

# Mixtures Specialty Section

*A mixture of business, social and news*

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## *From the President*

Dear SOT Mixtures Specialty Section (Mix SS) members,

Hope you all are enjoying summer! After two challenging years of coping with the pandemic, it's good to see life slowly coming back to normal.

I was excited to hear that several of you were able to attend the SOT 2022 Annual Meeting in San Diego. Unfortunately, I was not able to attend the meeting in-person and I missed meeting you all! Thanks to all the Mix SS Executive Committee members who were there in-person and helped lead and manage all Mix SS events at the SOT Annual Meeting.

We learned about the passing of our dear colleague, Dr. Jane Ellen Simmons right before the Annual Meeting and we are deeply saddened by the loss. I still remember my first meeting with her when I attended a CE course where she was presenting. She was passionate about mixtures research, full of enthusiasm, and always willing to discuss new ideas. Dr. Simmons was committed to advancing the science on mixtures and encouraged young scientists. As a tribute to her contributions, Mix SS is working on organizing an award in her name.

The Mix SS held its first mentoring event at the 2022 SOT Annual Meeting. Thanks to Dr. Courtney Roper for leading this effort and all the officers who helped make it a success. This mentoring event provided toxicology trainees in their early career an opportunity to interact and network with a panel of experts from different sectors...

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# From the President cont'd

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...i.e. government, industry, academia, CRO/consulting, including a unique perspective from recruiting experts to explore different career paths in mixtures.

Thanks to all who responded to our new membership survey and volunteered for different Mix SS committees. In the next few months, you will be hearing from Mix SS Executive Committee regarding next steps related to each of the committees. We received some good suggestions on topics for the future webinars and sessions. We are looking forward to working with you all and bringing your ideas fruition.



Attendees listen to announcements and awards at the 2022 Mix SS reception.

As I was not able to attend, Dr. Paul Price, our current President has graciously agreed to share highlights below from Mix SS events at SOT 2022:

*Mix SS had a very successful annual meeting in San Diego. The members of the Mix SS and Exposure specialty section offered a continuing education course entitled "How advances in exposure science and toxicology are changing assessments of the effects of chemical mixtures on human health". The course had over 150 students and received positive feedback. A symposium, was presented on mixtures of chemical and non-chemical stressors resulting from climate change along with two sessions on mixtures of PFAS and neurodevelopmental effects of combined exposures. Forty-one posters on a wide range of mixture topics were also presented at the annual meeting.*

*The Mix SS annual meeting/reception was marked by a remembrance ceremony for the passing of Dr. Jane Ellen Simmons former president of the Mix SS, leader in the field of mixtures research, and friend and mentor to many mixture toxicologists. Dr. Linda Birnbaum and many others spoke in remembrance of Jane Ellen as a person and as scientific researcher. The meeting also included a "Mixtures mixer" where small groups of members gave brief presentations (elevator pitches) as a way of rapidly sharing their research and networking with fellow members.*

*The specialty section made two trainee awards one to Ms. Lucie Ford for her poster "A Population-Based Human In Vitro Approach to Characterize Inter-Individual Variability in Responses to Complex Mixtures" and the second to Ms. Celeste K. Carberry for "Wildfires and Extracellular Vesicles: Linking Cardiopulmonary Hypoxia Signaling Alterations across Tissues in Mice Exposed to Variable Biomass Smoke." Our congratulations to the two winners and our thanks to Wiley publishing for their support of the awards.*

*Mix SS also presented the best abstract award to Dr. Jolyn Fernandes...*

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# From the President cont'd

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*...of the University of Oklahoma Health Sciences Center for her poster Metal Exposome Influenced by Fishing Activity Reveal Differences in Metabolomic Association Networks in Cheyenne River Sioux Tribal Community. Awards for four other outstanding abstracts were presented to Shayla Victoria (University of Mississippi), David Leuthold (Helmholtz Centre for Environmental Research), Qiang Zhang (Emory University) and Tyler Armstrong (University of North Texas).*

*Finally, the Mix SS sponsored a mentoring event for young researchers. This event was held prior to the reception. At this event, leaders in the field shared their views on building careers in the fields of mixture exposure and mixture toxicity research. Approximately thirty graduate students and young researchers had a chance to ask questions about careers in academia, government, industry, and consulting. The feed back from participants was very positive and the event may be repeated in the future.*

It has been an honor to serve as the President of Mix SS this year. I want to thank all of the members of the Mix SS 2021-2022 Executive Committee. I was fortunate to have a strong, enthusiastic and dedicated leadership team. Despite the challenges due to the pandemic, we kept going and made progress in several areas. We added new committees, launched Mix SS LinkedIn page, kicked off the first Mix SS mentoring event at SOT Annual meeting, and conducted our first membership survey. I'd like to welcome our new officers Drs. Courtney Roper (Vice President-Elect), Allison Philips (Junior Councilor), Rachel Dee (Post Doctoral Representative), and Ms. Greylin Nielsen (Graduate Student Representative). I'd also like to thank Drs. Paul Price (President), Esra Mutlu (Vice President), Jennifer Schlezinger (Secretary/Treasurer), Justin Conley (Senior Councilor) and Brianna Rivera (Ad-hoc Graduate Student Representative) for continuing with their responsibilities and going above and beyond their commitments to support the leadership team. Also, special thanks to SOT staff who have helped us out with a variety of questions and logistics. If you have any thoughts and suggestions to help improve our specialty section or would like to share your scientific and career achievements, please feel free to contact any of the officers or me.

Sincerely,

Mansi Krishan, PhD, DABT, ERT  
President, Mix SS (2021-2022)



Mix SS members networking at the 2022 Mix SS reception.

# SOT 2022 Annual Meeting Recap

## Mentoring Panel at 2022 SOT Mixtures SS Reception



This year prior to the Annual Meeting Mixtures Specialty Section Reception we hosted a mentoring event for early career scientists sponsored by **InSphero Inc.** and **SOT**.

- A panel of experts from government, industry and academia were present
- Each mentor gave information on their background and career path
- Prior to the event trainees submitted questions and topics they were interested in learning about
- Trainees were invited to attend and ask questions
- Overall the event was a success with over 30 trainees in attendance

Special thanks to the panel of experts **Danielle Carlin, Sue Grepper, Terry Leyden, Paul Price** and **Thomas Webster**. Please let us know if you have topics or mentoring event ideas for a 2023 event!

*–Courtney Roper, Senior Councilor  
& Esra Mutlu, Vice President*

## The Virtual Perspective

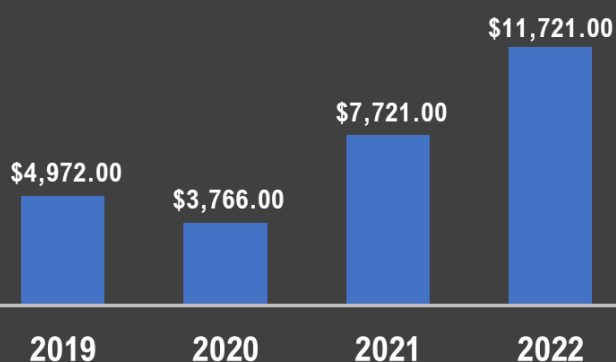
There is no replacement for attending a scientific conference and interacting face-to-face with colleagues and scientists from across the field of toxicology. Often it is the unplanned, middle-of-the-hallway-while-you're-walking-to-lunch conversations that can be the most fruitful and memorable and those occurrences don't happen virtually. That said, there is also clearly a great deal of value in the meeting being offered with a virtual option. For myself, the best option this year was attending virtually and I greatly appreciated the ability to do that versus not being able to attend at all or having to travel and the strain it would put on my family. The main benefit I found from the virtual option was the opportunity to spend more time taking in the science the meeting had to offer. Remotely, I could closely investigate posters because I was not limited to a set session time to run around and try to view all the ones I was interested in. Similarly, when there were two sessions that I was interested in that had overlapping timeframes, I could choose one and then go back later and watch the recording of the missed session. I definitely missed catching up with friend and colleagues and the opportunity to grow my network, but I also got to take in the meeting content more at my own pace. You win some, you lose some - thanks to SOT for doing the legwork to make virtual attendance possible. Looking forward to 2023.

*–Justin Conley, PhD, USEPA, RTP, NC*

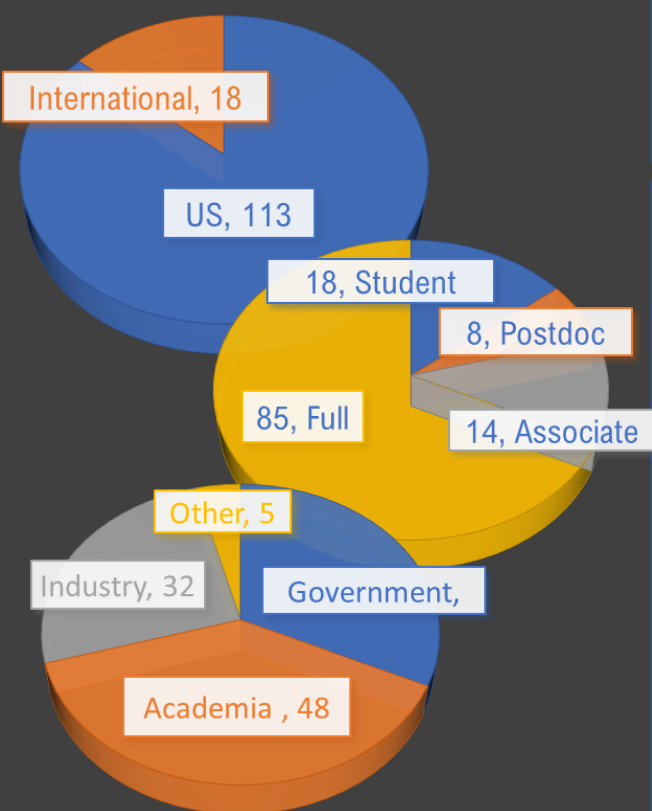
# Meeting Recap Cont'd

## Mix SS Stats

### Budget



### Membership Breakdown



## Top Overall Mixtures Abstracts for SOT 2022

### 1. Jolyn Fernandes, University of Oklahoma

*Metal Exposome Influenced by Fishing Activity Reveal Differences in Metabolomic Association Networks in Cheyenne River Sioux Tribal Community*

### 2. Shayla Victoria, University of Mississippi

*Indoor Fuel Sources Influence PM<sub>2.5</sub> Chemical Composition and Alter Zebrafish (*Danio rerio*) Behavior*

### 3. Wibke Busch, PhD, Helmholtz Centre for Environmental Research

*Combined Effects of Chemical Mixtures Are Predictable for the Whole Transcriptome: A Proof-of-Concept Study with Zebrafish Embryos*

### 4. Qiang Zhang, Emory University

*A Flexible Physiologically Based Pharmacokinetic (PBPK) Model for Mixtures of Dioxin-Like Compounds*

### 5. Tyler Armstrong, University of North Texas

*Traffic-Generated Pollutant-Exposure Combined with High-Fat Diet Exacerbates the Expression of Factors Associated with Alzheimer's Disease Pathophysiology in Aged C57BL/6 Wild-Type Mice*

## Mix SS Endorsed 2022 SOT Sessions

**Continuing Education:** How advances in exposure science and toxicology are changing assessments of the effects of chemical mixtures on human health

**Symposia:** A Holistic View on the Impacts of Climate Change

PFAS sum vs some? Science and Policy of Mixtures

**Workshop:** This is Your Brain on Mixtures: Neurodevelopmental Effects of Combined Exposures

# 2022 SOT Award Winners

## Trainee Award Winner:



### **Lucie Ford, Texas A&M University**

*A Population-Based Human In Vitro Approach to Characterize Inter-Individual Variability in Responses to Complex Mixtures*

Lucie Ford is originally from New Brunswick, Canada. She received her Bachelors in Biology from Salve Regina University in Newport, Rhode Island. During her undergraduate studies, she worked with human hepatocytes and exposure to PFAS chemicals. Lucie is a 2nd year PhD candidate in Dr. Ivan Rusyn's laboratory at Texas A&M University, in College Station, Texas. Her PhD research focuses on inter-individual variability in responses to environmental chemicals and mixtures. In her free time, she enjoys sailing, skiing, baking, and spending time with family and friends.



## Trainee Award Winner:



### **Celeste K. Carberry, University of North Carolina**

*Wildfires and Extracellular Vesicles: Linking Cardiopulmonary Hypoxia Signaling Alterations across Tissues in Mice Exposed to Variable Biomass Smoke*

Celeste Carberry received her Bachelor of Science in Public Health (B.S.P.H.) in Environmental Health Sciences from the University of North Carolina at Chapel Hill. During her undergraduate studies, she evaluated exposomic, genomic, and epigenomic alterations in placentas from a cohort of patients with preeclamptic pregnancies. Celeste is now a third year PhD student in Environmental Health Sciences and Engineering in Dr. Julia Rager's laboratory at the University of North Carolina at Chapel Hill. Her PhD research investigates extracellular vesicles as a mechanism of toxicological effects related to environmental exposures, including wildfires and per and polyfluoroalkyl substances (PFAS). In her free time, she enjoys graphic design and all things crafty.



## Best Overall Abstract:

### **Jolyn Fernandes, University of Oklahoma Health Sciences Center**

*Metal Exposome Influenced by Fishing Activity Reveal Differences in Metabolomic Association Networks in Cheyenne River Sioux Tribal Community*

Dr. Jolyn Fernandes is an Assistant Professor of Pediatrics and Associate Director of Metabolomics at the University of Oklahoma Health Sciences Center (OUHSC), College of Medicine. With a particular focus on metallomic and metabolomic strategies, she uses diverse cellular and molecular integrated approaches to identify key adverse and beneficial molecular pathways that associate pre- and postnatal environmental exposures with offspring neurodevelopmental and metabolic disease susceptibility. Dr. Fernandes received her Ph.D. in 2015 in Biochemistry and Molecular Biology from OUHSC and was a postdoctoral fellow at Emory University School of Medicine. She has over 20 publications and her award-winning work has been presented across the country and world.



# Outgoing Officers

2021–2022



*Past President*  
Thomas Webster



*President*  
Mansi Krishan



*Vice President*  
Paul S. Price



*Vice President-Elect*  
Esra Mutlu



*Secretary/Treasurer*  
Jennifer Schlezinger



*Senior Councilor*  
Courtney Roper



*Junior Councilor*  
Justin Conley



*Postdoc Rep*  
Elizabeth Kakaley



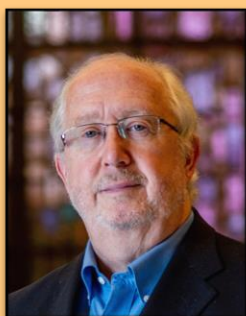
*Graduate Student Rep*  
Brianna Rivera

2022–2023

# Incoming Officers



*Past President*  
Mansi Krishan



*President*  
Paul S. Price



*Vice President*  
Esra Mutlu



*Vice President-Elect*  
Courtney Roper



*Secretary/Treasurer*  
Jennifer Schlezinger



*Senior Councilor*  
Justin Conley



*Junior Councilor*  
Allison Phillips



*Postdoctoral Rep*  
Rachel Dee



*Ad hoc Graduate  
Student Rep*  
Brianna Rivera



*Graduate Student Rep*  
Greylin Nielsen

# Meet Your New Officers

**Allison Phillips**  
*Junior Councilor*



Dr. Allison Phillips is a Toxicologist at the US Environmental Protection Agency, where she performs chemical hazard assessments and conducts research involving cumulative risk assessment and new approach methodologies. She received her doctorate in Environmental Chemistry & Toxicology from Duke University in 2019, was employed as a toxicology consultant at Arcadis, U.S., and completed a postdoctoral fellowship at US EPA. Dr. Phillips currently co-chairs the Study Reporting Tool Committee of Benchmarking and Publications for Non-Targeted Analysis (BP4NTA). She has authored or co-authored 26 peer-reviewed publications.

Dr. Rachel Dee is a postdoctoral fellow at the National Institute of Environmental Health Sciences, where she assess the potential toxicity of chemical, pharmaceutical, and other environmental agents selected for study at National Toxicology Program. In addition, Dr. Dee works to bolster the NTP's capabilities to assess cardiotoxicity caused by environmental agents. Dr. Dee received her doctorate in Pathology from the University of North Carolina at Chapel Hill in 2019, where she studied mechanisms of blood pressure regulation within the vasculature. In her free time, Dr. Dee likes to run, do yoga, or read a good book in her hammock.

**Rachel Dee**  
*Postdoctoral Rep*



**Greylin Nielsen**  
*Graduate Student Rep*



Greylin Nielsen is a PhD Candidate in the Department of Environmental Health at Boston University School of Public Health where she works in Dr. Jennifer Schlezinger's lab. Her dissertation research focuses on using human-relevant systems to probe the nuclear-receptor mediated effects of per-and polyfluoroalkyl substances (PFAS) on liver function and lipid homeostasis. Additionally, she is interested in applying data-driven risk assessment methods to quantify population-level health effects associated with exposure to non-cancer causing agents. She leverages her training in molecular toxicology to understand the low-dose effects of chemical exposures at the population level. Greylin received her BA in Biology from Smith College and has an MPH in environmental health. She has used her training in and dedication to public health throughout the pandemic as a volunteer with the Cambridge Department of Public Health. In her free time, Greylin enjoys exploring remote landscapes both near and far through rock climbing, mountain biking, and trail running.

A tribute to a valued colleague and dear friend:

**Jane Ellen Simmons**

**September 8, 1952 - March 19, 2022**



Jane Ellen Simmons of Durham, NC passed away on March 19, 2022 after a short illness, surrounded and supported by her family. She was born in 1952 in Asheville, NC and spent her first 18 years on the parental family farm near the Blue Ridge Mountains close to Marion, NC. Upon finishing high school, she came down to Chapel Hill and began her studies at the University of North Carolina, earning a B.S. in Zoology, a M.S.P.H. in Environmental Management and Protection, and a Ph.D. in Toxicology from the UNC School of Public Health. After finishing her studies, she joined the US Environmental Protection Agency, Research Triangle Park, NC, as a Toxicologist. At the EPA she had an

active career as a Researcher and Branch Chief until the day of her passing. She conducted important studies in areas like the toxicity of drinking-water-disinfection byproducts, the toxicity of chemical mixtures, and the health effects of exposures to agents like lead and ozone. Jane Ellen was an enthusiastic and deeply caring person who touched many people's lives, both in the community and in her place of work. She cared deeply about our stewardship of the Environment and the protection of all natural life. She will be missed by many.

**COMING FALL 2022: SPECIAL JANE ELLEN TRIBUTE ISSUE**

Do you have a picture of Jane Ellen  
or a story about her you'd like to share?

Please send to [Rachel Dee](#) by September 2nd, 2022

# Looking Ahead: SOT 2023

## Proposal Review

In late April, the Mix SS Program sub-committee began pre-review for SOT 2023 session proposals. During this initial round of review, the sub-committee was able to provide feedback to strengthen several “pre-proposals,” as well as offer advice on potential speakers for various topics, etc.

After SOT’s session proposal deadline on May 16<sup>th</sup> 2022, the sub-committee received a total of five proposals that included a Continuing Education course, workshops and symposiums. Each proposal was reviewed and scored based on:

- 1) How well the session was developed
- 2) If the speakers’ professional perspective was balanced
- 3) Scope
- 4) Relevancy to mixtures
- 5) Whether the session was timely and not redundant to past sessions.



**62nd Annual Meeting  
& ToxExpo • Nashville, TN  
March 19–23, 2023**



Have a topic you’d like to see endorsed by the Mix SS in the future?

[Submit your ideas HERE](#)

## HELP US RECRUIT EMERGING TOXICOLOGISTS!

SOT ToxScholar program supports presentations to increase awareness of toxicology as a science and as a career field.

At institutions that are

- Primarily undergraduate
- With a high proportion of undergraduates from underrepresented groups
- In developing countries



We need YOU to be a ToxScholar. [Apply for funding.](#)

Faculty United for Toxicology Undergraduate Recruitment and Education (FUTURE) Committee



## New Logo Alert!

As part of the effort lead by SOT’s creative team, the Mixtures Specialty Section was given the opportunity to redesign our website and logo. As part of this redesign officers, of the Mixture Specialty Section decided to focus on the integration of three central themes to mixtures toxicology: non-chemical stressors, cumulative exposure, and chemical interactions. The three different colors in the logo represents the integration and influence of these factors on human and environmental health.

## Important Upcoming Dates

March 27-31, 2023 .....	<a href="#">SOT Nashville 2023</a>
August 1, 2022 .....	Registration and Housing open
August 15 <sup>th</sup> – December 1 <sup>st</sup> , 2022 ..	Abstract submission
October 9, 2022 .....	SOT Awards deadline
January 31 <sup>st</sup> , 2023 .....	Mixtures SS <a href="#">Best Overall and Best Student/Postdoc Awards</a> Deadline



Are you on LinkedIn? Now we are too! Connect with the Mixtures Specialty Section on LinkedIn to stay up to date on Specialty Section announcements, SOT Annual Meeting deadlines, and upcoming webinars.

[Find the MixSS LinkedIn Page HERE](#)