SOT Mixtures Specialty Section

Volume 11

February 2021

President's Message

Thomas F. Webster, D.Sc.
Mixtures SS President
Boston University School of Public Health

Dear Members,

What a year 2020 was, even if we just focus on the pandemic! In early March 2020 I was visiting family in San Diego and planning to take the train to Anaheim for the SOT meeting, mixtures poster in hand and looking forward to seeing you all. But as the pandemic worsened, I remember worrying about what was going to happen, and then hearing that the annual meeting was cancelled. I immediately changed my plans and headed back to Boston. None of us really knew then what lay in store for us (!), although I suppose I had my forebodings as I used to teach about the 1918-1919 influenza pandemic. As a professor of public health and someone who does research in both toxicology and epidemiology, I was rapidly sucked into discussions and plans about the pandemic. Here we are nearly a year later, approaching half a million deaths in the USA, the worst public health crisis in a century. Fortunately, modern vaccine technology and old-fashioned public health practice—social distancing, masks, etc.—mean that we can expect a return to normality, including a 2022 SOT meeting in person.

SOT will be virtual in 2021, as will the MixSS events. I look forward to seeing you all at the first ever Virtual MixSS Reception on March 15 from 5:30–6:30 PM EST!

In addition to awarding prizes for best mixtures presentations, we also have planned an exciting discussion of hot topics in mixtures research. Please come, we'd love to see you, but BYOB! In addition to the mixtures poster session on March 16 from 11:15 AM to 1 PM, there will be a number of other mixtures related events during the conference as detailed later in this newsletter.

How might the pandemic change our field? Although we have tended to think mostly about chemical mixtures, I think that the resurgent threat of infectious disease implies that we should pay more attention to joint exposure to chemicals and micro-organisms, a process that was already underway. The effect of chemical exposures (e.g. PFAS) and vaccine response is just one example. The health disparities during the pandemic point out yet again that health also depends on social factors. In mixtures epidemiology, the interaction of social factors and chemical/physical exposures has taken on new urgency. Furthermore, as we get better and better at measuring the exposome in all of its facets, there is a clear need for new methods to help us figure out how to analyze and apply such data.

I believe that mixtures research has a crucially important and bright future and one that is interdisciplinary, bringing together toxicologists, epidemiologists, exposure scientists, mathematical modelers, statisticians, risk assessors and others. The SOT Mixtures Specialty Section is actually one of the few professional organizations that specializes in this field of research. Please invite your colleagues to join us!

Inside this Issue

2021 SOT Annual Meeting

Mixtures at SOT

Continuing Education Course (CE02): *Advances in Single Cell Genomic Analyses for Toxicological Testing*
March 12th from **11:00 am – 2:45 pm**
Chair: Justin Colacino (University of Michigan), **Co-Chair:** Bhattacharya (Michigan State University)

MixSS Reception
March 15th from **5:30 -6:30 pm**

Mixtures Poster Session
March 16th from ***11:15 am – 1 pm***

Symposium Session: *It Is Not Just Air: Exposure to Indoor Air Pollution, Diagnostic Tools, and Evaluation of Health Effects*
March 17th *from* ***11:30 am – 2:15 pm***
Chair: Esra Mutlu (NIEHS/NTP), **Co-Chair:** Lupita Montoya, (University of Colorado Boulder)

Continuing Education Course (CE06): *Insider Secrets for Design and Analysis of Defined-Mixture Experiments*
March 19th from **9:30 – 10:30 am**
Chair: Jane Ellen Simmons (USEPA/CPHEA), **Co-Chair:** Richard Hertzberg (Emory University)

Workshop Session 1: *Tackling the Potential Human Health Impacts of Microplastics and Nano plastics: Challenges for Toxicologists in the Assessment of Real-World Mixtures*
March 22nd from ***11:15 am – 2 pm***
Chair: Nigel Walker (NIEHS/NTP), **Co-Chair:** Anil Patri (US FDA/NCTR)

Workshop Session 2: *The Community Exposome: Effects of Environmental Contamination on Health Disparities and Marginalized Populations through the Lens of a Toxicologist*
March 22nd from ***2:45 pm - 4:15 pm***
Chair: Judy Zelikoff (New York University), **Co-Chair:** Courtney Selenic, (Wright State University)

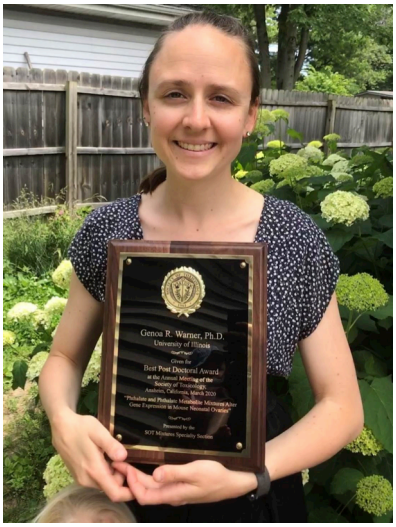
Symposium Session: *Botanical Mixtures: Predictive Approaches to Evaluating Pregnancy, and Reproductive and Developmental Health*
March 24th from ***11:45am – 2:30pm***
Chair: Madelyn Huang, (NIEHS/NTP), **Co-Chair:** Catherine Mahony (Procter & Gamble, UK)

2020 MixSS Award Winners

Best Mixtures Abstract: Development of an AOP Network for the Developmental Effects of Exposure to the PFAS. LE Grey, USEPA

Graduate Student Award: Alyssa Merrill. Endocrine Disrupting Chemical Exposure during Pregnancy and Metabolic Reprogramming. A. K. Merrill, T. Anderson, E. Marvin, K. Conrad, B. Lawrence, M. Susiarjo, D. Cory-Slechta, and M. Sobolewski. University of Rochester, Rochester, NY.

Post-doctoral Award: Genoa Warner. Phthalate and Phthalate Metabolite Mixtures Alter Gene Expression in Mouse Neonatal Ovaries. G. R. Warner, J. S. Yue, and J. A. Flaws. University of Illinois at Urbana-Champaign, Champaign, IL.



Genoa Warner
U. Illinois

Alyssa Merril
U. Rochester

Top 5 2020 Abstracts (listed alphabetically)

Y Chang (Oregon State University and U. North Carolina**)**. Linking Co-regulated Gene Modules with Polycyclic Aromatic Hydrocarbon-Related Cancer Risk (RPF) in the 3D Human Bronchial Epithelium.

DL Cucchiara (University of Florida, Colorado School of Mines, Applied Limnology Professional.**)**. Using Gene Expression Analysis to Support Risk Assessment of Metal Mixtures in Freshwater Systems.

LE Grey (USEPA). Development of an AOP Network for the Developmental Effects of Exposure to the PFAS.

J Schlezinger (Boston University School of Public Health). Modeling Induction of Proximal and Distal Endpoints following PPARγ Activation by Ligand Mixtures.

DN Williams (Oak Ridge Institute for Science and Education and USEPA). Identification of Co-occurrence Patterns of Persistent Organic Pollutants with Data Mining Methods.

2020-21 Joint MixSS-RASS Webinars:

Webinar September 9, 2020: Paul Price. *Organizing Mechanism-related Information on Chemical Interactions Using a Framework based on Aggregate Exposure and Adverse Outcome Pathways.*

Webinar January 13, 2021: L. Earl Gray Jr., Justin M. Conley. *Characterization of Developmental Toxicity and Adverse Outcome Pathways (AOPs) for Emerging PFAS — Individual Compounds and Mixtures*

https://www.toxicology.org/groups/ss/mix/Downloads.asp

A Student's Perspective

Toxicity screening of environmental chemicals such as Pesticides, PAHs, PCBs, etc. is typically done on a single chemical basis. While the toxicological information obtained through current research efforts is valuable, it does not address the issue of exposure to mixtures of environmental compounds. In a real-life scenario, humans are exposed to multiple chemicals through various exposure routes. The complexity of these exposures creates a need to evaluate chemicals on a mixture basis rather than just single chemical. The purpose of my research is to identify novel techniques that can be applied towards assessing toxicokinetics related to environmental compounds in both single and mixture settings. Another challenge my research is addressing is the ability to accurately predict *in vivo* effects through *in vitro* assays. The current paradigm shift in toxicology is moving away from traditional animal testing and relying more on *in vitro* methods that are able to effectively mimic human physiology. One current way we hypothesize we can achieve this goal is through the use of organs-on-a-chip. We can create designed mixtures and test them through a variety of specialized tissue chips such as liver and kidney chip. Both of these organ systems play a major role in the toxicokinetics associated with chemical mixtures. However, we do recognize that designed mixtures prepared in lab may not accurately reflect exposure scenarios present in real life. In order to address this issue, one of my current research efforts is applying untargeted analysis to real environmental water samples. Being able to identify the chemical compositions of environmental samples enables my research to have a more refined and focused approach towards creating mixtures that accurately reflect chemical presence in the environment. My overall goal is to provide toxicokinetic data derived from testing chemical mixtures to better inform regulatory agencies that oversee environmental chemical policy. We acknowledge that there are many remaining questions pertaining to mixtures; however, we believe that our research will be crucial towards understanding the toxicity associated with exposure to multiple chemical compounds from the environment.

Alan Valdiviezo
3rd Year Doctoral Student
Interdisciplinary Faculty of Toxicology, Texas A&M University

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Krisa Camargo (GSLC Representative; bottom right)









Thank You to our 2019-2020 Officers!

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THANK YOU!

SOT Annual Meeting & ToxExpo
VIRTUAL EVENT • MARCH 2021

"SEE YOU" AT SOT!