EuChemS
Division of Chemistry and the Environment

Newsletter 6
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Consequences of Climate Change

The climate change leads to a number of problems for our planet. Among these problems the following have to be mentioned:

- ***Outdoor Air Pollution***

People are killed by poor air quality. Long term air pollution may be linked to:
asthma, cancer, heart disease, stroke.
It is due to carbon dioxide level on our planet which has lately enhanced. It was assumed that by eliminating fossil fuel emissions, the average life expectancy of the world's population would increase by 1.8-2.9 years and global economic and health costs would considerably decrease.[1]

- ***Extinction of species***

Over 500 species of land animals will be possibly lost in the next 20 years. Without human destruction of nature, this rate of loss would have taken thousands of years.[2]

- ***Ocean acidification***

Increase of carbon dioxide emission leads to ocean acidification killing marine life.[3]

- ***Food insecurity***

Climate change affects agriculture. The crops yields are affected and the agriculture zones moved. Such as, wheat and rice, main sources of protein for 71 % of population, are sensitive to carbon dioxide emissions. At the same time attention has to be directed toward the valorization of food waste which generates 1/3 of the greenhouse emissions.[5]

Food production leads also to deforestation, which is one of the causes of climate change.[6]

Some solutions

- *Reduce greenhouse emissions* (implement a carbon tax);
- *Plant Based Diet*;
- *Reduce waste*;

- *Invest in Renewable, Clean Energy*;

- *Efforts for Wildlife Conservation*

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Prof. Michaela Dina Stanescu, Romanian Chemical Society, member DCE

Towards a pollution free society

18th International Conference on Chemistry and the Environment (ICCE) Venice (Italy), June 11-15.2023

Design, production, manipulation, and/or use of chemicals either in their pure form or in the form of mixtures, materials, and composites, can have a significant impact on the environment i.e., natural resources and human health. In fact, understanding the chemistry of the environment and the underpinned concern about the impact of anthropogenic activity is the general mission of environmental chemists.

Environmental global change and its consequences on humans and ecosystems are dominating the actual public and political debate, and the development and promotion of research and public awareness on these issues is a primary objective of the Division of Chemistry and the Environment (DCE) of the European Chemical Society (EuChemS).

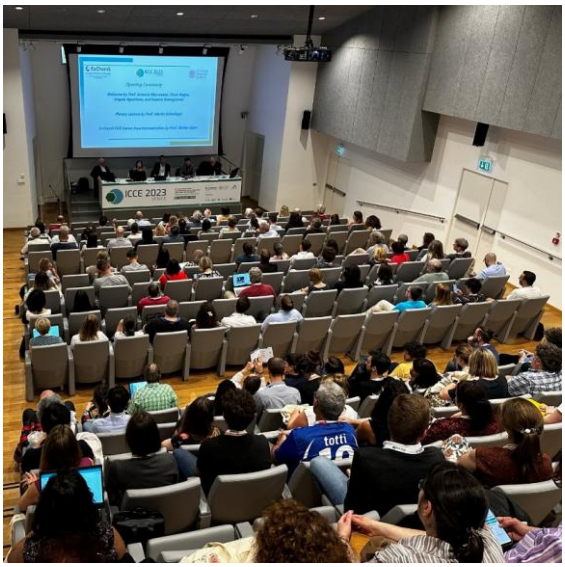
The 18th Edition of the International Conference on Chemistry and the Environment (ICCE 2023) has been organized by Ca' Foscari University of Venice and held at the University Scientific Campus in Venice-Mestre (Italy) on June 11-15.

Over 530 registered participants from 46 countries of Europe, Africa, America, and Asia attended this important event, contributing to its wide scientific program, which included 5 plenary lectures, 23 keynote presentations, 320 oral presentations, 50 posters with spotlight, and 185 posters.

These contributions covered the most relevant topics in the field of environmental chemistry, including experimental analysis and modelling of environmental contaminants, emerging contaminants, air-water-soil pollution, innovations in water and wastewater treatment, biotransformation of organic pollutants, green chemistry, ecotoxicology, LCA, environmental sustainability, environmental risk and impact assessment, nano-sized particulate materials and microplastics in the environment, atmospheric pollution (indoor and outdoor), effects of climate change on local to global circulation of chemicals, environmental impacts on cultural heritage, role of chemistry in the circular economy, and university education in environmental chemistry.

In the opening ceremony, the President of the Division of Chemistry and the

Environment (DCE) of EuChemS, Prof. Ioannis Katsogiannis, and the Chairman, Prof. Antonio Marcomini, introduced the Conference and were followed by the welcome speeches by Prof. Floris Rutjes, current EuChemS president, and Prof. Angela Agostiano, coming EuChemS president.



The opening plenary lecture was given by Prof. Martin Scheringer (Masaryk University and ETH Zürich), *Chemistry and the Environment – Where Do We Stand in 2023?* and the "DCE Lifetime Achievement Award" was conferred to Prof. Walter Giger (EAWAG-ETH Zürich) who gave the award lecture *Climbing peaks in science and life*.

Each day of the Conference started with a plenary lecture given on some of the most relevant topics in the field of environmental chemistry i.e. Prof. Christian Zwiener (University of Tübingen), *PFAS: Allrounders or Problem Generators? - Environmental and Analytical Perspectives*; Prof. Roberto Terzano (University of Bari "Aldo Moro"), *Unraveling environmental issues in the soil-plant system with X-rays: opportunities and challenges*; Prof. Adrian Covaci (University of Antwerp), *Human exposure to emerging contaminants: advances and challenges*; Prof. Dionysios (Dion) D. Dionysiou (University of Cincinnati), *Degradation of Contaminants of Emerging Concern on Reactive Surfaces: Kinetics, Mechanisms and Transformation Products*.

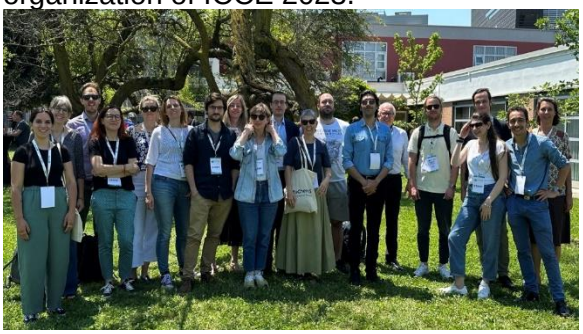
The Scientific Committee also awarded 6 Poster Awards (sponsored by IUPAC and EuChemS Divisions of Chemistry & the Environment and by the Rovaltain Foundation) based on the technical quality, importance to the fields of environmental chemistry, presentation quality and originality of the research. The winners of this awards were: i) Samuel Guéret (IIASA), *Impact assessment of shipping activities: Applying the critical load concept to both the atmosphere and marine environment*; ii) Martina Kalt (Eawag), *Biotransformation capacity for trace contaminants - from wastewater to natural surface water*; iii) Anjela Vogel (University of Tübingen), *Dosage concentration and pulsing frequency affect the degradation efficiency in simulated bacterial polycyclic aromatic hydrocarbon-degrading cultures*; iv) Ana Torres-Agullo (IDAEA-CSIC), *Optimization and application of a pyrolysis – GC-Orbitrap method for the identification and quantification of microplastics in air*; v) Anna Avgenikou (AUTH), *Risk assessment of household dust-bound PAHs in relation to residents' smoking habits*; vi) Clara Jaen (IDAEA-CSIC), *Source apportionment of inorganic and organic aerosols in a high-altitude mountain site in south Spain*.

This Conference has shown it will be fundamental to maintain the focus on and further develop the capability to, among others

i) studying kinetics and mechanisms of pollutants of concern (i.e., pharmaceuticals, pesticides, plasticizers, PFASs, etc.) and their (bio)degradation products under natural and engineered conditions;
ii) processing rich sets of data from human biomonitoring for discovering health-impairing exposures and advancing in the analytical screening to decipher the problematic nature of persistent contaminants in material recycling;
iii) providing guidance towards more accurate prevention measures (e.g. Safe-by-Design approach) that protect against exposure to (emerging) environmental contaminants and their substitutes in new materials and products;
iv) assessing and managing the water-energy-food-ecosystem nexus under a changing climate; v) specifically targeting different chemical vs nano forms of the materials with different hazards.

A special issue entitled “Recent progress of environmental chemistry towards a pollution free society — ICCE 2023” at the Environmental Science and Pollution Research (ESPR) Journal is now open at https://www.springer.com/ journal/11356, and the Conference Book of Abstracts is freely available for download at the website https://www. icce2023.com.

The organizers would like to express their thanks to Ca’Foscari University of Venice, EuChemS, Waters, Agilent, Bruker, Toxics Journal, Springer and the Rovaltain Foundation for their financial support in the organization of ICCE 2023.



On behalf of the ICCE 2023 Local Organizing Committee, *Prof. Antionio Marcomini and Dr. Loris Calgaro (Ca’Foscari University of Venice)*

Prof. Dr. Walter Giger

At ICCE 2023, held in Venice, Italy, **Dr. Walter Giger** received the 2023 EuChemS DCE Lifetime Achievement Award from the European Chemical Society, Division of Chemistry and the Environment (EuChemS DCE).

As current DCE Chair Prof. Ioannis Katsogiannis stated at the opening ceremony of the conference on 11 June 2023, Walter Giger has been a leading figure in environmental chemistry in Europe for many decades. He has built an impressive reputation as outstanding scientist and internationally renowned expert on all aspects of organic contaminant research and trace analysis in the environment. Based in Zurich, Switzerland, with leading positions at EAWAG (Chemistry Department; Division of Chemical Pollutants) and ETH (Professor for Environmental Chemistry), Walter Giger has held numerous prestigious positions at other institutes worldwide, notably in the USA and Australia. Walter Giger is best known for his seemingly endless and unbridled energy with which he stimulates and guides his colleagues and students.

Throughout his career, Dr. Giger focused his research on the development and applications of chemical analytical methods (organic and inorganic separation techniques) for trace analysis of environmental pollutants. Dr. Giger belongs today to the top-rated environmental chemists globally acknowledged for his key contributions to the elucidation of pollutant fate in the environment. His outstanding position is documented and recognized in various awards, including the Medal of Honor for achievements in training and research in Vietnam, the Legend of Environmental Chemistry Award, American Chemical Society 2008 (ACS), and a personalized Tribute Issue of Environmental Science and Technology (ES&T). Dr. Giger dedicated his scientific career to research on the environmental fate and distribution of anthropogenic pollutants with specific emphasis on the elucidation of what are

nowadays termed “emerging pollutants” by analytical method development, fate and behaviour studies, and environmental monitoring.

As expert on environmental chemistry, Dr. Giger is/was editor and/or member of numerous editorial boards for international renowned peer-reviewed journals including Environmental Science and Technology (EST, Editor), Environmental Science and Pollution Research (ESPR, Editor) and The Journal of Analytical and Bioanalytical Chemistry (JABC, Editorial Board). In addition to serving as DCE Chair, he was instrumental as coordinator, chair/member of committees for the organization of many international conferences in environmental research on aspects in method development and contaminants research, including the International Conference on Chemistry and the Environment (ICCE).

Dr. Giger consciously and successfully combined his research work with university education as ETH Professor in Zürich (Switzerland). As author and co-author of around 224 ISI registered peer-reviewed publications (status 20.03.2023), Dr. Giger belongs today to the most cited authors in Environmental Sciences worldwide. His outstanding publication record is well documented in the impressive h-index of 72 (18773 Citations, Web of Science).

Walter Giger is widely appreciated as a very open-minded person, always interested to share and actively contribute with his enormous scientific expertise to the knowledge of younger colleagues in their early careers. As an internationally renowned interdisciplinary oriented senior scientist, Dr. Giger is very team-oriented in his scientific work. He is always open for new scientific ideas which he often tested and further developed in his laboratories in the frame of doctoral theses or Post Doctorate projects.

Dr. Walter Giger fully deserves the DCE Lifetime Achievement Award as he actively shaped and served the DCE in uncountable occasions and functions over decades, he has been a gifted and enthusiastic teacher and conveyer of our scientific discipline to colleagues, students and the broader public alike, and he is a world-leading scientist on environmental chemistry research, with a strong interdisciplinary focus on contaminants research.

Willem de Lange, Secretary of DCE

Environmental education

5th International Summer School in Thessaloniki, Greece

For the last 5 years, the **International Summer School on Circular Bioeconomy and Sustainable Development took place in Thessaloniki**. The organizers are the National and Kapodistrian University of Athens, the BioCircularity SCE, the International Greek University and the excellent facilities by the host Perrotis College in the American Farm School of Thessaloniki. **More than 50 guests from 22 countries** were attending to share the latest developments on circular bioeconomy and sustainable developments. The event was opened by Prof Dr. K. Vorgias, Chairman of the Organizing Commitee and the opening lecture hold by Dr. C.Patermann, Emer. EU Director in Bioeconomy, Germany, and a legend of Bioeconomy in Europe and worldwide.
The International Summer School on Circular Bioeconomy and Sustainable Development is an annual event that aims to bring together the academia, students, SME’s and clusters all over the world to exchange experiences on the development of Circular bioeconomy and create a powerful network of actors in the field, all while enjoying the Greek summer. This year it is included in the program of the Centre of Training and Lifelong Learning of the National and Kapodistrian University of Athens and the students can receive 2 ECTS.

For five days, the participants had the chance to follow interesting lectures of various topics for example:the background

and history of bioeconomy (M.Greimel), the importance of competition, innovation and the integration of industries (M. Kircher), (E.Papadopoulou), CSR in the tourism sector (E.Andreadis), sustainable Agro-food sector (M.Katharakis) (M.Dettenhofer) and circular agriculture (C.Vasilikiotis, K.Zinoviadou), Mediterranean diet (T. Adamidis), forestry and agriculture waste valorization (N.Damatis), novel applications of biochar (F.Aulenta), lignin valorization in the chemical industry, sustainable waste water treatment (L. Diels), the valorization of grape seeds from winemaking (M. D. Stanescu), the production of antimicrobial substances from tomato pomace (R.Escórcio), the production of bacterial cellulose (S. Bielecki), fertilizer production using sheep wool (N.Koltsidas), production of biopolymers from organic waste (M.Villano), food waste (S.Lalou) and recycling potential (K.Rotsios). In the education sector the importance of connecting the academia with the bioeconomy job market (N. Monokrousos) was highlighted as well as new educational opportunities (G. Burgos) challenges (A. Gertsis), and skill development driven by the industry (N. Emerencia, BIC). Communicating the Circular Bioeconomy was mentioned (M.Andrielou and I.Delioglanis) paired with creative approaches (S. Albertini, E.Andreadis). The contribution of sustainable economics in policy making (L. Rizopoulos) was also discussed. Furthermore, SMEs presented their own sustainable practices (a)Apivita (S. Pastras), (b) EGGpro (T. Tziogli),(c) ALUMIL S.A. (G. Fytianos), (d) PROUD FARM (N. Koltsidas), (e) Agrotrack (V. Tsezos), (f) MACC (M. Katharakis) and examples from EU funded projects were introduced CEE2ACT (M. Rossel), GenB, BioGov.net, etc. The participants were also exposed to the World Café group discussion method (A.Pantazidis) and played the innovative Bioeconomy Game (E. Matsarides, E.Fotiadou, A. Panayiotopoulos).

The importance of cooperation in the development of Bioeconomy, especially at a macro-regional and regional level was articulated. Examples from Greece were presented, like the Cluster for Bioeconomy and Environment (Y. Fallas, Clube, Greece), the Greek Bioeconomy Forum (E. Anthis) and the Regional Development Fund of Central Macedonia (K. Kissa). The achievement of the BIOEAST initiative that is supporting bioeconomy deployment in 11 countries of the BIOEAST macro-region was presented by G.Sakellaris (BIOEAST HUB CZ).

Several private companies and organizations supported the school and are listed alphabetically. AIOLOS, ALUMIL, ANTHIS, APIVITA, BROKENHILL Publ., CLUBE, HELLABIOM, International Hellenic University, MSC in Bioeconomy Biotechnology and Law (Center of International Programmes of Studies of the International Hellenic University), ICA COP, KLIMIS,The Greek Bioeconomy Forum. The President of the National and Kapodistrian University of Athens (Prof. A. Dimopoulos) generously supported the event.

It was a great pleasure to welcome all participants in Thessaloniki. The event was once more successful thanks to their participation and enthusiasm, and we are looking forward to renewing our meeting next year.

The organization was supported by the team of BioCircularity SCE www.biocircularity.eu (E. Matsarides, A. Panayiotopoulos, E. Fotiadou and L. Christodoulaki) and A. Perouli, coordinated by the chairmam and the contact person's Email addresses for further information are: cvorgias@biol.uoa.gr and Perouli.anastasia10@gmail.com

Information and future registration on the web site of BioCircularity SCE: www.teachbio.eu

Prof Dr. K. Vorgias, Chairman of the Organizing Committee

Research Project

Sustainable and cost-effective production of drinking water from eutrophic and micro-polluted water using a membrane hybrid process

The three year project **SUPREMES** aims to gain new knowledge on innovative drinking water treatment process which combines ultrafiltration, coagulation, and the application of eco-sorbents for the removal of organic micropollutants from drinking water resources. For this purpose, a special eco-sorbent based on drinking water treatment sludge was developed and produced in the laboratories of the partner university from Germany. Its efficiency in removing micropollutants is compared with the conventional activated carbon application and tested in parallel in pilot water treatment plants in Serbia and Germany. Synthetic eutrophic lab waters developed in a laboratory and real eutrophic waters from reservoirs will be used. Investigating algal populations in different freshwater resources will be conducted to determine the predominant algal groups and to study the impact of different algal populations on membrane fouling and organic micropollutants removal. The focus is on assessing how the morphology and growth phase of different algae affect the treatment process. In this way, SUPREMES is directly responding to key challenges in drinking water treatment by creating new knowledge needed in water management in the light of emerging contaminants and the intense eutrophication that is occurring worldwide. In addition to the two universities, the German SME Cornelsen Umwelttechnologie GmbH is also involved in the project. Three water utilities in Serbia are supporting the implementation of the project by providing water samples for testing, and Serbian Association for Water Technology and Sanitary Engineering will support the project by helping to disseminate the results and organize the upcoming workshop. Furthermore, the project employs two young researchers in Serbia and one young researcher in Germany. It is funded from German federal budget by the DLR Project Management Agency acting on behalf of Federal Ministry for Education and Research (Bundesministerium für Bildung und Forschung-BMBF, grant number 01DS21012A) in the frame of financing research and development projects in between Germany and Western Balkans (WBC2019). The next project workshop entitled "Innovative technologies in water treatment for removal of contaminants of emerging concern - examples of solutions for mycrocistines, pharmaceuticals and PFAS" is scheduled for 31/01-01/02/2024. Contact persons are Dr. Minja Bogunović (minja.bogunovic@dh.uns.ac.rs), and Denizer Didem (didem.denizer@uni-due.de).

Stefan Panglisch (University of Duisburg-Essen, Germany) and Ivana Ivančev-Tumbas (University of Novi Sad, Faculty of Sciences, Serbia)

DCE publication

Environmental Science and Pollution Research (ESPR),
A scientific journal with a broad interdisciplinary outlook.

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