

Mid-Atlantic Chapter



Society of Toxicology (MASOT)

Fall 2017 Scientific Meeting

Sheraton Edison Hotel, Raritan Center, Edison, NJ

The *Mid-Atlantic Chapter of the Society of Toxicology (MASOT)* was formed to: (1) serve as a focal point for toxicological interests within the region; (2) encourage interactions among toxicologists in government, industry, and academia; and, (3) sponsor scientific and educational programs in toxicology. The Chapter and its bylaws were officially approved by the Council of the Society of Toxicology at the March 1982 Annual Meeting.



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MASOT FALL MEETING

October 18, 2017

Emerging and Existing Concerns of Water Contaminants

- 8:30 – 9:00** Continental Breakfast/Registration/Networking
- 9:00 – 9:15** Introduction and MASOT Update –Norman Barlow, D.V.M., Ph.D.
Education and Outreach Committee Update –Lisa Hoffman, Ph.D.
- 9:15 – 10:00** Gloria Post, Ph.D., DABT (New Jersey Department of Environmental Protection)
Title: [Drinking Water Contaminants and Standards: An Overview](#)
- 10:00 – 10:45** Jamie DeWitt, Ph.D. (East Carolina University/Brody School of Medicine)
Title: [The Never-Ending Story of Per- and Polyfluoroalkyl Substances: Immunotoxicity from Legacies to Alternatives](#)
- 10:45 – 12:00** Student Poster Session 1
- 12:00 – 1:15** Ambassador Award Presentation to Joseph Graziano, Ph.D. during lunch
- 1:15 – 2:15** Student Poster Session 2
- 2:15 – 3:00** Joseph Graziano, Ph.D. (Columbia University/Mailman School of Public Health)
Title: [Poison in the Well: Exposure, Health Effects and Remediation of Arsenic in Drinking Water in Bangladesh](#)
- 3:00 – 3:45** Terrence Collins, Ph.D. (Carnegie Mellon University)
Title: [Designing oxidation catalysts and processes to advance sustainable chemistry: Stewardship for Micropollutants](#)
- 3:45 - 4:10** Awards and Closing Remarks: Norman Barlow, D.V.M., Ph.D.
- 4:10 - 4:30** Alex Torres Director, Professional Development and Career Services (American Association for the Advancement of Science)
[AAAS Career Development Course Presentation](#)



Drinking Water Contaminants and Standards: An Overview

Gloria Post, Ph.D., DABT (New Jersey Department of Environmental Protection)

Gloria Post has been a Research Scientist in the New Jersey Department of Environmental Protection (NJDEP) Division of Science, Research and Environmental Health since 1986. Her responsibilities include human health risk assessment and toxicology support for NJDEP programs. Since 2006, she has been a member of the New Jersey Drinking Water Quality Institute, an advisory body established by New Jersey law to recommend drinking water standards to NJDEP. Dr. Post has developed risk assessments for many well-known drinking water contaminants including chlorinated volatile organics, methyl tertiary butyl ether (MTBE), and perchlorate. She is the first author of the chapter on “Health and Aesthetic Effects of Drinking Water Contaminants” in the American Water Works Association *Handbook of Water Quality & Treatment* used by drinking water treatment plant personnel. Dr. Post and her colleagues have focused on the evaluation of perfluorinated chemicals in drinking water for over 10 years, and she is the first author of four publications on this topic.

Dr. Post has been a Diplomate of the American Board of Toxicology since 1990 and an SOT member since 1984. She has been a MASOT member since its founding in 1981, served as Secretary and on the Program Committee, and is currently active in the Education and Outreach Committee. She has served on several EPA Science Advisory Board panels and represented state risk assessors at the 2012 EPA Integrated Risk Information System (IRIS) Public Stakeholders Meeting. She also represents NJDEP on the New Jersey Governor’s Council for Prevention of Developmental Disabilities. She holds an A.B. with honors in Biochemical Sciences from Princeton University, a Ph.D. in Pharmacology from Thomas Jefferson University, and did post-doctoral research at Duke University. In 2010, she was the first recipient of the NJDEP Gail P. Carter Memorial Award for a major contribution to environmental science and/or use of scientific expertise to improve New Jersey’s environment. In 2014, she received the New Jersey Section of the American Water Works Association annual award for ongoing contributions to drinking water research.

Abstract

Access to drinking water that is free of unacceptable levels of contamination is expected and generally taken for granted in the U.S. It is often forgotten that disinfection of drinking water, a major public health milestone in reducing infectious disease incidence, began only a little more than a century ago. Federal and state drinking water standards were developed in the 1980s and 1990s for many chemical and microbiological contaminants that may pose health risks. However, emerging contaminants that have not yet been sufficiently addressed are now known to occur in drinking water at levels of potential

concern. This talk will present the major types of drinking water contaminants (e.g. microorganisms, disinfectant byproducts, organic and inorganic chemicals, radionuclides), their toxicological effects, and how they are evaluated and addressed by federal and state government agencies. While potential health risks are the primary basis for drinking water standards developed by USEPA and states, other factors including analytical limitations and availability of treatment removal methods are also considered. Drinking water contaminants of current toxicological and public interest will be discussed, including lead, cyanotoxins released from harmful algal blooms, Legionella, 1,2,3-trichloropropane, and per- and polyfluoroalkyl substances (PFAS).



The Never-Ending Story of Per- and Polyfluoroalkyl Substances: Immunotoxicity from Legacies to Alternatives

Jamie DeWitt, Ph.D. (East Carolina University)

Dr. Jamie DeWitt is an Associate Professor in the Department of Pharmacology and Toxicology at the Brody School of Medicine of East Carolina University (ECU). She received BS degrees in Biology and Environmental Science from Michigan State University and PhD degrees in Environmental Science and Neural Science from Indiana University-Bloomington. Dr. DeWitt completed postdoctoral training in Developmental Cardiotoxicity at Indiana University-Bloomington in collaboration with the U.S. Fish and Wildlife Service and in Immunotoxicology at the U.S. Environmental Protection Agency (EPA) in collaboration with the University of North Carolina at Chapel Hill. It was during her postdoctoral training at the U.S. EPA that she first started working with per- and polyfluoroalkyl substances (PFASs).

Dr. DeWitt joined ECU in 2008 and the focus of her lab is on emerging environmental contaminants in the aquatic environment. A major goal of her laboratory is to conduct studies on emerging contaminants to describe their immunotoxicity and then to explore their mechanisms of immunotoxicity. These contaminants include PFASs as well as pharmaceutical and personal care product pollutants. A parallel focus of her laboratory is on how environmental contaminants alter the developing immune system and how these changes to the immune system influence the developing brain. By looking at this “neuroimmune interface,” and how it is impacted by contaminants, her laboratory works to further understanding of diseases such as autism spectrum disorders and Alzheimer’s disease and other disorders that are responsive to early-life immune influences.

Dr. DeWitt has co-authored 11 primary research articles related to PFAS toxicity that include assessments of immunotoxicity, developmental immunotoxicity, developmental neurotoxicity, developmental cardiotoxicity, dosimetric anchoring, and epidemiological associations. She also has co-authored three review articles and a commentary on PFAS toxicity, two book chapters related to PFAS immunotoxicity, and edited one of the first comprehensive texts on the toxicity of PFASs. Other publications concern toxicological

effects of environmental contaminants, including their impact on human diseases. Overall, she has co-authored approximately 60 scientific publications.

Abstract

Per- and polyfluoroalkyl substances (PFASs) have received enormous amounts of attention due to widespread contamination of public drinking water supplies in exceedance of recent U.S. Environmental Protection Agency health advisory levels. While PFASs have vital importance in numerous industrial processes, a consequence of widespread use is extensive environmental contamination and accumulation in humans and wildlife. Two members of this extremely diverse group of chemicals, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), considered long-chain or legacy compounds, have been extensively toxicologically studied. However, less is known about the toxicity of many of the other PFASs, especially those that are shorter chain replacements for the legacy compounds. Sheer numbers, diversity in physiochemical properties, environmental persistence, bioaccumulation, internal breakdown, and toxicity of these alternatives are largely unknown, posing an enormous regulatory challenge.

Concordance between studies of experimental animal models and exposed human populations has established the immune hazard of PFOA and PFOS to humans. However, unified mechanisms of PFAS-induced immunomodulation have not been identified, making comparisons among compounds challenging if not impossible. This talk will highlight what we know about the immunotoxicity of the legacy compounds, what we think we know about the mechanisms behind the immunotoxicity of the legacy compounds, and what we anticipate as challenges in understanding the immunotoxicity of the alternative compounds.



Ambassador Award Lecture

Poison in the Well: Exposure, Health Effects and Remediation of Arsenic in Drinking Water in Bangladesh

Joseph H. Graziano, Ph.D., Professor of Environmental Health Sciences and Pharmacology (Columbia University, Mailman School of Public Health)

Dr. Joseph Graziano (Ph.D. Rutgers University, NJ, 1971) was an Assistant Professor at Rockefeller University (1973-1978) and Cornell University (1974-1978), an Associate Professor of Pediatrics and Pharmacology at Cornell University Medical College (1978-1979), Associate Professor of Pharmacology (Pediatrics) at Columbia University College of Physicians and Surgeons (1979-1990), Professor of Pharmacology (Pediatrics) at Columbia University College of Physicians and Surgeons (1990-1991) Professor of Pharmacology (in Pediatrics) and Public Health (Environmental Health Sciences) Columbia University, College of Physicians and Surgeons (1991-2001), Founding Director, P30 NIEHS Center for Environmental Health in Northern Manhattan, Head, Division of Environmental Sciences, (1992-2001) Chairman, Department of Environmental Health Sciences (2001-2002) Associate Dean for Research, Columbia University Mailman School of Public Health (2002-2010) Interim Chairman, Department of Environmental Health Sciences, (2008-2010) Director, Columbia University Superfund Basic Research Program (2001-present), Professor of Environmental Health Sciences

and Pharmacology, Columbia University College of Physicians and Surgeons (2015-2016) Interim Chairman, Department of Environmental Health Sciences (2008-2010), Director, Columbia University Superfund Basic Research Program (2000-present) Professor of Environmental Health Sciences and Pharmacology, Columbia University, College of Physicians and Surgeons (2001-present) and Interim Chairman, Department of Environmental Health Sciences and Pharmacology, Columbia University, College of Physicians and Surgeons (2015-2016). Dr. Graziano's research career has been devoted to understanding the consequences of exposure to metals, both on the molecular and population levels. In the past, Dr. Graziano's research was almost entirely devoted to lead poisoning, which has contributed to understanding the adverse effects of lead exposure on childhood development. As a pharmacologist, his laboratory developed the oral drug (Succimer) that is now widely used to treat children with lead poisoning. More recently, Dr. Graziano's work has taken him to Bangladesh, where his current research is aimed at understanding the consequences of arsenic exposure on the Bangladeshi population, and on devising strategies to reduce toxicity and provide arsenic-free drinking water, a problem that spans beyond the political borders of Bangladesh, to much of South Asia, from India to Vietnam. Recent findings that both arsenic and manganese, both elevated in Bangladesh drinking water, are associated with cognitive deficits in children, add urgency to solving this enormous public health and environmental problem.

Abstract: Many unresolved issues remain today regarding human exposure to inorganic arsenic (As) from drinking water. In some cases, elevated As concentrations in untreated ground water are purely the result of natural, fundamental geochemical and hydrological processes that are still not fully understood. In other cases, the release of As to groundwater water from sediments with natural background As concentrations is indirect and triggered by human activities. Sadly, on a global basis, more than 200 million people across 70 countries are still chronically exposed to elevated concentrations of As in drinking water.

For the past 16 years, Dr. Graziano's group has conducted multi-disciplinary research in Bangladesh and elsewhere with funding from the U.S. NIEHS Superfund Research Program and other sources. Our program (see <http://superfund.ciesin.columbia.edu/>), entitled "Health Effects and Geochemistry of Arsenic," continues to address important biomedical and non-biomedical dimensions of these complex problems. His presentation will provide a summary of highlights of the findings of our biomedical research that has taken place in Araihasar, Bangladesh, a region where naturally occurring As in well water has led to a wide range of human exposures, with water As concentrations ranging from very low to very high. For example, a recent survey of 10,879 wells in Araihasar found household well water concentrations ranging from <0.1 to 1200 ug/L. He will also discuss his group's efforts to provide As-safe drinking water to study participants as well as the broader population.



Designing oxidation catalysts and processes to advance sustainable chemistry: Stewardship for Micropollutants

Terry Collins, Ph.D., Carnegie Mellon University

Terrence J. Collins Ph.D., Hon FRSNZ, is the Teresa Heinz Professor of Green Chemistry and the Director of the Institute for Green Science (IGS; <http://greenscienceinstitute.org/>) at Carnegie Mellon University in Pittsburgh, Pennsylvania. He was born and raised in Auckland, New Zealand, and is a citizen of both New Zealand and the United States. He holds numerous academic and public awards.

Abstract: The IGS team, partnered with a large group of multidisciplinary, multinational collaborators, is focused on accurately *identifying* and *finding solutions* for major public health and environmental challenges of everyday-everywhere commercial chemicals. In the *identification* section of this lecture, an overview of the scientific and cultural challenges of green chemistry will be presented that Dr. Collins believes should become bread and butter content in chemical education to deal with the dramatic rise in noncommunicable, potentially heritable conditions related to chemical exposures. Major mechanisms by which manmade chemicals adversely impact public health and the environment through low dose processes will be sketched. The methods of pathfinding toward a sustainable chemical enterprise will be reviewed. Critical take-home messages will be concerned with the low dose adverse effects of endocrine disrupting chemicals.

In the *solutions* section of this lecture, the work of the IGS in inventing small-molecule mimics of oxidizing enzymes that outperform the enzymes will be sketched. The development of these catalysts, called *TAML* and *NewTAML* activators, has served as a beta-testing platform for learning how to integrate the performances that have historically dictated the commercial viability of chemicals, *the technical and cost performances*, with typically externalized performances that matter most for sustainability, *the health, environment and fairness performances*. Beta testing occurs through *Tiered Protocol for Endocrine Disruption*, or TiPED, the most advanced scientific assay system for identifying endocrine disruptors.

It will be shown how TAML activators can enable important industrial processes to be carried out Nature's way using processes that are backed by extensive safety testing. The work is aimed at providing potent tools for reducing and eliminating the exposure of people and the environment to chemicals that elicit low dose adverse effects. Research into the use of TAML activators for the purification of water of chemical contaminants and hardy pathogens will be detailed along with other technologies that are important for improving public health. Critical take-home messages will be concerned with the revolutionary catalytic properties across both chemistry and biology of TAML and NewTAML activators.

MASOT Student Achievement Award

The MASOT Student Achievement Award is a \$1000 award that was developed to recognize significant achievements of MASOT doctoral student members. Criteria that will be considered for this award include academic excellence, outstanding scientific achievement in the field of toxicology, and leadership and service to SOT, MASOT and the applicant's academic institution.

Student Poster Awards

Most Outstanding

Outstanding

Honorable Mention

Membership Choice

Post-Meeting Career Development Presentation



In this short presentation, Director of Professional Development and Career Services, **Alex Torres**, will be introducing the AAAS Career Development Center. This is a new online education platform created by AAAS to support early career scientists and engineers. The AAAS Career Development Center offers career and professional development online learning courses that support the career lifecycle of scientists and engineers in academia, industry, government and non-profit organizations. The online offerings are primarily focused on non-technical topics such as communications, career development, advocacy, proposal writing, and management skills.

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