

Division of Environmental Chemistry Program

ACS Spring 2021 Virtual National Meeting & Expo April 5 – 16, 2021

Abstract Submission open December 16, 2020 – January 19, 2021

Program Chair: Slawo Lomnicki, slomni1@lsu.edu
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Submit abstracts to the Division of Environmental Chemistry at <https://maps.acs.org>

ACS Theme: Macromolecular Chemistry—The Second Century

Chemical & Biotechnological Advances Directed to the Recycling of Plastics (Cosponsored by: BIOT)

Symposium Organizer: John Glaser, glaser.john@epa.gov

This interdisciplinary symposium is designed to engage chemists, polymer scientists, engineers, and biotechnologists to develop an understanding of the problem scope and to advance integrative, effective and sustainable strategies critical to the prevention of plastic pollution through the sustainable reuse of used plastic materials.

Macromolecular Chemistry & Nanomaterials in Daily Life: Applications and Environmental Interactions

Symposium Organizers: Mark Benvenuto, benvenma@udmercy.edu; Satinder Ahuja, sutahuja@atmc.net

Macromolecular chemistry and nanomaterials continue to find new uses in the everyday life of the general population. As well, new macromolecules and new nanomaterials continue to be produced, often for a specific niche application. These are new materials, sometimes with fascinating properties, that have yet to be studied in a cradle-to-grave or cradle-to-cradle scenario. This symposium hopes to discuss and further understand such materials, how they are created, what by-products form in the process, what their entire life cycle is, and their ultimate fate.

Micro- & Nano-Plastics in the Environment: Detection, Characterization, Fate & Impact

Symposium Organizers: Souhail Al-Abed, al-abad.souhail@epa.gov; Phillip Porter, potter.phillip@epa.gov; Miranda Gallagher, mgallagher@jhu.edu

This symposium invites papers that focus on various environmental aspects of microplastics in the environment.

Plastics & Oceans: Chemistry for the Journey Ahead

Symposium Organizers: Robert Giraud, robert.j.giraud@outlook.com; Sara Orski, sara.orski@nist.gov; Brett Howard, Brett_Howard@americanchemistry.com; George Cobb, george_cobb@baylor.edu; Marie Bourgeois, mmbourgeois@usf.edu

Developing a research agenda for the ocean plastics challenge requires constructive input from the full gamut of chemistry disciplines. This symposium will bring together those various perspectives to identify needed advances in the

measurement, assessment, and prevention of plastic environmental impacts on the ocean as well as opportunities for interdisciplinary collaboration.

Aquatic Chemistry

Aquatic Photochemistry (Cosponsored by CEI)

Symposium Organizers: Kristopher McNeill, kristopher.mcneill@env.ethz.ch; Bill Arnold, arnol032@umn.edu; Garrett McKay, gmckay@tamu.edu

Photochemical transformations are important in geochemistry and environmental chemistry in diverse contexts, ranging from natural systems where sunlight is acting on surface waters to engineered systems using UV irradiation. The COVID-19 pandemic has also led to the evaluation of the use of UV light in the context of disinfection of water and surfaces. Light may act directly upon target compounds or indirectly through interactions with redox-active species including minerals, dissolved organic matter, and small molecule sensitizers. Understanding the roles of photochemistry in these complex systems will provide important insight into the fate of chemical and biological species in the environment. In this symposium, we invite submissions that explore the direct and indirect roles of light in the photochemical transformation of natural and anthropogenic compounds, inactivation of microorganisms, as well as interactions of light with organic matter, biomolecules, and redox-active minerals. ***In recognition of the recent 50th anniversary of the US EPA (est. 1970), we will be honoring the long-serving EPA photochemist **Dr. Richard Zepp**, whose work is familiar to all environmental photochemists. We are happy that Richard has agreed to give an invited talk as part of our symposium. We will also be grateful for contributed abstracts that reflect on the role of the EPA and Richard's contributions to our field.***

Current Status of Environmental Research on Water Contaminants

Symposium Organizers: Satinder Ahuja, sutahuja@atmc.net; B. (Logan) Loganathan, bloganathan@murraystate.edu

Papers that focus on the current environmental research on water contaminants are invited.

Performance of Stormwater Treatment Systems Under Changing Environments (Cosponsored by: GEOC)

Symposium Organizers: Sanjay Mohanty, mohanty@ucla.edu; Sujith Ravi, tuf77011@temple.edu; Timothy Dittrich, gk2840@wayne.edu

This session welcomes studies from lab to field scale on how different designs of stormwater treatment systems affect contaminant removal under complex conditions expected in nature. Studies examining the effect of changing environments (e.g., temperature fluctuation, precipitation duration, frequency, or intensity, and land uses) on the performance of stormwater treatment systems are particularly invited. Studies on stormwater treatment technologies quantifying contaminant removal processes or capacity at different design scenarios are also welcome.

Human Exposure to Emerging & Replacements of Organic Contaminants

Symposium Organizers: Dr. Un-Jung Kim, unjung.kim@uta.edu; Dr. Karthikraj Rajendiran, Karthikraj.Rajendiran@health.ny.gov

There are growing needs for new and replacement chemicals in consumer products as a result of the national and/or international regulations to remove controversial and/or confirmed toxic chemical additives from the market. However, some of the replacement chemicals were proven to be similarly or more toxic than the old harmful chemicals. Hence, it is necessary to assess emerging and replacement chemicals with respect to their current usage, exposure routes, levels and associated adverse health effects to humans. This symposium will focus on discussing novel analytical methods, epidemiological and toxicological human biomonitoring (tissues/fluids) and environmental monitoring studies on exposure assessment (e.g., food, indoor, personal care products) to emerging replacement chemicals including but not limited to: Alternative flame retardants (e.g., OPFRs, NBFRs, Melamine), alternative plasticizers (e.g., BPS, BPF, DINCH, Terephthalates) and PFAS replacement (e.g., GenX, DONA). Studies measuring their corresponding metabolites and transformation products will also be considered.

Innovation in Remediation Strategies & Their Impact on Superfund Contaminants

Symposium Organizers: Angela Gutieres, amgu232@g.uky.edu

Currently, hundreds of thousands of contaminated sites exist in the US due to hazardous waste being dumped, left out in the open, or otherwise improperly managed. This issue is compounded with the growing list of emerging contaminants, and it is imperative for the environmental science and engineering community to develop real and practical remediation strategies for these contaminants. Remediation strategies span from biological treatment, physical/chemical treatment and thermal treatment as well as innovative detection methods. Recent advances in materials science, analytical chemistry, imaging techniques and 'omics' technologies have driven the development of effective and efficient treatment approaches. Given the prevalence of superfund sites across the nation and the emergence of priority contaminants - like persistent per- and polyfluoroalkyl substances - the impact and translation to the field of these remediation technologies is of utter importance. This symposium will feature key advances, identify pressing challenges, and propose future directions for contaminant remediation strategies - specifically for Superfund contaminants (such as industrial solvents, arsenic, lead, and mercury). This symposium will also feature innovative detection and monitoring technologies that aid in the evaluation of remediation effectiveness. The topics that would be covered in this session are, but are not limited to case studies applying innovative technologies or approaches related to Superfund chemicals and their impact on the environment/community.

MT-EC: Molecular Toxicology Meets Environmental Chemistry

Symposium Organizers: Christie Sayes, Christie_Sayes@baylor.edu; Carsten Prasse, cprasse1@jhu.edu

Our global economy exposes the environment and humans to tens of thousands of substances (chemicals, particles, and other materials), with more developed every day. There is a need to understand how these substances affect health including the underlying molecular mechanisms that lead to toxicity or mechanisms of transformation. To accomplish these goals, our community must develop analytical techniques and biological models to measure complex exposures. The focus of this symposium is to encourage submissions that present novel research and development strategies designed to improve our understanding of how molecular toxicology in conjunction with environmental chemistry impacts environmental health.

Sensors & Biosensors for Widespread Environmental Monitoring

Symposium Organizers: Paul Schorr, schorr@njit.edu; Tao Li, li.tao@epa.gov; Maria Romero- Gomez, m.romero-gonzalez@qmul.ac.uk; Vishnu Rajasekharan, vrajasek@hach.com; Wen Zhang, wen.zhang@njit.edu

This symposium focuses on advances in widespread deployable environmental sensors to detect conventional, priority and emerging chemicals and pathogens for specific potable water, wastewater, and water for power generation, industrial, pharmaceutical, and agricultural uses. We also invite presentations on techniques to predict and monitor environmental impacts of extreme weather events on natural and manmade water systems.

Chemical, Physical & Biological Processes in the Environment

Accurate Mass/High Resolution Mass Spectrometry for Environmental Monitoring & Remediation (Cosponsored by ANYL, CEI)

Symposium Organizers: Tarun Anumol, tarun.anumol@agilent.com; Ruth Marfil-Vega, rmmarfilvega@shimadzu.com; Damia Barcelo, dbcqam@cid.csic.es

This session focuses on the application of high resolution mass spectrometry for analysis of organic contaminants in the environment. Papers that involve methods to identify known and unknown contaminants in the environment including effects-directed analysis, computational modelling of HR/MS data, studies on treatment process efficiency and identification of transformation products are the major themes of this symposium.

Biogeochemical Transformation in Underground Environments: Natural Processes & Engineered Implementations for Contaminant Abatement (Cosponsored by: GEOC, CEI)

Symposium Organizers: Weile Yan, weile_yan@uml.edu; Kayleigh Millerick, Kayleigh.Millerick@ttu.edu; John Ferry, ferry@mailbox.sc.edu; Matthew Siebecker, Matthew.Siebecker@ttu.edu

This symposium invites discussion on recent advances in various aspects of electron transfer at bio-carbon or bio-mineral interface, impacts of biogeochemical cycling on the speciation and mobility of trace elements, methods for laboratory or field characterization of geochemical conditions or indicators of biological processes, quantifying subsurface reactive capacity and intensity (moles/time) based on instantaneous or short-term behavior at an interface, and other related topics.

Green Chemistry & the Environment (CEI)

Symposium Organizers: Rafael Luque, q62alsor@uco.es; Sherine Obare, soobare@uncg.edu

Papers that focus on any aspects of green chemistry processes are invited to submit an abstract to this symposium.

Recent Advances in Destruction, Degradation, Isolation, Removal & Sensing of PFASs (Cosponsored by: ANYL)

Symposium Organizers: Manoj Shukla, Manoj.K.Shukla@usace.army.mil; Manoj Kolel-Veetil, manoj.kolel-veetil@nrl.navy.mil; Nancy Kelley-Loughnane, nancy.kelley-loughnane.1@us.af.mil

Per- and polyfluoroalkyl substances (PFASs) are a large family of manufactured industrial chemicals developed in the 1940s with diverse applications in almost every aspects of our lives now. These chemicals are nicknamed “forever chemicals” because of their omnipresence and resistance to natural degradation. As of October 2019, there were 1398 locations in 49 states in the US that are known to be affected with PFAS contamination. Moreover, it is estimated that around 110 million Americans find PFAS contamination in their drinking water supplies. According to the US National

Health and Nutrition Examination 2011-2012 survey, detectable serum PFAS concentrations were revealed in 97% of tested individuals. The ground and surface waters in sixty-six public sites contain orders of magnitude higher PFAS concentrations than the EPA limit for drinking water, which is 70 parts per trillion (ng/L). Human PFAS exposure has been linked to several health-related issues such as cancer, elevated cholesterol, obesity, immune suppression and endocrine disruption. Currently produced short-chain PFAS have been found to also have adverse effect on human health and are more mobile than their long-chain cousins. Traditional remediation technologies are usually not effective against PFASs. Therefore, currently there are no viable technology to efficiently remove and or degrade PFASs from the contaminated sites. This symposium will discuss recent research efforts from government agencies, industries and academic institutions, their success, failure and their limitations for the destruction, degradation, isolation, removal and detection of PFASs from the contaminated media.

Environmental Chemistry in Industry

Advanced & Additive Manufacturing Materials & Technologies for Environmental Applications

Symposium Organizers: Nirupam Aich, nirupama@buffalo.edu; Saifur Rahaman, saifur.rahaman@concordia.ca; William Phillip, william.a.phillip.1@nd.edu

The symposium invites abstracts that focus on innovative strategies that show advances and sustainable methods for including and utilizing additives in manufacturing for electrochemical, energy and environmental applications. This symposium will provide the environmental science and engineering communities with opportunities to exchange knowledge and ideas about the recent innovations and challenges associated with Advanced & Additive Manufacturing for applications that impact the natural and built environment. Also, this symposium will include discussions regarding the environmental, energy, and health sustainability and implications of advanced manufacturing.

Applications of Artificial Intelligence, Machine Learning & Data Analytics in Environmental Science & Engineering

Symposium Organizers: Huichun (Judy) Zhang, hjz13@case.edu; Qilin Li, qilin.li@rice.edu; April Z. Gu, aprilgu@cornell.edu; Xingmao "Samul" Ma, xma@civil.tamu.edu; Qi Ying, qying@civil.tamu.edu; Zhen Cheng, chengz88@sjtu.edu.cn

This symposium will bring experts and newcomers from a diverse background to explore opportunities in applying AI/ML and data analytics to solving environmental problems, and to identify research priorities our community should focus on in the near future.

Industrial Applications of Environmental Chemistry

Symposium Organizers: Nicole Lock, nmlock@shimadzu.com; Steven Lingenfelter, steven.lingenfelter@glwater.org; Tarun Anumol, Tarun.amumol@agilent.com

The role of industry in using environmental chemistry to develop practical applications that support manufacturing and commerce is often understated. This symposium will highlight applications of environmental chemistry in industry and their role in everyday-life. The key areas of focus will be water treatment (both drinking water and wastewater), advances in analytical instruments, predictive modeling (i.e., pollutants and emissions), petrochemical manufacturing and other applications where environmental chemistry influences daily life. This symposium will mainly feature speakers from industry. However, academic speakers whose work focuses on topics relevant to industry will also be given equal consideration to their industry colleagues. The symposium will conclude with a panel discussion of the selected speakers. The intended audience will be those from industry and to some extent, government.

Innovative & Practical Approaches for the Treatment of Per- & Polyfluoroalkyl Substances (PFASs)

Symposium Organizers: Jinyong Liu, jyliu@engr.ucr.edu; Jong Kwon Choe, jkchoe@snu.ac.kr; Yin Wang, wang292@uwm.edu; Shubham Vyas, svyas@mines.edu; Yongju Choi, ychoi81@snu.ac.kr

This symposium centers on opportunities and challenges for developing effective and efficient treatment approaches, such as chemical, photochemical, catalytic, and biological degradation, thermal and non-thermal destruction, as well as adsorption and membrane separation, to remove the emerging and persistent per- and polyfluoroalkyl substances.

Nanomaterials & Nanotechnology

Applications & Implications of Nanomaterials in the Environment (Financially supported by: AFIT, USA; AFRL, USA; Batelle USA; Naresuan University, Phitsanulok, Thailand; KAIST, Rep. of Korea; The Siam Cement Public Company LTD, Thailand)

Symposium Organizers: Sushil R. Kanel, sushil.kanel@wright.edu; Mallikarjuna Nadagouda, Nadagouda.Mallikarjuna@epamail.epa.gov; Tanapon Phenrat, pomphenrat@gmail.com or tanaponph@nu.ac.th; Seoktae Kang, stkang@kaist.ac.kr; Sudip Chakraborty, sudip.chakraborty@unical.it

The symposium solicits recent developments in the applications, implications, medical applications, and toxic effects of nanomaterials (NMs). Presentations may address one or more of the many aspects of NMs, including the following: 1) Synthesis and characterization of NMs, 2) Coating with rare earth metals and minerals, 3) Use of NMs for water treatment including emerging contaminants like per- and polyfluoroalkyl substances (PFAS), 4) Fate and transport of NMs in the environment, 5) NM incorporated membrane technology for water treatment, 6) NM for the sensor, and 7) Recycling of NM and reuse. Presentations on the analysis and characterization of NMs using microscopy, spectroscopy, synchrotron-based X-ray techniques, and mathematical modeling will be invited. The overall goal is to connect and engage individual investigators working on the topics above and other related aspects of the environmental chemistry of NMs.

General Environmental Chemistry

General Papers in Environmental Chemistry

Symposium Organizers: Slawo Lomnicki, slomni1@lsu.edu

This symposium is open to all papers on environmental chemistry or environmental engineering that may be beyond the focus of the specific topics addressed in other ENVR symposia.

General Posters

Symposium Organizers: Slawo Lomnicki, slomni1@lsu.edu

Poster presentations of research that focuses on environmental chemistry and/or engineering, not covered in other ENVR poster sessions are invited. *Please note that presentation details for posters at this meeting have not yet been determined.*

Award Symposia (Invited Abstracts Only)

[Tentative] ACS Award Symposium for Creative Advances in Environmental Science & Technology (Financially Supported by Aerodyne)

Symposium Organizers: Virender K. Sharma, vsharma@tamu.edu

This symposium recognizes the recipients of the ACS National Award for Creative Advances in Environmental Science & Technology for 2020 and 2021. All papers presented in this symposium will be invited to honor the awardees.

Great Achievements in ES&T: James J. Morgan Early Career Environmental Advances Award Symposia for 2020 and 2021 Recipients (Cosponsored with ES&T Journal and ES&T Letters)

Symposium Organizers: Maggie Mills, mmills@acs-i.org, William Aumiller, w_aumiller@acs.org

The first session of this symposium will honor **Professor Jingyun Fang**, Associate Professor in the School of Environmental Science and Engineering at Sun Yat-Sen University, recipient of the 2020 James J. Morgan Early Career Environmental Advances Award. This award, named after the first Editor-in-Chief of Environmental Science & Technology, recognizes the contributions of early-career researchers who have led the field in new directions through creative, new ideas consistent with Morgan's early contributions in environmental chemistry. This session will feature a lecture by Prof. Fang and other invited presenters.

The second session of this symposium will honor the 2021 award recipients with lectures by the award winners and other invited presenters.

Symposia Cosponsored by ENVR

ANYL

Colorimetric Sensing

Symposium organizer: Richard Kingsborough, rkingsborough@ll.mit.edu

Description: The recent development of commodity optical components (imagers, cell phone cameras, etc.) coupled with low-cost, low-power consumer electronics has ushered in a revisiting of chemical-based analyte detection as a low-cost solution for vapor and liquid sensing. This symposium will bring together researchers developing both the electronic sensors as well as the colorimetric dye front ends to share their approaches to the far-reaching problem of chemical sensing in the environment.