019-2-700
Chair: M. Liebman
Impact of objective analysis of clinical trial failures on drug discovery and development processing
SC Drug Discovery and Development current project

Project 2019-021-1-700

J. Fischer

Book: Successful Drug discovery, Volume 5

New drug discoveries: small-molecule-, peptide- and protein-based drugs. This will include both pioneer drugs (first in class drugs) and drug analogues (follow on drugs) in a range of therapeutic areas.
SC Toxicology and risk assessment completed project

Project 2014-019-1700
The emerging problem of Novel Psychoactive Substances
Chair: V. Abbate
Part I. Synthetic cannabinoids
IUPAC Technical Report, PAC, 2018
Anti-doping: Two Scientists’ Points of View

Chemistry International, January – March, 2020
by David A Cowan and Vincenzo Abbate
SC Toxicology and risk assessment completed project

Project 2017-035-2-600

Consideration of nano-enabled pesticides for industry and regulators ‘

"Key challenges for evaluation of the safety of engineered nanomaterials“

Chair: L.J. Johnston et al.

Online in NanoImpact 2020, Elsevier ScienceDirect
SC Toxicology and risk assessment project in end-stage

2017-012-1-700
Chair: D. Templeton

Book: Glossary of terms in molecular toxicology

Publ. RSC

*It describes 2800 terms, or about 3400 counting synonyms*
SC Toxicology and risk assessment project in development

Project 2017-040-1-700

Chemistry in the class room

Chair: V. Gubala
SC Toxicology and risk assessment project in progress

Project 2017-005-3-500

Analytical chemistry of nanomaterials - critical evaluation

Chair: J. Labuda
NPU

Nomenclature, properties and units in clinical chemistry

Completed projects

Project 2004-023-1-700

Vocabulary for nominal properties and nominal examinations
Chair: Gunnar Nordin

Publication in PAC 2018
NPU

Nomenclature, properties and units in clinical chemistry

Completed projects

Project 2019-009-1-700
What is NPU terminology and how is it used
Chair: H. Johannessen

Video can be viewed on https://www.youtube.com/watch?v=7Qw4d0uhxqQ

Article in preparation for CI
NPU

Nomenclature, properties and units in clinical chemistry project in development

2010-035-3-700

Chair: H. Johannessen

Establishing definitions for non-referenced terms in the NPU terminology
NPU

Nomenclature, properties and units in clinical chemistry project in development

2014-017-1-700

Chair: D. Karlsson

Piloting NPU-SNOMED CT mapping
NPU

*Nomenclature, properties and units in clinical chemistry*

project in development

2016-044-2-700

Chair: Young Bae Lee Hansen

[Online Dynamic NPU Manual](#)
Priorities for the 2020-2021 Biennium

- Renewal of chairs of subcommittees:
  - TRA: V. Abbate succeeds J. Duffus
  - NPU: U. Magdal Petersen succeeds H. Johannessen

- Renewal of part of membership of the 3 SC: DDD, TRA and NPU

- Innovative projects