IUPAC Division VI – Chemistry and the Environment

Report to Bureau, March 2022

I. Highlights and/or Executive Summary

Division VI members for the biennium 2022-2023 are from 20 different countries and 5 continents: 10 from Europe, 6 from Asia, 6 from Americas, 2 from Africa and 2 from Australia. Gender distribution is: 14 males and 12 females. The Division Executive Committee is composed for 3/4 of females.

Division activities are presently carried out by 2 Subcommittees:

- **Subcommittee on Chemical and Biophysical Processes in the Environment**
- **Advisory Committee on Crop Protection Chemistry**

Division and Subcommittees Members are drawn from government, regulators, academia, industry and private consultancies, thus ensuring a wide range of expertise and experience, essential for solving complex problems typically encountered in environmental chemistry and interacting with different types of stakeholders.

Beside the typical topics dealt with by the Division in the last years (new emerging pollutants and their impact on the environment, health and food safety; assessment of environmental fate and behavior of chemicals in the environment; ecological risks assessment and management of chemicals in the environment; management of chemicals in the environment, including regulatory and policy frameworks, etc.) particular attention will be addressed in this biennium to those issues highlighted by the **Intergovernmental Panel on Climate Change (IPCC)** and related to:

• Chemistry & climate change: monitoring, understanding, preventing, mitigating

• Methods for reducing and removing greenhouse gases from the atmosphere

• Development of environmentally sustainable processes, chemicals and practices

These topics have been already integrated in the annual **"Call for proposals"** of Division VI (available on the Division webpage) and new projects on these subjects have been just approved or are under preparation (see Sections II and III).

In addition to this, recent Division projects aim at technology transfer, capability building and community outreach for environmental solutions, especially in **developing countries** like Central and Southeast Asia through the organization of workshops, conferences and symposia (see section II and III).

The Division is strengthening its structure through both the retaining of "older" Members (through the IUPAC Emeritus Fellow program) and the creation of a **"Young Observers Group"** to attract the participation of "younger" Members. We believe that an additional contribution to Division activities from both experienced Members and enthusiastic active new collaborators will boost Division action (see sections II and III).

Actions will be taken to increase Division **social media communication** by appointing a social media communication manager among the Division Members and through the active participation of younger members.

Division VI will continue to develop and participate to **interdisciplinary projects** with the collaboration of other Divisions and Committees. Recently approved project and projects under preparation are being

developed in collaboration with Division II, III, IV, V, VII, COCI, CHEMRAWN, ICGCSD, CCE (see Section II and III).

Division VI is collaborating with COCI for the development of a **Safety Training e-learning Program**.

Through projects, Division VI is also collaborating with other International Organization such as **OPCW** and **IAEA**. One of the Division AM has been nominated Member of the Scientific Advisory Board of OPCW and Division VI Past President is involved in joint activities with OPCW (see Section II and III). Expressions of interest in collaboration have been expressed also by **USEPA** and **EuCheMS** and will be explored in the coming months.

Division Members will continue to support IUPAC dissemination activities like "**IUPAC Global Women's Breakfast"** and **Top Ten Emerging Technologies in Chemistry**. Also in 2022, participation of Division Members to the GWB has been remarkable.

Division VI has actively contributed to the **48th IUPAC World Chemistry Congress** with the organization of 4 symposia and awarding the **Chemistry and the Environment Award 2021**. Such active participation will be continued in the next 2023 Congress where we are going to contribute to the organization of the **Sustainability theme**.

II. Plans and priorities for this biennium, and beyond

Currently, Division VI has **18 active projects** developed within the Division and collaborates in 8 projects promoted by other Divisions or Committees. Current Division VI projects mostly relate to issues such as: management of chemicals in the environment, including regulatory and policy frameworks; chemical processes affecting the fate and behavior of pollutants in the environment; sampling, analysis, monitoring and exposure assessment of chemicals in the environment; ecological risks assessment and management of chemicals in the environment; terminology and classification of environmentally related substances and materials; dissemination of good practices and scientific developments in environmental chemistry through symposia, conferences, books and guides. Given the interdisciplinarity of Environmental Chemistry, most of these projects are being developed in collaboration with other Divisions and Committees as well as with other international organizations and public and private stakeholders (see section III and IV).

Three new projects have been approved in the last few months, one is in its final way to approval and two are in the form of drafts under a first evaluation step by Division Officers before submission (see Section III).

Recently approved or under development projects deal with recent IPCC indications:

- The role of mega ports in climate change (2021-026-3-600)
- Carbon Sequestration: Harmonizing carbon sequestration measurement – what does it mean and how we do it (in preparation)
- Improving the Sustainability of Chemistry Labs (in preparation)

The submission of new projects addressing the relevant issues of **climate change and sustainable development** will be solicited and encouraged within the Division and outside.

In the last two years it came to urgency the need of face-to-face meetings and in-person dissemination activities.

Division VI is planning a face-to-face meeting in November 2022 in Cambodia, during the **APCE & CECE Conference (Angkor Wat, November 6-10, 2022)** organized with IUPAC endorsement and with the financial support of IUPAC for conferences in scientific emerging regions (#2020-003-1-FSC). During this conference Division VI will organize Symposia related to ongoing division projects and on environmental topics of special interest for the local scientific community (see Section III).

Division VI has already proposed two of its Members to be part of the **IUPAC World Chemistry Congress 2023** Theme Committee for the "Sustainability" theme. The Division is willing to actively contribute to the organization of the Sustainability Theme program and will propose special symposia as it happened at nearly all the Conference editions since 2009.

The Division, through the action of the Advisory Committee on Crop Protection Chemistry, is organizing the **15th IUPAC International Congress on Crop Protection Chemistry** that will be held in New Delhi, India, January 10-13, 2023.

Division Members will be involved in the organization of the IUPAC endorsed **Conference of the International Humic Substances Society** (September 17-23, 2022), also related to the recently approved project 2021-032-3-600 "Conceptualization of definition and classification for humic substances".

There is ongoing discussion with the European Chemical Society – Division on Chemistry and the Environment to organize joint symposia and workshops for the next **EuCheMS-DCE conference in 2023**, Venice, Italy.

Division AM Matteo Guidotti has been recently nominated Member of the **Scientific Advisory Board of OPCW**. This will further strengthen the collaboration of the Division with OPCW. Collaboration is ongoing also through the involvement of Division VI past president in **joint IUPAC-OPCW initiatives** (see Section III).

With the aim of expanding and retaining Member and volunteer base, 3 **Emeritus Fellows** have been awarded in the last biennium (Laura McConnell, Yehuda Shevah and John Unsworth) and 3 new ones will be nominated this year (Nicola Senesi, Ken Racke and Willie Peijnenburg). In addition, the creation of a **"Young Observers Group"** will be discussed during the next Division meeting (April 5th, 2022). This Group will be useful to keep active those many YOs that participate every two years to our Division meeting at General Assemblies but that are usually "lost" afterwards during the biennium. Indeed, during the last Division meeting at the General Assembly, 24 YOs attended the meeting (about 50% of the participants). They will be asked to actively contribute to Division activities including projects and to disseminate Division activities through social networks and within their scientific communities. Some of these YOs are already participating to newly approved projects.

III. An overall report of Division/Committee activities and achievements during the later part of the 2020-2021 biennium and organized by the Goals and Objectives laid out in the current IUPAC Strategic Plan (see below).

As far as the general IUPAC strategy is concerned, in the following lines some activities and achievements of the Division pertaining the end of 2021 and early 2022 are reported according to the most relevant IUPAC goals and objectives:

Goal: Provide scientific expertise to address critical world needs.

Through world-recognized expertise and experience via its members and project teams, Division VI makes scientifically sound and timely contributions towards addressing the critical environmental issues at a global scale. Such contributions are developed within projects that are conceived and carried out mainly by two Division Subcommittees: the Subcommittee on Chemical and Biophysical Processes in the Environment and the Advisory Committee on Crop Protection Chemistry. Beside Division Members, these two subcommittees are open to all scientists, regulators, and chemists from industry which are interested in questions regarding the topics of the subcommittees. Main outcomes from IUPAC projects managed via these committees are review papers, technical reports or books on certain topics, organization of conferences, workshops and symposia.

The **Subcommittee on Chemical and Biophysical Processes in the Environment** comprises about 30 scientists from over 15 countries and deals with topics regarding the distribution and environmental fate of chemicals

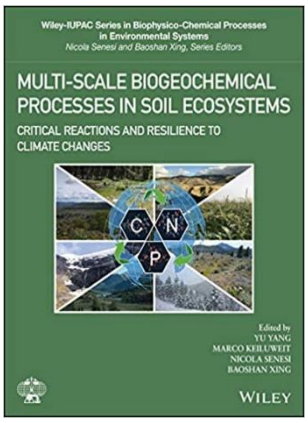
(inorganic and organic compounds, nanomaterials), chemical and biophysical processes in environmental compartments (e.g., air, soil and aquatic ecosystems) and interactions with organisms (bioavailability).

The **Advisory Committee on Crop Protection Chemistry** provides unbiased and authoritative views regarding environmental and human health aspects of crop protection chemistry through its projects and outreach activities. Primary areas of emphasis include definitions, methodologies, and regulations. 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 IUPAC International Congress of Crop Protection Chemistry which serves to highlight state-of-the-art scientific advances and regulatory approaches.

The next **15th IUPAC International Congress on Crop Protection Chemistry** will be held January 10-13, 2023 in New Delhi, India.

Recent relevant outcomes of projects and outreach activities of the two Subcommittees are:

Book on “Multi-Scale Biogeochemical Processes in Soil Ecosystems - Critical Reactions and Resilience to Climate Changes”, 2022, **Wiley - IUPAC Series on Biophysico-Chemical Processes in Environmental Systems** (project 2016-047-1-600)



Publication in **Nature Nanotechnology**: “Comprehensive Framework for Human Health Risk Assessment of Nanopesticides” by Kah et al., 2021, Vol. 16, pages 955–964 (project 2017-035-2-600)

Publication in **Chemistry International**: “Tiny nanopesticides promise big gains to farmers” by Schmidt S., January-March 2022, pp. 23-25 (project 2017-035-2-600)

IUPAC Technical Report: "Seabed mining and blue growth: Exploring the potential of marine mineral deposits as a sustainable source of rare earth elements (MaREEs)" by Sakellariadou et al., 2022, Pure and Applied Chemistry, in press, https://doi.org/10.1515/pac-2021-0325 (project 2018-039-3-600).

Translation into Russian of the **Emergency Response Guidebook 2020**, March 2022 (project 2020-020-2-600)

IUPAC Technical Report: "Pesticide soil microbial toxicity: setting the scene for a new pesticide risk assessment for soil microorganisms" by Karpouzas et al., 2022, submitted to Pure and Applied Chemistry (project 2014-032-1-600)

IUPAC Technical Report: "Glossary of terms used in biochar research" by Biliasa et al., 2022, submitted to Pure and Applied Chemistry (project 2015-056-3-600).

Publication in **Chemistry International**: "Environmental Chemistry and Sustainability" by Purchase et al., in press (project 2021-008-1-600)

Within project 2021-008-1-600, Division VI has organized **four Symposia at the 48th IUPAC World Chemistry Congress** (Virtual, August 13-20, 2021) under the Theme "Chemistry for Sustainability": "Emerging Technologies and Conservation Practices for Sustainable Agriculture and Public Health", "The Environmental Impact of Fires", "Sustainable Polymers", "A Healthy Intake: Environmental Pollutants in Air, Water, Food and their Removal" - Coorganized with CIC.

The **2021 "Chemistry and Environment Division Award"** has been awarded to three posters presented at the 48th IUPAC World Chemistry Congress:

$300 Award to Nansi Fakhri, Université Saint-Joseph, Beirut, Lebanon: "PM2.5 sources in the Eastern Mediterranean capital Beirut: chemical characterization and contribution to ambient concentrations"

$200 Award to Mahshid Keramatnejad, Concordia University, Montreal, Canada: "The Impact of Air Pollutants on the Biophysical Properties of a Model of Tear Film Lipid Layer"

$100 Award to Andrés Villamil Hernández, Universidad Distrital Francisco José de Caldas, Bogotá, Colombia: "An experience for soil recovery and fortification from vermicompost"

In the end of 2021/beginning 2022 Division VI has approved the **new following projects**:

2021-026-3-600 - The role of mega ports in climate change

2021-032-3-600 - Conceptualization of definition and classification for humic substances

2021-028-3-600 - Minimising Environmental Impacts of Tyre and Road Wear Particles

and contributed to the preparation and financially supported the following projects:

2021-036-1-500 - LC-MS quantitative method validation and performance: an exemplified guide

2021-012-2-400 - Personal Protective Equipment Disposal for the Future

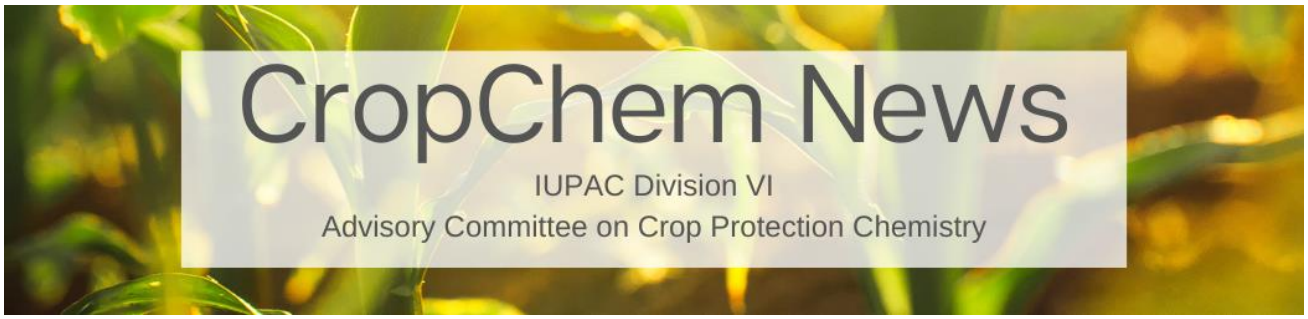
The following **projects** are **under approval or in preparation**:

proposal 2021-027-2 "The global scenario and challenges of radioactive waste in the marine environment"

"Improving the Sustainability of Chemistry Labs"

“Carbon Sequestration: Harmonizing carbon sequestration measurement – what does it mean and how we do it”

The Advisory Committee on Crop Protection Chemistry publishes twice a year a virtual newsletter entitled **“CropChem News”**. The last issue has been released on October 2021 (https://iupac.org/iupac-cropchem-news-issue-2-oct-2021/).



Goal: Improve the vitality, effectiveness and efficiency of our Union.

We believe that the Division would benefit from the contribution of **younger members** both in terms of new ideas and in communication of the Division activities to a broader audience. For this reason, the Division is trying to involve more and more younger members, including YOs, through their active participation to Subcommittees activities and projects. The creation of a “Division YOs group” is in discussion during the next Division meeting.

To increase the external visibility of Division activities, the identification of a **social media communication manager** is in discussion during the next Division meeting. This person will act in synergy with the Division Executive Committee to diffuse through social media the Division activities and products and in this operation will be supported by younger division members and YOs.

The **Division website** is frequently updated with last news and documents. **Division Members biosketches** have been also recently integrated on the website to facilitate the search for expertise when developing projects and collaborations (https://iupac.org/wp-content/uploads/2022/01/Biosketches-January-2022.pdf).

Objective: Expand and retain Member and volunteer base with an emphasis on diversity and inclusion.

The volunteer base of the Division is expanded through the action of the two Divisional Subcommittees that attract the participation of additional scientists of different disciplines to Division activities. **Old members** are retained through continuing participation to Subcommittees. YOs participation is encouraged through subcommittees membership, participation to projects, and the creation of a “Division YOs group” is in discussion during the next Division meeting. The **IUPAC Emeritus Fellow program** is also actively carried out by Division VI. Three Emeritus Fellows have been awarded in the last biennium (Laura McConnell, Yehuda Shevah and John Unsworth) and 3 new ones will be nominated this year (Nicola Senesi, Ken Racke and Willie Peijnenburg) to acknowledge their contribution to the Division and to IUPAC in general.

Objective: Improve quality and frequency of communication with stakeholders

Division VI is the forefront of the **collaboration between IUPAC and OPCW**. We have an active project co-chaired by a Division Member and an OPCW Officer: 2020-020-2-600 “Enhancing capabilities for the mitigation of chemical risk: the dissemination of the Emergency Response Guidebook in Russian-speaking countries.”

Division Associate Member Matteo Guidotti has been nominated **Member of the Scientific Advisory Board of OPCW**.

Past President Hemda Garelick is a member of the **organizing committee of IUPAC-OPCW AI-assisted chemistry workshop**: A proposed framework/sessions for SAB-IUPAC workshop on AI applications in Chemistry. The workshop will be held in The Hague in June 2022.

Objective: Enhance interdivisional interaction and collaboration

For its interdisciplinary and transversal nature, the Chemistry and Environment Division has always sought **collaboration with other IUPAC Divisions and Committees**. In most of the cases, our invitation to join and contribute to interdivisional projects has received attention and collaboration from other Divisions and Committees. On the other side, Division VI has always offered its contribution, both in terms of members participation and financial support, to interdivisional projects proposed by other Divisions and Committees.

Recent examples are the development of the following projects:

2021-027-2-600 - The global scenario and challenges of radioactive waste in the marine environment (in collaboration with IAEA, IRSN, Division VII, Division II and CHEMRAWN) – under final approval

2021-032-3-600 - Conceptualization of definition and classification for humic substances (in collaboration with Division V)

2021-028-3-600 - Minimising Environmental Impacts of Tyre and Road Wear Particles (in collaboration with Division IV and V)

and the contribution to the preparation and financial support to the following projects:

2021-036-1-500 - LC-MS quantitative method validation and performance: an exemplified guide (in collaboration with Division V and VII)

2021-012-2-400 - Personal Protective Equipment Disposal for the Future (in collaboration with Division IV, VII, CCE and ICGCSD)

Division VI is collaborating with COCI for the development of a **Safety Training e-learning Program**

Emphasize multidisciplinary projects addressing critical global issues

Multidisciplinarity is at the basis of environmental chemistry and therefore almost all Division projects are multidisciplinary. Projects task groups are usually composed of components from different disciplines and with different expertise, including representatives from government agencies, regulators, academia, industry and private consultancies. Such a variety is extremely important to tackle **environmental issues of global concern** like those dealt with in the following ongoing projects:

2021-026-3-600 - The role of mega ports in climate change

2021-028-3-600 - Minimising Environmental Impacts of Tyre and Road Wear Particles

2019-026-2-600 - The Environment, Health and Food Safety Impact of Microplastics

2019-029-1-600 - Per and polyfluroalkyl substances (PFASs) in the environment: Information for emerging economies on PFASs analyses in environmental media and their impacts on human health

2018-013-2-600 - Bioavailability of Endocrine Substances in Aquatic Ecosystems

2017-035-2-600 - Human Health Risk Consideration of Nano-enabled Pesticides for Industry and Regulators

2014-031-3-600 - The environmental and health challenges of e-waste and its management: an emerging 21st century global concern

Objective: Support chemistry education, particularly in developing countries

Division Associate Member Matteo Guidotti has organized a workshop as part of Training Programme "Sustainable management of hazardous chemical and biological waste in Central Asia: open questions, current trends and future opportunities" CABICHEM – EU CBRN CoE65 Partner Countries; Remote mode; 09 - 11 November 2021

Two members of the Division have given presentations there

1. Hemda Garelick: Focus on: plastics and micro-plastics from waste materials. An ever-growing threat
2. Diane Purchase :Urban mining and treatment of electronic waste streams

Division VI is planning to present the outcomes of three ongoing projects (The Environment, Health and Food Safety Impact of Microplastics - 2019-026-2-600; Per and polyfluroalkyl substances (PFASs) in the environment: Information for emerging economies on PFASs analyses in environmental media and their impacts on human health - 2019-029-1-600; Minimising Environmental Impacts of Tyre and Road Wear Particles - 2021-028-3-600) during the next **APCE & CECE Conference** (Angkor Wat, Cambodia, November 6-10, 2022), organized with IUPAC endorsement (https://iupac.org/event/apce-cece-2020-2/?msclkid=fe849661a60e11eca869274cee621442).

This conference is additionally supported by IUPAC for **conferences in scientific emerging regions** (#2020-003-1-FSC). Aim of the Division is that of generating interest about environmental chemistry issues in a country where the Chemical Society is newly founded (2010). It will also enable scientists from Cambodia and the neighboring countries to form scientific connections with Division VI and IUPAC. Finally, topics on environmental aspects of special interest for the local scientific community will be presented and disseminated to the Asia-Pacific scientific community.

Three Division Members are involved in the organization of the Conference: Doo Soo Chung (Chair), Diane Purchase and Hemda Garelick (Scientific Committee Members).

Another project (Enhancing capabilities for the mitigation of chemical risk: the dissemination of the Emergency Response Guidebook in Russian-speaking countries- 2020-020-2-600) aims at **disseminating** in Central Asian and Eastern European countries, where Russian is a common working language, good practices about risks related to the handling, transport and disposal of hazardous materials. All this will lead to a more sustainable approach to Chemistry and to the use of industrial chemicals in everyday life, with a neat advantage in terms of safety and security for human health and the environment. This project is also supported by IUPAC CCE.

In particular, this initiative and the related dissemination events will be an occasion to **attract the interest on IUPAC goals and initiatives by the chemists' scientific communities** of Central Asian countries (in

particular, Uzbekistan, Kyrgyzstan and Kazakhstan, which are not currently members of IUPAC or have just entered IUPAC).

IV. **Tabular material.**

Publications

Melanie Kah and Rai Kookana (2020) Emerging investigator series: nanotechnology to develop novel agrochemicals: critical issues to consider in the global agricultural context. Environmental Science Nano, 7, 1867-1873. (IUPAC project 2017-035-2-600 and 2016-016-2-600)

Purchase D, Abbasi G, Bisschop L, Chatterjee D, Ekberg C, Fedotov P, Garelick H, Kandile N. Lundström, Matharu A, Miller B, Pineda A, Popoola O, Retegan T, Ruedel H, Serpe A, Sheva Y, Surati K, Walsh F, Wilson B.P. and Wong MH. 2020. Global occurrence, chemical properties and ecological impacts of e-wastes (IUPAC Technical Report). Pure and Applied Chemistry, 9, 1733-1767 (IUPAC project 2014-031-3-600)

Zherebker A, Kim S, Schmitt-Kopplin P, Spencer RGM, Lechtenfeld O, Podgorski DC, Hertkorn N, Harir M, Nurfajin N, Koch B, Nikolaev EN, Shirshin EA, Berezin SA, Kats DS, Rukhovich GD, Perminova IV 2020. Interlaboratory comparison of humic substances compositional space as measured by Fourier transform ion cyclotron resonance mass spectrometry (IUPAC Technical Report), 2020, Pure and Applied Chemistry, Vol. 92, pp. 1447-1467. (IUPAC Project 2016-015-2-600).

Purchase D, Chen W, Garelick H, Kandile N G, Kookana R, Miller B, Terzano R (2020) Innovative Chemistry for Environmental Enhancement, Chemistry International, 42(1), 41-44 (IUPAC project 2018-026-2-600)

Johnston LJ, Gonzalez-Rojano N, Wilkinson KJ, Xing B (2020) Key challenges for evaluation of the safety of engineered nanomaterials, NanoImpact, 18, art n° 100219

Kleter GA (2020) Food safety assessment of crops engineered with RNA interference and other methods to modulate expression of endogenous and plant pest genes, Pest Management Science, 76, Pages 3333-3339 (IUPAC project 2013-029-2-600)

Melanie Kah, Linda J. Johnston, Rai Kookana, Wendy Bruce, Andrea Haase, Vera Ritz, Jordan Dinglasan, Shareen Doak, Hemda Garelick, Vladimir Gubala (2021) Comprehensive Framework for Human Health Risk Assessment of Nanopesticides. Nature Nanotechnology, Vol. 16, pages 955–964 (IUPAC project 2017-035-2-600)

Wu W, Fan X, Li Y, Dong R (2021) Growing collaborations between Chinese and UK young scholars on chemical science and technology. Frontiers of Chemical Science and Engineering, 15, 1–3.

Schmidt S 2021 “Tiny nanopesticides promise big gains to farmers, Chemistry International, January-March 2022, pp. 23-25 (IUPAC project 2017-035-2-600)

Sakellariadou F, Gonzalez FJ, Hein JR, Rincón-Tomás B, Arvanitidis N, Kuhn T (2022) Seabed mining and blue growth: Exploring the potential of marine mineral deposits as a sustainable source of rare earth elements (MaREEs) (IUPAC Technical Report), Pure and Applied Chemistry, in press, https://doi.org/10.1515/pac-2021-0325 (IUPAC project 2018-039-3-600)

Karpouzas DG, Vryzas Z, Martin-Laurent F (2022) Pesticide soil microbial toxicity: setting the scene for a new pesticide risk assessment for soil microorganisms (IUPAC Technical Report), submitted to Pure and Applied Chemistry (IUPAC project 2014-032-1-600)

Biliasa F, Sewu DD, Woo SH, Anastopoulos I, Verheijen F, Lehmann J, Teixeira WG, Gasparatos D, Draper K, Kalderis D (2022) Glossary of terms used in biochar research (IUPAC Technical Report), submitted to Pure and Applied Chemistry (IUPAC project 2015-056-3-600).

Purchase D, Farenhorst A, Garelick H, Kandile NG, Luscombe C, McConnell L, Mertoglu B, Miller B, Sakellariadou F, Terzano R, Wu W (2022) "Environmental Chemistry and Sustainability", Chemistry International, in press (IUPAC project 2021-008-1-600).

Conferences and Symposia

Symposium on "Emerging Technologies and Conservation Practices for Sustainable Agriculture and Public Health", 48th IUPAC World Chemistry Congress (Virtual, August 13-20, 2021) (IUPAC project 2021-008-1-600)

Symposium on "The Environmental Impact of Fires", 48th IUPAC World Chemistry Congress (Virtual, August 13-20, 2021) (IUPAC project 2021-008-1-600)

Symposium on "Sustainable Polymers", 48th IUPAC World Chemistry Congress (Virtual, August 13-20, 2021) (IUPAC project 2021-008-1-600)

Symposium on "A Healthy Intake: Environmental Pollutants in Air, Water, Food and their Removal" – Coorganized with CIC, 48th IUPAC World Chemistry Congress (Virtual, August 13-20, 2021) (IUPAC project 2021-008-1-600)

Presentations

Rai Kookana "Nanopesticides: Regulatory Evaluation of Environmental Risks", 5th Annual International Conference-NANOFORAGRI 2021, 8-9 December 2021 (IUPAC project 2017-035-2-600 and 2016-016-2-600)

Diane Purchase "'E-waste contamination in soil and its management', CHEMRAWN XXII E-waste in Africa Conference, 9-11 November 2021 (IUPAC project 2014-031-3-600)

Nadia Kandile "E-waste in education – a case study of an Egyptian University", CHEMRAWN XXII E-waste in Africa Conference, 9-11 November 2021.

Guidotti M, Martyniuk A "Enhancing capabilities for the mitigation of chemical risk: the dissemination of the Emergency Response Guidebook in Russian-speaking countries", IUPAC CCCE 2021 – 48th World Chemistry Congress, August 13-20, 2021 (IUPAC Project 2020-020-2-600)

Rai Kookana "Emerging technologies and improved practices for sustainable agriculture", IUPAC CCCE 2021 – 48th World Chemistry Congress, August 13-20, 2021 (IUPAC project 2021-008-1-600).

Annemieke Farenhorst "Technologies for use in biobed systems to turn pesticide rinsate into clean water", IUPAC CCCE 2021 – 48th World Chemistry Congress, August 13-20, 2021 (IUPAC project 2021-008-1-600).

Roberto Terzano "The impact of fire on the distribution and bioavailability of potentially toxic elements (PTE) in soils", IUPAC CCCE 2021 – 48th World Chemistry Congress, August 13-20, 2021 (IUPAC project 2021-008-1-600).

Fani Sakellariadou "An approach to study the impacts of a wildfire on the land uses of a coastal urban-rural area", IUPAC CCCE 2021 – 48th World Chemistry Congress, August 13-20, 2021 (IUPAC project 2021-008-1-600).

Diane Purchase "Urban mining and treatment of electronic waste streams", Workshop on "Strengthening chemical and biological waste management in Central Asia countries for improved security and safety risk mitigation", 10 November 2021, organised by the EU Chemical, Biological, Radiological and Nuclear (CBRN) Risk Mitigation Centres of Excellence (CoE). (IUPAC project 2014-031-3-600)

Yong-Chien Ling “Analysis of plastics in the environment for sustainability”, IUPAC CCCE 2021 – 48th World Chemistry Congress, August 13-20, 2021 (IUPAC project 2019-026-2-600)

Projects

Project Number	**Started**	**Planned end date**
2013-029-2-600, Kleter *Inventory of developments in the field of RNAi-based pesticides and potential needs for international harmonization of regulatory safety requirements.*	01/1/2014	30/9/2022
2014-026-3-600**,** Obare *Chemical Speciation of Anthropogenic Nanoparticles.*	01/8/2015	31/12/2022
2014-031-3-600, Purchase *The environmental and health challenges of e-waste and its management: an emerging 21st century global concern.*	15/3/2015	31/12/2021
2014-032-1-600, Karpouzas *Advances on the Assessment of Pesticides' Soil Microbial toxicity: New research and regulatory aspects in light of the recent methodological advances.*	01/6/2015	30/06/2022
2015-056-3-600, Kalderis Glossary of terms used in biochar research.	07/2/2018	30/06/2022
2016-016-2-600 2019-010-1-600 (supplement), Kookana *Guidance for Industry and Regulators on Assessment of the Environmental Fate and Risks of Nano-enabled Pesticides.*	19/9/2016	30/6/2022
2016-047-1-600 Extended to 2018-035-1-600, Xing *Multi-scale Biogeochemical Processes in Soil Ecosystems: Critical Reactions and Resilience to Climate Changes**.***	1/3/2017	31/12/2022
2017-013-1-600**,** Racke *Harmonization award.*		31/12/2022
2017-035-2-600, Kookana *Human Health Risk Consideration of Nano-enabled Pesticides for Industry and Regulators.*	19/12/2017	30/6/2022
2018-013-2-600, Shevah	22/10/2018	31/12/2022

Bioavailability of Endocrine Substances in Aquatic Ecosystems.		
2018-014-1-600 Extension of 2017-040-1-700, Gubala	29/12/2017 (as 2017-040-1-700)	30/06/2022
2018-039-3-600**,** Sakellariadou *Seabed mining and Blue growth: Exploring the potential of the marine mineral deposits as a sustainable source of Rare Earth Elements (MaREE).*	1/05/2019	31/12/2022
2019-026-2-600**,** Wu *The Environment, Health and Food Safety Impact of Microplastics.*	1/12/2019	31/12/2022
2019-029-1-600, Kah *Per and polyfluroalkyl substances (PFASs) in the environment: Information for emerging economies on PFASs analyses in environmental media and their impacts on human health**.***	01/12/2019	31/12/2022
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