Vol 14 Issue 1 Sep. 2023

Mixtures Specialty Section

A mixture of business, social, and news

In this Issue

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From the President

Dear SOT Mixtures Specialty Section (MixSS) members,

I hope you are doing well and enjoying the fall. We had an amazing meeting at SOT 2023 in Nashville, and it was great to see you all! As the new President of MixSS, I would like to welcome our new officers: Drs. Shannah Witchey (Secretary/Treasurer), Christopher D. Kassotis (Junior Councilor), and Kristin M. Eccles (Postdoctoral Rep), and Ms. Ishita Virmani (Graduate Student Rep). I'd also like to thank Drs. Paul Price (Past President), Courtney Roper (Vice President), Jennifer Schlezinger (Vice President-Elect), and Allison Phillips (Senior Councilor) for their continued service to MixSS. On behalf of MixSS, I would like to express our gratitude to our outgoing officers Drs. Rachel Dee (Postdoctoral Rep) and Brianna Rivera (Graduate Student Rep (Ad hoc)), and Ms. Greylin Nielsen (Graduate Student Rep) for their hard work and commitment to our mission, and for going above and beyond to support the MixSS.

At the 2023 Annual Meeting, the MixSS held its annual mentoring event prior to the reception. One of the success metrics for this event was the number of attendees. Approximately 50 students and young investigators met with mentors from academia, government, non-profit, and industry and had a chance to explore job opportunities and learn more about different career paths. I want to give a special thanks to Dr. Courtney Roper (Vice President) for spearheading this effort year….

From the President continued…

Cont'd from pg. 2

… after year and to SOT for their financial support. If you would like to provide feedback for the past events or have any ideas for future events, please don't hesitate to contact us.

MixSS officers are working diligently as we are getting ready for the SOT 2024 Annual Meeting. We reviewed and endorsed several proposals. MixSS strongly believes that the future of mixtures research is dependent on today's students, postdocs, and young investigators. Therefore, we will be providing several awards this year. As is our tradition, this year, we will continue to give 2 awards for students and postdocs. Our sincere thanks go to RTI International for agreeing to sponsor this important award 2 years in a row! They stepped in when we were struggling to find sponsors to continue to support our students and postdocs.

In addition, this year, the MixSS is organizing a virtual event where students, postdocs, and young investigators will have the opportunity to present projects related to the mixtures field and compete for the ***MixSS Jane Ellen Simmons SOT Travel Award*** to support their travel to the 2024 SOT Annual Meeting in Salt Lake City (application to come). The travel award will be conferred in honor and remembrance of our dear colleague, Dr. Jane Ellen Simmons. Jane Ellen deeply cared about the protection of the environment, contributed immensely to the field of mixtures research and risk assessment, and supported young scientists during her career. She also helped found the MixSS. If you would like to consider sponsoring or contributing toward this award, please send an email to SOTmixSS@gmail.com or Donate Here.

Please watch out for the announcements for the 2024 Annual Meeting award applications if you would like to be considered for MixSS student, postdoc, and Young Investigator Awards.

As we look forward to meeting again in 2024, I hope that you will consider getting involved in MixSS and being a part of this amazing community that actively works to be an invaluable resource for mixtures research. Thanks to our members and their continued support, we continue to grow as a specialty section. However, we need you and your help to continue to grow. Please contact us if you would like to become an active MixSS member and learn about the upcoming opportunities such as running for an officer position or nominating someone.

Please follow us on MixSS home page and LinkedIn Page to stay up to date on MixSS events.

Sincerely,

Esra Mutlu, PhD, DABT

President, MixSS (2023–2024)

SOT 2023 Annual Meeting Recap

MixSS Endorsed 2023 SOT Sessions

1. New Approach Methodologies to Evaluate Botanical Safety
2. Challenges and Future Directions in NAM Applications to Mixtures Risk Assessment
3. Mixtures Poster Session

103

 # abstracts that are mixtures related at SOT 2023

Mentoring Panel at 2023 SOT Mixtures SS Reception

This year, prior to the Annual Meeting Mixtures Specialty Section Reception, we hosted our second annual mentoring event for early career scientists sponsored by **SOT**.

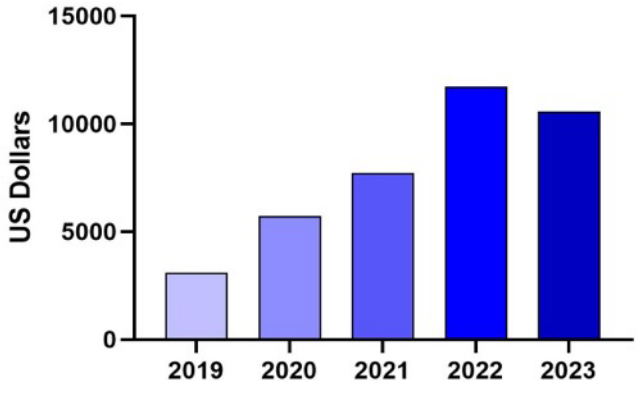
- A round table discussion with trainees and mentors at each table occurred
- Each mentor gave information on their background and career path
- Overall, the event was a success with over 50 trainees in attendance

A special thanks to all of our mentors, including: Brianna Rivera, Yvonne Rericha, Melissa Heintz, Keith Levine, Reshan Fernando, Iris Camacho, Sue Fenton, Imari Walker-Franklin, and Paul Price. Please let us know if you have topics or mentoring event ideas for a 2024 event!

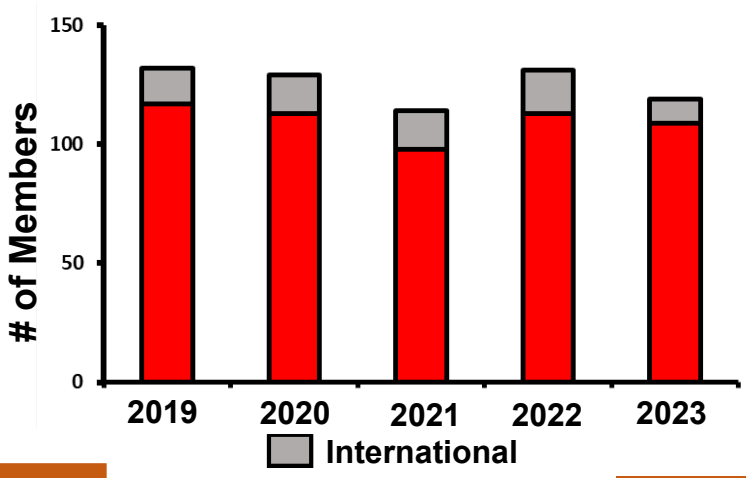
–Courtney Roper, Vice President & Esra Mutlu, President

MixSS Stats

Budget



Membership



2023 SOT Award Winners

Thank you to RTI International who sponsored two $1000 trainee travel awards. The checks were presented by Dr. Keith Levine on behalf of RTI International at the MixSS reception. Next year's awardee could be you! Please watch out for the announcements about applications and apply here.

Student Award Winner: Kimberly Gaston, US EPA

In vitro Evaluation of Polycyclic Aromatic Hydrocarbon Compound (PAC) Mixtures

Kimberly Gaston received her Master of Environmental Management (MEM) with a concentration in Ecotoxicology and Environmental Health from Duke University. Her graduate studies evaluated the potential toxicity of novel bioremediation by-products using both *in vitro* and *in vivo* methods. She is currently an Oak Ridge Institute for Science and Education (ORISE) participant at the US Environmental Protection Agency. Her work focuses on exploring *in vitro* tools to detect mixtures of environmental compounds that can have adverse biological outcomes such as polycyclic aromatic compounds (PACs). In her free time, she enjoys dancing, painting, drawing, and spending time with friends and family.

Postdoc Award Winner: Kristin Eccles, NIEHS

Mapping a Path to Disease: Quantifying the risk of exposure to environmental chemical mixtures via a common molecular target using a geospatial modeling approach

Dr. Eccles received her doctorate in Biology with a Specialization in Chemical and Environmental Toxicology from the University of Ottawa (Canada) in 2019, where her dissertation was on the use of geographic information systems (GIS) in ecotoxicology to quantify the geospatial relationships between sources of environmental chemical exposures and related health outcomes. Dr. Eccles completed postdoctoral fellowships at the University of Toronto and the Division of Translational Toxicology (DTT) at the National Institute of Environmental Health Sciences (NIEHS) in Durham, North Carolina. She recently started as a research scientist at Health Canada, leading computational toxicology research in the Exposure and Biomonitoring Division. Her work uses geospatially informed computational approaches to identify localized exposures to environmental chemicals and quantify the risk from exposure.

Top 5 Abstracts

Best Abstract: **Catalina Cobos-Uribe** (University of North Carolina at Chapel Hill) - The Upper Airway Exposomics Associated with E-cigarette Use

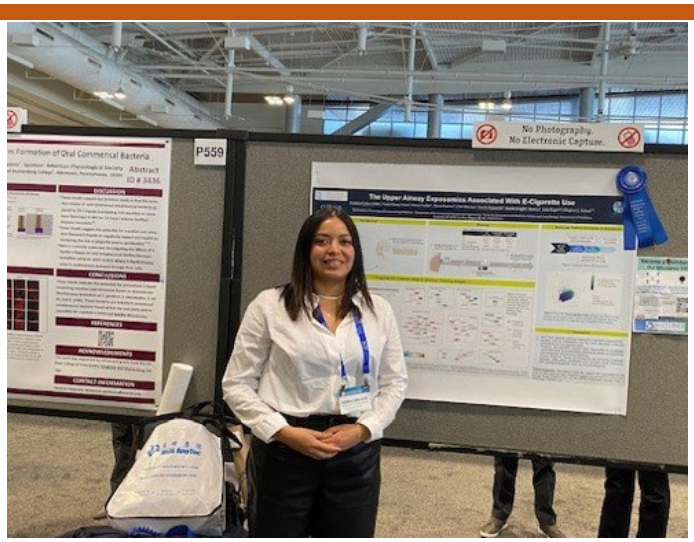
2nd Place: **Jolyn Fernandez** (University of Oklahoma Health Sciences Center) - Meconium as a Repository of *In Utero* Metal Exposures Defines Neonatal Metabolic Associations

3rd Place: **Celeste Carberry** (University of North Carolina at Chapel Hill) - Extracellular Vesicles Altered by Per- and Polyfluoroalkyl Substance Mixtures: *In Vitro* Concentration-Dependent Release, Chemical Content, and MicroRNA Signatures Involved in Liver Health

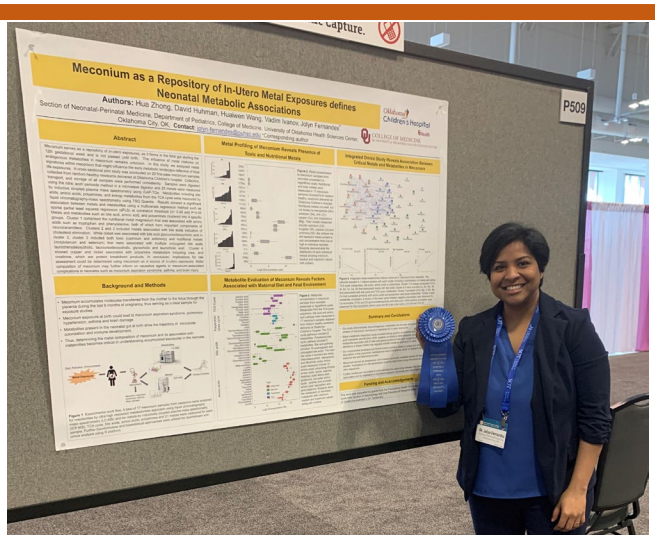
4th Place: **Cynthia Rider** (NIEHS) - *In Vivo* Evaluation of Polycyclic Aromatic Compounds and Mixtures

5th Place: **Catherine Wise** (Duke University) - Environmental Exposure Mixtures Associated with Bladder Cancer in Pet Dogs

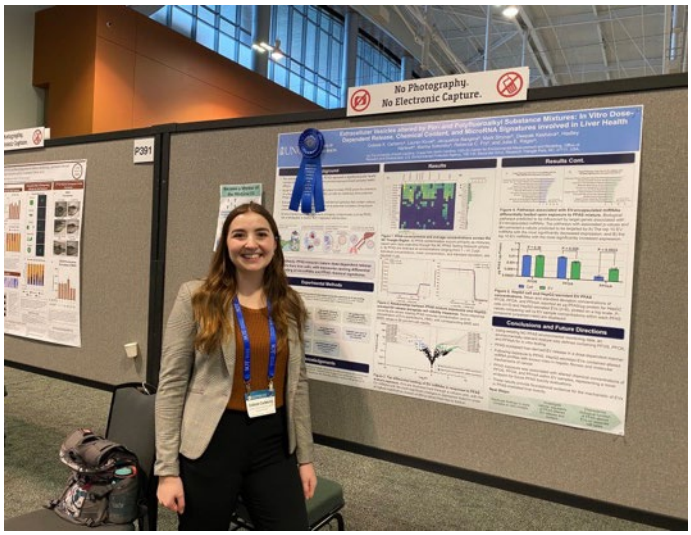
SOT 2023 Photo Album



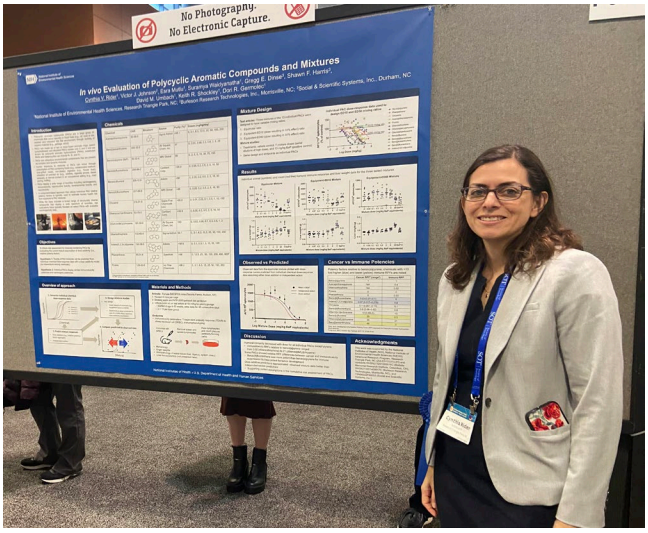
Best Abstract Winner: **Catalina Cobos-Uribe** (University of North Carolina at Chapel Hill)



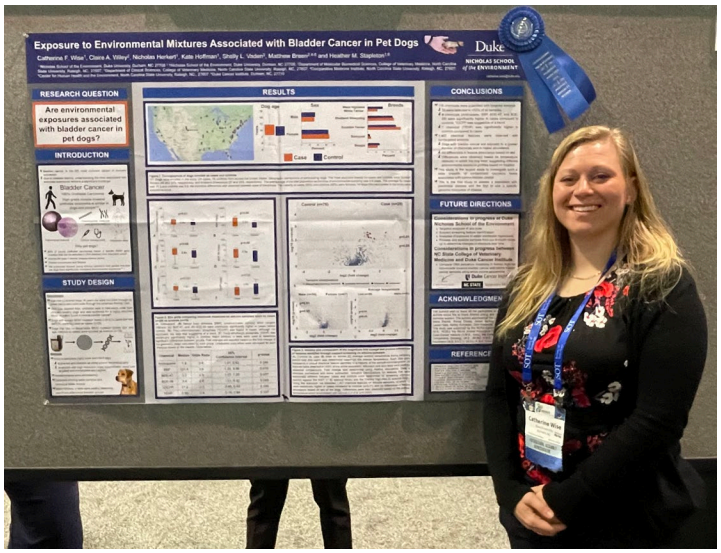
2nd Place Best Abstract: **Jolyn Fernandez** (University of Oklahoma Health Sciences Center)



3rd Place Best Abstract Place: **Celeste Carberry** (University of North Carolina at Chapel Hill)



4th Place Best Abstract: **Cynthia Rider** (NIEHS)

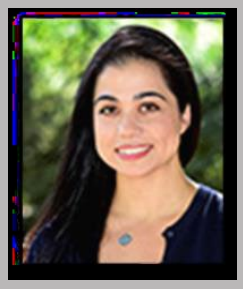


5th Place Best Abstract: **Catherine Wise** (Duke University)

Outgoing Officers 2022–2023

Past President
Mansi Krishan

President
Paul S. Price



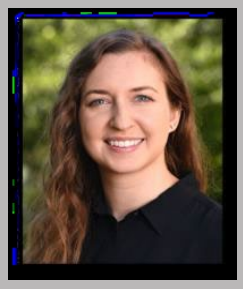
Vice President
Esra Mutlu

Vice President-Elect
Courtney Roper

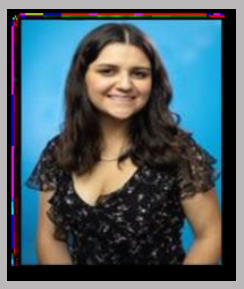
Secretary/Treasurer
Jennifer Schlezinger

Senior Councilor
Justin Conley

Junior Councilor
Allison Phillips



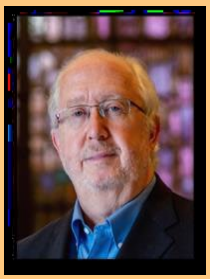
Postdoctoral Rep
Rachel Dee



Graduate Student
Rep (Ad hoc)
Brianna Rivera

Graduate Student
Rep
Greylin Nielsen

2023–2024 Incoming Officers



Past President
Paul S. Price

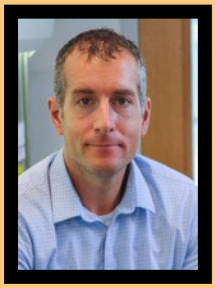
President
Esra Mutlu

Vice President
Courtney Roper

Vice President-Elect
Jennifer Schlezinger

Secretary/Treasurer
Shannah Witchey

Senior
Councilor
Allison Phillips



Junior Councilor
Christopher D.
Kassotis

Postdoctoral
Rep
Kristin M. Eccles

Graduate Student
Rep
Ishita Virmani

Meet Your New Officers

Christopher D. Kassotis, *Junior Councilor*

Dr. Chris Kassotis is an Assistant Professor in the Institute of Environmental Health Sciences and in the Department of Pharmacology at Wayne State University. He received his PhD in Biology at the University of Missouri, working on unconventional oil and gas ("fracking") chemicals as endocrine disruptors and then pursued his postdoctoral fellowship in the Nicholas School of the Environment at Duke University, where he examined metabolism disrupting activity associated with environmental chemicals and mixtures, such as residential household dust. Dr. Kassotis joined Wayne State in 2020; his lab explores new and emerging endocrine disrupting chemicals and complex chemical mixtures, with a particular focus on metabolic health outcomes using cell and zebrafish models. He has authored or co-authored >45 peer-reviewed publications and is the President-Elect for the Michigan Regional Chapter of the Society of Toxicology.

Shannah Witchey, Secretary/Treasurer

Dr. Shannah Witchey is a study director at Inotiv, where she monitors and reports research supporting preclinical and general toxicity studies. She received her doctorate in physiology from Kent State University in 2018, focusing on behavioral neuroendocrinology. Dr. Witchey completed a postdoctoral fellowship at North Carolina State in 2020 where she researched neurotoxicological effects of flame retardants and at the Division of Translational Toxicology in 2022 where she worked with interdisciplinary teams of scientists to design, analyze, and report studies evaluating toxicity of chemicals. In her free time, Dr. Witchey enjoys spending time outdoors, especially working in her garden.

Kristin Eccles, *Postdoctoral Rep*

At the time of election, Dr. Kristin Eccles was a postdoctoral fellow in the Division of Translational Toxicology at the National Institute of Environmental Health Sciences, where she used computational toxicology approaches with a geospatial framework to identify localized exposures to chemical mixtures to quantify the risk that results from chemically perturbing biological pathways. Dr. Eccles received her doctorate in Biology with a specialization in chemical and environmental toxicology from the University of Ottawa in 2019. There, her research focused on the applications of geospatial methods within toxicology to understand spatial patterns and relationships between environmental sources of contaminants, chemical exposures, and adverse health outcomes. In her free time, Dr. Eccles likes to downhill ski, read, and travel.

Ishita Virmani, *Graduate Student Rep*

Ishita Virmani is pursuing her PhD in Environmental Health Sciences at Masaryk University in Europe's Czech Republic. As a member of the Cell and Tissue Toxicology group, she actively engages in research focused on the utilization of *in vitro* models to investigate the mechanisms of action of environmental chemicals and mixtures, particularly in the realm of male reproductive toxicity. Ishita is passionate about exploring New Approach Methodologies (NAMs) for risk assessment. Prior to embarking on her PhD journey, Ishita earned her MRes degree from Newcastle University in the UK. During her free time, she enjoys travelling and immersing herself in the world of books

Looking to the Year Ahead

SOT Salt Lake City 2024

March 10–14, 2024	SOT Salt Lake City 2024
August 1, 2023	Registration and Housing open
November 13, 2023	Abstract submission deadline
October 9, 2023	SOT Grad Student Travel Award Due
January 31, 2023	MixSS Best Overall and Best Student/Postdoc Awards Deadline

MixSS Jane Ellen Simmons SOT Travel Award

Dr. Jane Ellen Simmons, 1952–2022

This year the MixSS is organizing a virtual event where students, postdocs, and young investigators will have the opportunity to present their projects related to the mixtures field. The competition will provide an award to support travel to the 2024 SOT meeting in Salt Lake City (application to come soon). This award will be conferred in honor and remembrance of our dear colleague, Dr. Jane Ellen Simmons. We are indebted to her service and legacy.

If you would like to be considered for this award, please follow MixSS announcements through member emails, the MixSS home page, and our LinkedIn Page. We look forward to receiving your applications!

Application deadline is Dec 15th, 2023, and the competition will be in 2024, *date to be announced*.

Recent and Upcoming Webinars

September 2022
Joint Risk Assessment and Mixtures Specialty Sections

Wibke Busch, PhD, UFZ Helmholtz Centre for Env. Research
Combined effects of chemical mixtures are predictable for the whole transcriptome – A proof of concept study with zebrafish embryos

Lucie Ford, Texas A&M University
A population-based human in vitro *approach to characterize inter-individual variability in responses to chemical mixtures*

January 2023
Andreas Kortenkamp, PhD, Brunel University
Mixture assessment factors – motivations, derivations and uses

September 20, 2023
Joint Risk Assessment and Mixtures Specialty Sections

Kristin Eccles, PhD, Healthy Environments and Consumer Safety Branch, Health Canada
Methodological Details for Quantifying the Risk of Exposure to Environmental Chemical Mixtures via a Common Molecular Target using a Geospatial Modeling Approach

Paul S. Price, PhD, Risk Sciences International, Inc.
The Hazard Index at Thirty-Seven

January 10, 2024, 3:00–4:30 PM ET
Joint Risk Assessment and Mixtures Specialty Sections
Speaker TBA

Mixture Toxicity in the 21st Century

Drs. Kristin Eccles and Paul Price gave a thirty-minute talk as part of the Risk Assessment/Mixtures Specialty Sections webinar on September 20, 2023. Both talks reflected how NAMs are moving cumulative chemical risk assessment from its current focus on groups of chemicals causing a common adverse effect to groups causing a common early event in an AOP (e.g., the Molecular Initiating Event).

Mix SS Past President Dr. Paul Price kindly agreed to provide a message below for the latest RASS-MixSS Joint webinar:

There are likely to be concerns about this change. Specifically, early events in an AOP are not necessarily adverse and may be readily reversible. If such events occur at doses below the doses that cause the adverse effect, then the assessment would be protecting against non-adverse effects. This would result in a greater than necessary control of combined exposures.

This is a legitimate concern, but there are also a number of advantages in the use of early events. First, the use of an early event as the basis for a cumulative risk assessment reduces the chance for synergy between chemicals. It has long been recognized that the HI is not protective for cumulative exposures to chemicals when synergy occurs between two or more of the chemicals. Preventing an early common event in an AOP eliminates the chance for interactions between later events that could result in synergy. Second, the use of an early event measured using an *in vitro* assay of a human endpoint provides a more authoritative test as to whether chemicals belong in a common assessment group than is provided by *in vivo* data. *In vivo* data are always subject to the issue of concordance of effects between the test animal and humans. As a result, assessment groups in combined risk assessments often include chemicals that affect a common system in a test animal by different mechanisms since the concordance of the mechanism of action between the animal model and humans is uncertain. Using *in vitro* data avoids this issue and as a result could reduce the number of chemicals placed in an assessment group. Third, placing a chemical within an AOP provides the opportunity for the development of a quantitative AOP model that can account for the differences between the combined exposures that cause the key event and the combined exposures that cause the common adverse effect.

The most important reason for moving cumulative risk assessments to the early events, however, is that in the future NAMs and not *in vivo* studies will provide a basis for assessing risks from the thousands of chemicals in commerce and their combined exposures. We will have to use the early events because we will not have any alternative. I expect that this issue will be the subject of much discussion over the next 10 years.

–Paul S. Price, PhD

Past President, MixSS (2023–2024)

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