

S*T 64TH ANNUAL MEETING
& ToxExpo • March 16–20, 2025
ORLANDO, FLORIDA

Program



Published on December 5, 2024

Dear Colleagues:

As SOT President, it has been both an honor and a privilege to work alongside the SOT Council, Committees, and others to organize the SOT 64th Annual Meeting and ToxExpo, which will take place in Orlando, Florida, from Sunday, March 16, 2025, to Thursday, March 20, 2025.

While this year's meeting offers the rich scientific program for which SOT is known with more than 70 Featured and Scientific Sessions, alongside over 2,000 poster presentations, we also have been working hard to reimagine our Annual Meeting, creating new activities and opportunities for you. For the first time, Tuesday evening will feature Scientific Sessions during the sunset slot (i.e., 4:30 pm to 6:00 pm), as the SOT Annual Business Meeting transitions to a virtual format. Also new this year, is the development of a networking opportunity called the Smoothie Schmooze, a dedicated hour of networking on Tuesday afternoon in the ToxExpo Exhibit Hall where you'll be able to meet with peers, potential collaborators, and exhibitors while enjoying refreshments.

We also are excited to announce that SOT has received a Florida Sales Tax Exemption, an important financial benefit that allows SOT to be exempt from paying sales tax on activities for all activities that SOT organizes and pays for directly. This exemption helps address concerns that some may have about holding the meeting in Florida as we aim to minimize any indirect financial support for policies that are not in line with our core principles related to diversity, equity, inclusion, and accessibility.

Beyond the Scientific Sessions and networking opportunities, the ToxExpo remains a key feature of the meeting. With over 250 exhibitors and a central focus on innovation, product development, and professional networking, I encourage everyone to take the time to explore the Exhibit Hall and meet with vendors to learn about their service offerings that support and contribute to our scientific discipline. Also, remember to participate in exhibitor raffles and drop your business card in the SOT Diamond-level Supporter boxes located throughout the Exhibit Hall for a chance to win big!

Finally, SOT remains committed to sustainability. This year's venue, the Orange County Convention Center, is dedicated to reducing its environmental footprint through features such as its solar farm and arrays and refillable water bottle stations. SOT will continue its efforts to minimize waste through the use of recycled materials, consolidated signage, and more.

I look forward to welcoming you to Orlando for what promises to be a dynamic and enriching event, where science, community, and professional growth converge. Let's make this meeting one to remember, filled with knowledge, collaboration, and shared experiences!

Laurie C. Haws

Laurie Couture Haws, PhD, DABT, ATS
2024–2025 President



Reasons to Attend



Innovative Science

60+ Scientific Sessions

•
10+ Featured Sessions

•
2,000+ Abstracts



Global Networking and Partnerships

275+ ToxExpo Exhibitors

•
60+ Social Events

•
45+ Countries Represented



Education and Training

Continuing Education Courses

•
Career Development Events

•
Activities by and for
Postdocs and Students



Affordability and Value

Discounted Registration
for SOT Members

•
Discounted Registration
for Postdocs and Students

•
Exclusive Hotel Rates
and Travel Discounts

3 
**Program
Overview**

13 
**Venue
Maps**

20 
**Annual
Meeting
Support**

21 
Registration

26 
**Hotel and
Travel**

29 
**General
Information**

30 
**ToxExpo
Exhibits**

32 
**Program
Schedule**

Program Contents



Dear Colleagues,

This year, we are thrilled to welcome Kimberley Rain Miner, PhD, as our Opening Plenary speaker. Dr. Miner, a Climate Scientist with the NASA Jet Propulsion Lab, has dedicated her career to understanding the profound impacts of climate change, with groundbreaking work on Arctic methane and glacial meltwater pollution. Her pioneering research highlights how these shifts affect both ecosystems and public health, offering a timely perspective on toxicology's role in climate science.

Following the Plenary, attendees can look forward to Featured Sessions that promise to engage the community in critical discussions across emerging areas in toxicology.

Of note is a new session format: the Engagement Session. These exciting new sessions offer a more interactive format designed to deepen connections and foster open discussions on career development and scientific issues. We are piloting two Engagement Sessions this year—one on mentorship and another on challenges within the toxicology research field—in hopes to make this new format an ongoing feature of the annual scientific program.

Other Featured Sessions of interest include the:

- **SOT/EUROTOX Debate:** This timely debate will address the question, “Are Electric Vehicles Actually Bad for the Environment?” With participants from both SOT and EUROTOX, we anticipate a compelling exchange that will challenge perspectives on sustainable transportation.
- **SOT/EUROTOX Roundtable:** In this joint session, “Dazed and Confused: Cannabis, Magic Mushrooms, and Special K—EU Versus US on Recreational Drugs,” experts from both sides of the Atlantic will explore the evolving landscape of recreational drug policy, reflecting on societal and regulatory differences.
- **SOT/JSOT Symposium:** Bringing together experts from SOT and JSOT, “Emerging Frontiers in PFAS Research” will delve into the latest advances and ongoing challenges in understanding and addressing PFAS-related health and environmental impacts.

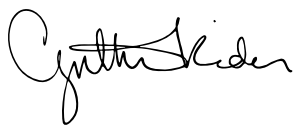
I also am pleased to announce that recordings of select Featured and Scientific Sessions will be available for on-demand viewing through the SOT Online Planner and Event App after the meeting concludes.

Finally, we’ve made updates to enhance attendee experiences. In response to feedback, we have adjusted the numbering of poster boards to improve navigation and accessibility within the ToxExpo Exhibit Hall and have added a networking hour in the ToxExpo—the Smoothie Schmooze on Tuesday afternoon.

Our goal is to make the 64th Annual Meeting and ToxExpo an inclusive, inspiring, and thought-provoking event, showcasing toxicology’s essential role in addressing today’s global challenges.

I look forward to seeing you in person and to the impactful discussions and discoveries that await!

Sincerely,



Cynthia V. Rider, PhD, DABT
2024–2025 SOT Vice President
and Scientific Program Committee Chair



2024–2025 COUNCIL

PRESIDENT

Laurie Couture Haws,
PhD, DABT, ATS
ToxStrategies, LLC

VICE PRESIDENT

Cynthia V. Rider, PhD, DABT
National Institute of
Environmental Health Sciences

VICE PRESIDENT-ELECT

James P. Luyendyk, PhD
Michigan State University

SECRETARY

Matthew J. Campen, PhD, MSPH
University of New Mexico

TREASURER

Brian S. Cummings, PhD
Wayne State University

TREASURER-ELECT

Rebecca C. Fry, PhD
University of North Carolina
at Chapel Hill

PAST PRESIDENT

Dori R. Germolec, PhD
National Institute of
Environmental Health Sciences

COUNCILORS

Lauren M. Aleksunes,
PharmD, PhD, DABT
Rutgers, the State University
of New Jersey

Chidozie J. Amuzie,
DVM, PhD, DACVP, DABT
Johnson & Johnson

Darryl B. Hood, PhD
Ohio State University College
of Public Health

Agnes L. Karmaus, PhD
Syngenta Crop Protection, LLC

Betina J. Lew, PhD, DABT, ERT
Johnson & Johnson

Jennifer L. Rayner,
PhD, DABT
SRC, Inc.

EXECUTIVE DIRECTOR

Tonia M. Masson

SOT
64TH ANNUAL MEETING
& ToxExpo • March 16–20, 2025
ORLANDO, FLORIDA

Session Types (Listed by date, then time, then session type)

- | | | |
|---|----------------------------------|--|
| CE Continuing Education Courses | IS Informational Sessions | W Workshop Sessions |
| EC Education-Career Development Sessions | PL Platform Sessions | IAT Innovations in Applied Toxicology |
| E Exhibitor-Hosted Sessions | PS Poster Sessions | ITS Innovations in Toxicological Sciences |
| FS Featured Sessions | R Roundtable Sessions | |
| | S Symposium Sessions | |

For the most up-to-date information on all Annual Meeting sessions, events, and activities, consult the [SOT Online Planner](#) and the [SOT Event App](#).

All events in this preview take place in the Orange County Convention Center unless otherwise noted.

Saturday, March 15

5:15 PM to 7:30 PM

UNDERGRADUATE DIVERSITY PROGRAM

- Opening Event (*IDEC Travel Awardees and Invited Guests Only*)
Executive Ballroom H, Rosen Centre Hotel

7:30 PM to 8:30 PM

UNDERGRADUATE DIVERSITY PROGRAM REUNION

- All meeting registrants are invited to attend, especially those who have previously participated in the SOT Undergraduate Diversity Program.
Executive Ballroom H, Rosen Centre Hotel

Sunday, March 16

7:00 AM to 7:45 AM

CONTINUING EDUCATION SUNRISE MINICOURSE **CE**

(Separate Registration and Fee Required)

- | | | |
|-------------|--|-------------------------|
| SR01 | Implementing Machine-Learning Approaches in PBPK and QSAR Models to Predict ADMET Properties of Xenobiotics
<i>Room W307A</i> | <i>Abstract #: 1001</i> |
| SR02 | Navigating Data Management and Sharing in Computational and Predictive Toxicology
<i>Room W308A</i> | <i>Abstract #: 1002</i> |

7:15 AM to 7:45 AM

SOT UNDERGRADUATE RESEARCH AWARD WELCOME

- EEOC will welcome and recognize the students who have received the SOT Undergraduate Research Award before they attend the Undergraduate Education Program. (*SOT Undergraduate Research Award Recipients and EEOC Members Only*)
Salon 13, Rosen Centre Hotel

8:00 AM to 5:00 PM

UNDERGRADUATE EDUCATION PROGRAM

- This daylong program introduces undergraduates to toxicology and includes opportunities to explore and interpret data, meet with academic program directors, and network with SOT mentors. (*Open to IDEC Travel Awardees, Registered Undergraduates, and Invited Guests*)
Various Rooms, Rosen Centre Hotel

8:15 AM to 12:00 Noon

CONTINUING EDUCATION MORNING COURSES **CE**

(Separate Registration and Fee Required)

- | | | |
|-------------|---|-------------------------|
| AM03 | Dosimetry for Inhaled Substances: Advancing <i>In Silico</i> Modeling and Quantitative <i>In Vitro</i> Workflows
<i>Room W202A</i> | <i>Abstract #: 1003</i> |
| AM04 | Key Considerations of NAM Development for Global Regulatory Harmonization
<i>Room W203A</i> | <i>Abstract #: 1004</i> |
| AM05 | Roadmap for Safety Evaluation of Emerging Consumer Products: Application and Adaptation of Existing Practices
<i>Room W204A</i> | <i>Abstract #: 1005</i> |
| AM06 | The Tox Side of Food: Building Comprehensive Safety Assessments
<i>Room W205A</i> | <i>Abstract #: 1006</i> |
| AM07 | Fit-for-Purpose Methods to Fulfill 21st-Century Chemical Risk Assessment
<i>Room W307A</i> | <i>Abstract #: 1007</i> |
| AM08 | Environmentally Focused Knowledgebases: Past, Present, and Future
<i>Room W308A</i> | <i>Abstract #: 1008</i> |

1:15 PM to 5:00 PM

CONTINUING EDUCATION AFTERNOON COURSES

(Separate Registration and Fee Required)

- PM09** Physiologically Based Kinetic Modeling Made Simple: A Nonprogrammer's Guide to Chemical Risk Assessment
Room W202A Abstract #: 1009
- PM10** Complexity of Food Packaging: Formulation, Safety, Regulation, Innovation, and Recycling
Room W203A Abstract #: 1010
- PM11** Tackling Risk Communication Challenges: Lessons from Expert Voices and Case Studies
Room W204A Abstract #: 1011
- PM12** Utilizing New Approach Methodologies (NAMs) for Regulatory Assessment of Developmental Neurotoxicity: Progress and Prospects
Room W205A Abstract #: 1012
- PM13** Seeing Ocular Pathology: Best Practices for Ophthalmic Endpoints in Ocular Toxicity Studies
Room W307A Abstract #: 1013
- PM14** Advances and Applications of Proteomics in Toxicity Assessment
Room W308A Abstract #: 1014

4:45 PM to 6:30 PM

AWARDS CEREMONY AND MUSIC

- Join SOT in honoring its award recipients. Music begins at 4:45 pm, with the ceremony starting at 5:15 pm.
(All Attendees Welcome)
Room W304A

6:30 PM to 7:30 PM

WELCOME RECEPTION

- Partake in the complimentary hors d'oeuvres while connecting with friends, colleagues, and new acquaintances. A cash bar is available during this event.
W Hall A4

7:00 PM to 8:00 PM

25-YEAR (OR MORE) MEMBER RECEPTION

- If you've been an SOT member for 25 years or more, come celebrate at this reception.
(By Invitation Only)
Room W311E

7:30 PM to 9:00 PM

STUDENT/POSTDOCTORAL SCHOLAR MIXER

- All students and postdocs are invited to attend. Complimentary refreshments and a cash bar will be available.
(Free Reservation Required)
Room W311A

Monday, March 17

6:15 AM to 8:00 AM

PAST PRESIDENTS' BREAKFAST

- (By Invitation Only)*
Room W104A

8:00 AM to 9:00 AM

OPENING PLENARY SESSION

Presentation Topic: Climate Risks to Human Health
W Hall A4



Speaker:
Kimberley R. Miner,
Climate Scientist, NASA Jet
Propulsion Lab, Pasadena, CA.

Kimberley Miner, PhD, is a Climate Scientist at the NASA Jet Propulsion Lab (JPL) in Pasadena, California, and a Climate Change Institute Research Assistant Professor. At JPL, Dr. Miner works on the Arctic Methane Project looking at the impacts of climate change in the Arctic.

8:00 AM to 5:00 PM

UNDERGRADUATE DIVERSITY PROGRAM

- Undergraduate Diversity Program mentor groups attend Annual Meeting sessions and posters, participate in exclusive activities, and celebrate the weekend's accomplishments. *(By Invitation Only)*
Various Locations

9:00 AM to 4:30 PM

TOXEXPO EXHIBITS

- Visit the exhibitors for product, service, and career insights.
W Hall A2

GLOBAL GALLERY OF TOXICOLOGY

- The Global Gallery of Toxicology allows participating organizations to display posters showcasing their upcoming meetings, key accomplishments, strategic initiatives, journals, awards, and more.
W Hall A2

SOT COMPONENT GROUP POSTERS

- Dedicated poster space showcases the activities of the SOT Regional Chapters, Special Interest Groups, and Specialty Sections
W Hall A2

9:15 AM to 12:00 Noon

SYMPOSIUM SESSIONS S

- Beyond Inflammation: Toxicities Associated with Ocular Therapeutics
Room W304E Abstract #:1015-1020
- Evolution of Human Health Risk Assessment: New Science and Approaches That Are Ready for Primetime
Room W202A Abstract #:1021-1026
- Into the Wild: Exploring Toxic Chemical Effects in Wildlife Species
Room W204A Abstract #:1027-1032
- Navigating Complexity: How 'Omics in Short-Term Animal Studies Are Optimizing and Accelerating Chemical Risk Assessment
Room W206A Abstract #:1033-1038
- When *In Vitro* Applied Dose ≠ Actual Dose: Overcoming Challenges for Next-Generation Risk Assessment for Difficult-to-Test Substances
Room W307A Abstract #:1039-1044

WORKSHOP SESSIONS W

- Developmental Immunotoxicology: A Comparison Between Traditional and New Approach Methods
Room W203A Abstract #:1045-1051
- Neurotoxicology and Brain Health Outcomes of Nanoparticles
Room W205A Abstract #:1052-1057
- Protecting Those Who Serve: Advances in Military Environmental Exposures Research
Room W308A Abstract #:1058-1063

9:15 AM to 11:45 AM

POSTER SESSIONS PS

- Specific Poster Sessions will be announced in January 2025. Note that posters are displayed from 9:00 am to 4:30 pm.
W Hall A2

9:15 AM to 10:15 AM

EXHIBITOR-HOSTED SESSIONS E

- IDEXX BioAnalytics
Room W208A

9:30 AM to 10:30 AM

GLOBAL COLLABORATION COFFEE

- Hosted by IUTOX and SOT, this event offers an opportunity for scientific leaders to connect and gain a better understanding of the initiatives of societies around the world.
Room W207A

9:30 AM to 3:00 PM

**RESEARCH FUNDING INSIGHTS ROOM:
NETWORK WITH GRANT PROGRAM OFFICERS**

- Representatives from federal agencies will be available to answer general grant-related questions.
Room W209C

9:30 AM to 10:30 AM

TRAINEE DISCUSSION

- Plenary Session speaker Kimberley Miner will meet informally for discussion with graduate students and postdoctoral scholars. (Free Reservation Required; Limited Seating; Graduate Students and Postdocs Only)
Room W209B

10:45 AM to 11:45 AM

EXHIBITOR-HOSTED SESSIONS E

- Pharmaron
Room W208A

11:00 AM to 12:00 Noon

**DISTINGUISHED TOXICOLOGY SCHOLAR
AWARD LECTURE FS**

- Award recipients will be announced in January 2025, with lecture titles and information to soon follow.
Room W304A

12:00 Noon to 1:30 PM

**IN VITRO TOXICOLOGY LECTURE
AND LUNCHEON FOR STUDENTS FS**

(Add-On Event; Limited Seating; Students and Postdocs Only)

**Leveraging *In Vitro* Methods to Advance
Antimicrobial Product Safety**

Room W311A



Lecturer:

Kathryn E. Page,

Clorox Company, Pleasanton, CA

12:10 PM to 1:30 PM

INFORMATIONAL SESSIONS IS

- A Cross-Industry Perspective on Exposure-Driven Human Safety Evaluation on Polymer Chemical Additives
Room W304E Abstract #:1064
- Accelerating Acceptance of New Approach Methodologies for Respiratory Toxicology Through Standardization Efforts
Room W206A Abstract #:1065
- Nonessential Heavy Metals in Food: How Low Should We Go?
Room W203A Abstract #:1066
- Recent Advances in Exposure Predictions: Model Refinement and Accessibility
Room W307A Abstract #:1067

12:15 PM to 1:15 PM

EXHIBITOR-HOSTED SESSIONS E

- CN Bio
Room W208B
- MultiCASE Inc.
Room W208C
- Lhasa Limited
Room W208A

1:45 PM to 4:30 PM

SYMPOSIUM SESSIONS S

- Circadian Rhythms in Environmental Toxicology and Chronic Diseases
Room W307A Abstract #:1068-1074
- Diving Deeper into Mechanisms of Neurotoxicity: Integrating Molecular, Behavioral, Pathological, and Imaging Assessments in Zebrafish Neurotoxicology Studies
Room W202A Abstract #:1075-1080
- Is the Microenvironment Key to Unraveling Cancer's Origins?
Room W308A Abstract #:1081-1086
- Leveraging AI and Genomics in Gene and Cell Therapies for Advancing Personalized Medicine Approaches in Safety Assessments
Room W204A Abstract #:1087-1093
- Living in a Chemical World: Identification and Characterization of Emerging Contaminants of Concern and Need for New Regulatory Approaches
Room W203A Abstract #:1094-1099
- Qualifying NAMs for Developmental and Reproductive Toxicity: Advancements and Pitfalls
Room W304A Abstract #:1100-1106
- Single-Cell RNA Sequencing Unravels Xenobiotic-Induced Alterations in Complex Biological Systems **IAT**
Room W304E Abstract #:1107-1112

1:45 PM to 4:30 PM

WORKSHOP SESSION W

- Into the Fire: Exploring Firefighter Exposures and Health
Room W205A Abstract #:1113-1119

1:45 PM to 4:15 PM

POSTER SESSIONS PS

- Specific Poster Sessions will be announced in January 2025. Note that posters are displayed from 9:00 am to 4:30 pm.
W Hall A2

1:45 PM to 2:45 PM

EXHIBITOR-HOSTED SESSIONS E

- Eurofins Medical Device Testing
Room W208A
- JOINN-Biomere
Room W208B

3:15 PM to 4:15 PM

EXHIBITOR-HOSTED SESSIONS E

- Gradient
Room W208A
- WuXi AppTec
Room W209A

4:30 PM to 5:30 PM

UNDERGRADUATE EDUCATOR NETWORK MEETING

- All faculty involved in teaching toxicology to undergraduates and others interested in teaching are invited to attend.
Room TBA

4:45 PM to 6:15 PM

SOT/EUROTOX DEBATE FS

Are Electric Vehicles Actually Bad for the Environment?

Room W307A



SOT Debater:

Michael Aschner,
*Albert Einstein College of Medicine,
Bronx, NY.*



EUROTOX Debater:

Ulf Olofsson,
*Royal Institute of Technology,
Stockholm, Sweden.*



Tuesday, March 18

7:30 AM to 9:00 AM

SOT MENTORING BREAKFAST

- This event is intended for SOT members, from graduate students through established career toxicologists to interact with individuals from various fields to learn about SOT mentoring resources and gain foundational tips on career advancement.
(Add-On Event; Limited Seating; SOT Members Only)
Room W311E

8:00 AM to 10:45 AM

SYMPOSIUM SESSIONS **S**

- Challenges of NAM-Based Toxicokinetic Assessment in Regulatory Risk Assessment
Room W203A Abstract #:1120-1124
- Environmental Cohort Studies to Promote Children's Health in Japan and the United States
Room W304E Abstract #:1125-1130
- Individual and Combined Effects of Climate Change-Associated Chemical and Nonchemical Stressors on Immunity
Room W202A Abstract #:1131-1136
- Toxicological and Regulatory Considerations for Emerging Technologies and Hot Topics in Food
Room W204A Abstract #:1137-1143
- What's Sex Got to Do with It? Sex-Dependent Cardiopulmonary Effects of Inhaled Environmental Pollutants
Room W307A Abstract #:1144-1149

WORKSHOP SESSIONS **W**

- Challenges and Advancements in *In Vivo* Genetic Toxicity Assessment for Regulatory Decision-Making
Room W304A Abstract #:1150-1155
- Integrating New Approach Methodologies to Inform Sustainable Chemical Decisions
Room W308A Abstract #:1156-1161
- Micro- and Nanoplastics: Lessons Learned from Nanotoxicology
Room W205A Abstract #:1162-1167
- Navigating CNS Toxicity Prediction: Insights from Case Studies on Preclinical and Clinical Correlations
Room W206A Abstract #:1168-1173

9:00 AM to 4:30 PM

TOXEXPO EXHIBITS

- Visit the exhibitors for product, service, and career insights.
W Hall A2

GLOBAL GALLERY OF TOXICOLOGY

- The Global Gallery of Toxicology allows participating organizations to display posters showcasing their upcoming meetings, key accomplishments, strategic initiatives, journals, awards, and more.
W Hall A2

SOT COMPONENT GROUP POSTERS

- Dedicated poster space showcases the activities of the SOT Regional Chapters, Special Interest Groups, and Specialty Sections
W Hall A2

9:15 AM to 11:45 AM

POSTER SESSIONS **PS**

- Specific Poster Sessions will be announced in January 2025. Note that posters are displayed from 9:00 am to 4:30 pm.
W Hall A2

9:15 AM to 10:15 AM

EXHIBITOR-HOSTED SESSIONS **E**

- EAG Laboratories
Room W208A

9:30 AM to 3:00 PM

RESEARCH FUNDING INSIGHTS ROOM: NETWORK WITH GRANT PROGRAM OFFICERS

- Representatives from federal agencies will be available to answer general grant-related questions.
Room W209C

10:45 AM to 11:45 AM

EXHIBITOR-HOSTED SESSIONS **E**

- Fraunhofer ITEM
Room W208C
- SenzaGen
Room W208B
- Lonza
Room W209A

11:00 AM to 12:00 Noon

LEADING EDGE IN BASIC SCIENCE AWARD LECTURE **FS**

- Award recipients will be announced in January 2025, with lecture titles and information to soon follow.
Room W304A

11:00 AM to 12:30 PM

SYMPOSIUM SESSIONS **S**

- Assessing the Metabolic Competence of *In Vitro* Models and Their Applicability in Regulatory Toxicology
Room W304E Abstract #:1174-1178
- Emerging Approaches in Chemical Analysis and Toxicological Risk Assessments of Extractables Data for Medical Device Evaluations
Room W203A Abstract #:1179-1183

11:00 AM to 12:20 PM

EDUCATION-CAREER DEVELOPMENT SESSIONS **EC**

- Bridging the Gap and Paving the Way for Future Leaders in Toxicology
Room W307A Abstract #:1184
- Teaching in the Age of AI: Benefits, Challenges, and Ethical Considerations
Room W202A Abstract #:1185

12:00 Noon to 1:15 PM

POSTDOCTORAL ASSEMBLY LUNCHEON

- This luncheon is a casual event that encourages engagement and networking among postdoctoral scholars. (Add-On Event; Postdoctoral Scholars Only)
Room W311E

12:15 Noon to 1:15 PM

EXHIBITOR-HOSTED SESSIONS E

- Accelerera S.r.l.
Room W208B
- SCIREQ an emka
TECHNOLOGIES company
Room W209A

12:30 PM to 1:45 PM

UNDERGRAD GAB WITH A GRAD OVER GRUB

- All undergraduates are encouraged to attend to learn about SOT programs and network with peers and graduate students; lunch is provided.
Room TBA

1:00 PM to 2:30 PM

ENGAGEMENT SESSION FS

Successful Mentorship: Aligning Expectations Through Effective Communication

Room W206A



Facilitators:
Ashley L. Woolard,
Amway/Nutriline, Irvine, CA.



Toufan Parman,
Sangamo Therapeutics Inc., Brisbane, CA.



Lauren M. Aleksunes,
Rutgers, the State University of New Jersey,
Piscataway, NJ.

1:00 PM to 2:00 PM

MERIT AWARD LECTURE FS

- Award recipients will be announced in January 2025, with lecture titles and information to soon follow.
Room W304A

1:00 PM to 2:30 PM

SYMPOSIUM SESSIONS S

- Behavioral Testing: Novel Strategies and Approaches to Maximize Translational Value, Reproducibility, and Rigor
Room W308A Abstract #:1186-1191
- Interplay of Toxicant Exposure and the Immune System: Impact on Pregnancy Outcomes
Room W304E Abstract #:1192-1196
- N-Nitrosamines in Water and in Drugs: Occurrence, Detection, Biological Effects, and Regulation
Room W204A Abstract #:1197-1200
- Reproductive and Endocrine-Disrupting Effects of Legacy and Emerging PFAS and Their Mixtures
Room W203A Abstract #:1201-1204

WORKSHOP SESSIONS W

- Applying Fit-For-Purpose Study Design to Build Confidence in NAM Use
Room W307A Abstract #:1205-1208
- Exposure Assessment Strategies for Susceptible and Vulnerable Communities
Room W202A Abstract #:1209-1213

1:45 PM to 4:15 PM

POSTER SESSIONS PS

- Specific Poster Sessions will be announced in January 2025. Note that posters are displayed from 9:00 am to 4:30 pm.
W Hall A2

1:45 PM to 3:00 PM

CAREER EXPLORATION THROUGH SPEED INFORMATIONAL INTERVIEWS

- Groups of trainees will rotate through a series of short discussions with career representatives from academia, government, and industry. (Complimentary Add-On Event; Students and Postdoctoral Scholars Only)
Room W311E

1:45 PM to 2:45 PM

EXHIBITOR-HOSTED SESSIONS E

- Dynamic42 GmbH
Room W209A
- ITR Canada (Bozo & ITR Group)
Room W208A
- Promega Corporation and Mimetas B.V.
Room W208B

3:00 PM to 4:15 PM

SMOOTHIE SCHMOOZE FS

- Enjoy an extended break featuring smoothies and schmoozing in the ToxExpo Exhibit Hall with exhibitors and poster presenters, courtesy of the ToxExpo exhibitors.
W Hall A2

4:30 PM to 6:00 PM

AMERICAN ACADEMY OF CLINICAL TOXICOLOGY
SYMPOSIUM **FS**

**Natural Doesn't Mean Safe: When Dietary
Supplements Become Deadly**

Room W304E



Panelists:

Jeanna M. Marraffa,

SUNY Upstate Medical University,
Syracuse, NY.



Justin N. Corcoran,

Medical College of Wisconsin,
Milwaukee, WI.

4:30 PM to 6:00 PM

SOT/EUROTOX ROUNDTABLE **FS**

**Dazed and Confused: Cannabis, Magic Mushrooms,
and Special K—EU Versus US on Recreational Drugs**

Room W202A



Speakers:

Max Leung,

Arizona State University, Glendale, AZ.



David Wood,

St. Thomas' Hospital,
London, United Kingdom.



William Slikker,

Retired, Little Rock, AR.



Félix Carvalho,

Universidade do Porto, Porto, Portugal.

4:30 PM to 5:30 PM

EXHIBITOR-HOSTED SESSIONS **E**

- AmplifyBio
Room W208A
- Instem
Room W209A

4:30 PM to 6:00 PM

SYMPOSIUM SESSION **S**

- Time After Time: Evaluating Chronic Toxicity Using NAMs to Inform
Longer-Term Chemical Hazard on a Quick Timeline
Room W307A Abstract #:1214-1217

WORKSHOP SESSION **W**

- Advancements in Microphysiological Systems for Toxicity Assessment:
Bridging the Gap Between *In Vitro* and *In Vivo* Models
Room W205A Abstract #:1218-1221

4:30 PM to 5:50 PM

ROUNDTABLE SESSION **R**

- Is It Time to Right-Size Systematic Review?
Room W206A Abstract #:1222

7:30 PM to 9:00 PM

TOX SHOWDOWN

- Three teams of three contestants participate in this quiz game,
an event that also features a cash bar.
Windermere Ballroom Y, Hyatt Regency



Wednesday, March 19

8:00 AM to 10:45 AM

SOT AND JAPANESE SOCIETY OF TOXICOLOGY SYMPOSIUM **FS**

Emerging Frontiers in PFAS Research

Room W304E



Speakers:

Jun Kanno,

National Institute of Health Sciences,
Kawasaki, Japan.



Suzanne E. Fenton,

North Carolina State University,
Raleigh, NC.



Akira Kubota,

Obihiro University of Agriculture and
Veterinary Medicine, Obihiro, Japan.



Michael J. DeVito,

US EPA, Research Triangle Park, NC.



8:00 AM to 10:45 AM

SYMPOSIUM SESSIONS **S**

- Exploring the Toxicological Impact of Micro- and Nanoplastics: Early-Stage Scientists' Perspective
Room W205A Abstract #: 1223-1229
- Launching Space Toxicology as a New Frontier Research Discipline: Academic, Industrial, and Intergovernmental Agency Perspectives
Room W204A Abstract #: 1230-1235
- Next-Generation *In Vitro* Neurotoxicology: Modeling Cognition-in-a-Dish
Room W202A Abstract #: 1236-1241
- Progress of *In Silico* Methodologies for Chemical Safety Assessment
Room W203A Abstract #: 1242-1247

WORKSHOP SESSIONS **W**

- Active Ingredient Degradation: Process and Challenges in Identification, Toxicological Limit Determination, and Regulatory Submission
Room W308A Abstract #: 1248-1252
- Global Implications of the Changing EU Expectations on Dose-Level Setting in Reproductive and Developmental Studies
Room W206A Abstract #: 1253-1258
- Incorporating Stress as a Variable into Toxicological Testing: Advancing Our Understanding of Cumulative Impacts
Room W307A Abstract #: 1259-1263

9:00 AM to 4:30 PM

TOXEXPO EXHIBITS

- Visit the exhibitors for product, service, and career insights.
W Hall A2

GLOBAL GALLERY OF TOXICOLOGY

- The Global Gallery of Toxicology allows participating organizations to display posters showcasing their upcoming meetings, key accomplishments, strategic initiatives, journals, awards, and more.
W Hall A2

SOT COMPONENT GROUP POSTERS

- Dedicated poster space showcases the activities of the SOT Regional Chapters, Special Interest Groups, and Specialty Sections
W Hall A2

9:30 AM to 3:00 PM

RESEARCH FUNDING INSIGHTS ROOM: NETWORK WITH GRANT PROGRAM OFFICERS

- Representatives from federal agencies will be available to answer general grant-related questions.
Room W209C

9:45 AM to 10:45 AM

TRANSLATIONAL IMPACT AWARD LECTURE **FS**

- Award recipients will be announced in January 2025, with lecture titles and information to soon follow.
Room W304A

11:00 AM to 12:00 Noon

EUROTOX AWARD LECTURE **FS**

**Endocrine Disruptors and Microplastics:
Facing Complexity with Connection**

Room W304A



Lecturer:
Juliette Legler,
Universiteit Utrecht, Utrecht, Netherlands.

11:00 AM to 12:20 PM

INFORMATIONAL SESSION **IS**

- Skin Deep: Navigating the Evolution and Application of Dermal Absorption Modeling in Modern Risk Assessment of Cosmetics and Personal Care Products
Room W203A Abstract #: 1264

EDUCATION-CAREER DEVELOPMENT SESSION **EC**

- Building and Improving Undergraduate Programs at Your Regional Chapter
Room W307A Abstract #: 1265

12:15 PM to 1:15 PM

EXHIBITOR-HOSTED SESSIONS **E**

- Cyprotex
Room W208B
- InSphero Inc.
Room W208A



1:30 PM to 4:15 PM

ENGAGEMENT SESSION **FS**

**Facing Inconvenient Truths: How the Current
Toxicology Research Ecosystem Limits Public
and Environmental Health Protection**

Room W206A



Facilitators:
Robyn Tanguay,
Oregon State University, Corvallis, OR.



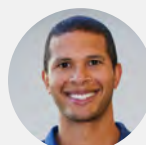
Sandrine Deglin,
HESI, Washington, DC.



Kevin Crofton,
R3Fellows LLC, Durham, NC.



David Balshaw,
NIEHS, Research Triangle Park, NC.



Corie Ellison,
Procter & Gamble, Cincinnati, OH.



Fenna Sillé,
Johns Hopkins University Bloomberg School
of Public Health, Baltimore, MD.



Justin Teeguarden,
Pacific Northwest National Laboratory,
Richland, WA



Richard Currie,
Syngenta Crop Protection,
Bracknell, United Kingdom.



Jamie DeWitt,
Oregon State University, Corvallis, OR.

1:30 PM to 4:15 PM

SYMPOSIUM SESSIONS S

- Clearing the Air: Health Effects of Secondhand and Thirdhand Vaping Exposure
Room W202A *Abstract #: 1266-1271*
- Coming into Focus: The Role of DNA Repair Inhibition in Carcinogenesis Through the Lens of Metal-Induced DNA Damage and Repair Inhibition
Room W304E *Abstract #: 1272-1277*
- Harnessing Generative AI: Revolutionizing Toxicology Research
Room W203A *Abstract #: 1278-1283*
- Science and Practice of Characterizing Population Variability for Regulatory Decision-Making
Room W205A *Abstract #: 1284-1289*

WORKSHOP SESSIONS W

- Battle of the Sexes: Sexually Dimorphic Responses to *In Utero* Toxicant Exposures
Room W304A *Abstract #: 1290-1296*
- How Can We Use Alternative Approaches to Move Safety Evaluation of Medical Devices Forward?
Room W204A *Abstract #: 1297-1302*
- Vaccine Toxicology in the Post-COVID Era
Room W307A *Abstract #: 1303-1307*

1:45 PM to 4:15 PM

POSTER SESSIONS PS

- Specific Poster Sessions will be announced in January 2025. Note that posters are displayed from 9:00 am to 4:30 pm.
W Hall A2

1:45 PM to 2:45 PM

EXHIBITOR-HOSTED SESSIONS E

- emka TECHNOLOGIES
Room W209C

Thursday, March 20

8:30 AM to 11:15 AM

SYMPOSIUM SESSIONS S

- Endocrine Disruption and Non-EATS Modalities: State of the Science for Metabolic Disorders and Next Steps **ITS**
Room W307A *Abstract #: 1308-1314*
- Translational Toxicology: Comparative *In Vivo* Models: Charting Efficacy and Safety in Cell and Gene Therapy Development
Room W204A *Abstract #: 1315-1320*

WORKSHOP SESSIONS W

- Computational Dynamic Systems Models for Predictive Hazard Assessment
Room W304E *Abstract #: 1321-1325*
- Do the ENDS Justify the Means? Exploring Vaping Exposures Through Varied Models
Room W202A *Abstract #: 1326-1331*
- Integrating Epidemiological, Animal, and NAM Evidence to Move Beyond Correlation and into Causality
Room W304A *Abstract #: 1332-1338*
- Unlocking the Power of Read-Across for Safety Assessment: Current Practices and Approaches
Room W203A *Abstract #: 1339-1344*

8:30 AM to 11:30 AM

LATE-BREAKING POSTER SESSIONS PS

- Poster Sessions will be announced in February 2025.
W Hall A4

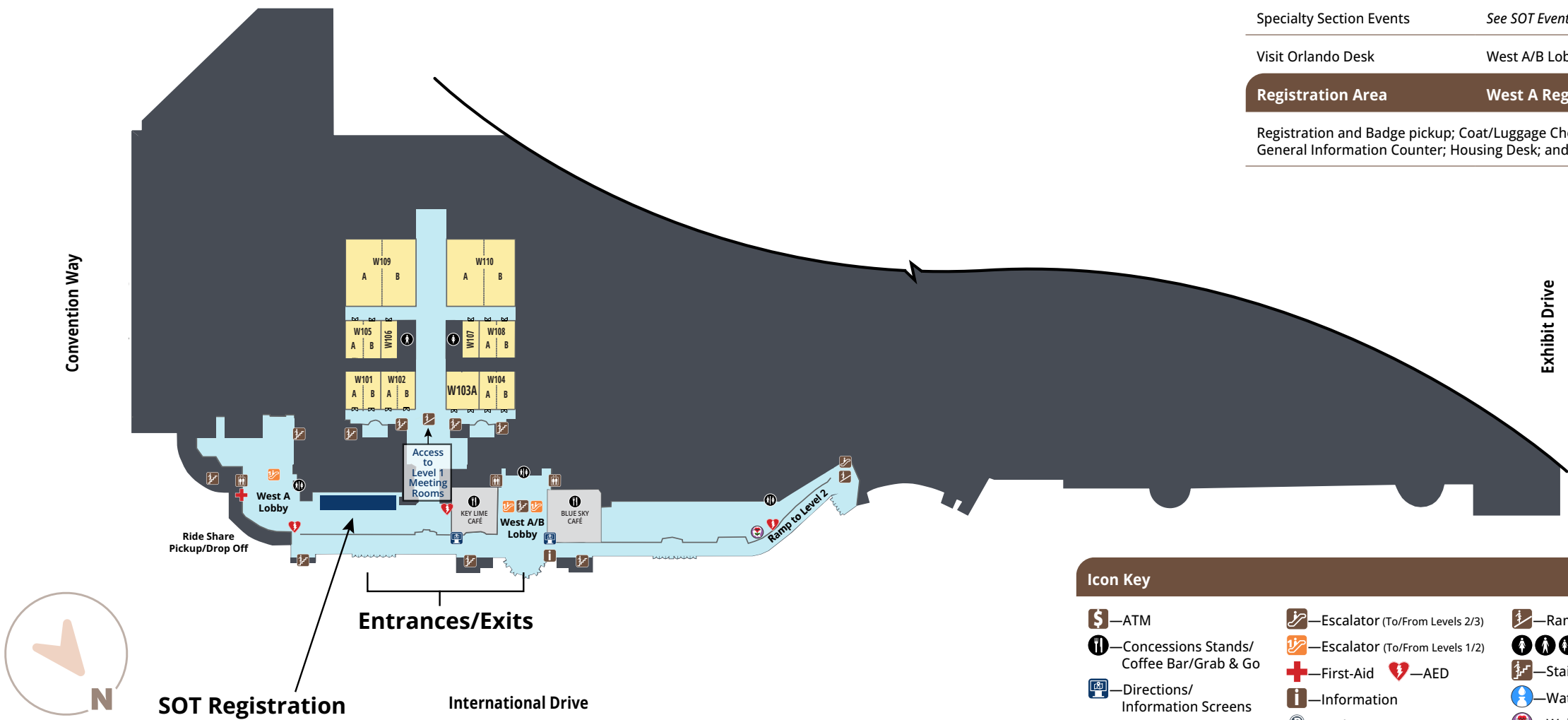


Venue Maps



Orlando Convention Center

West Concourse Level 1



In This Space

Committee and Officer Meetings	See SOT Event App for Room Info
Quiet Room	Room W105A
SOT Office	Room W103A
Specialty Section Events	See SOT Event App for Room Info
Visit Orlando Desk	West A/B Lobby

Registration Area

West A Registration

Registration and Badge pickup; Coat/Luggage Check; First Aid; General Information Counter; Housing Desk; and @SOT Center

Icon Key

- | | | |
|---|--------------------------------|------------------------------------|
| ATM | Escalator (To/From Levels 2/3) | Ramp |
| Concessions Stands/
Coffee Bar/Grab & Go | Escalator (To/From Levels 1/2) | Restrooms |
| Directions/
Information Screens | First-Aid | Stairs |
| Elevator | AED | Water Station |
| | Information | Wellness Rooms/
Nursing Mothers |
| | Parking | |

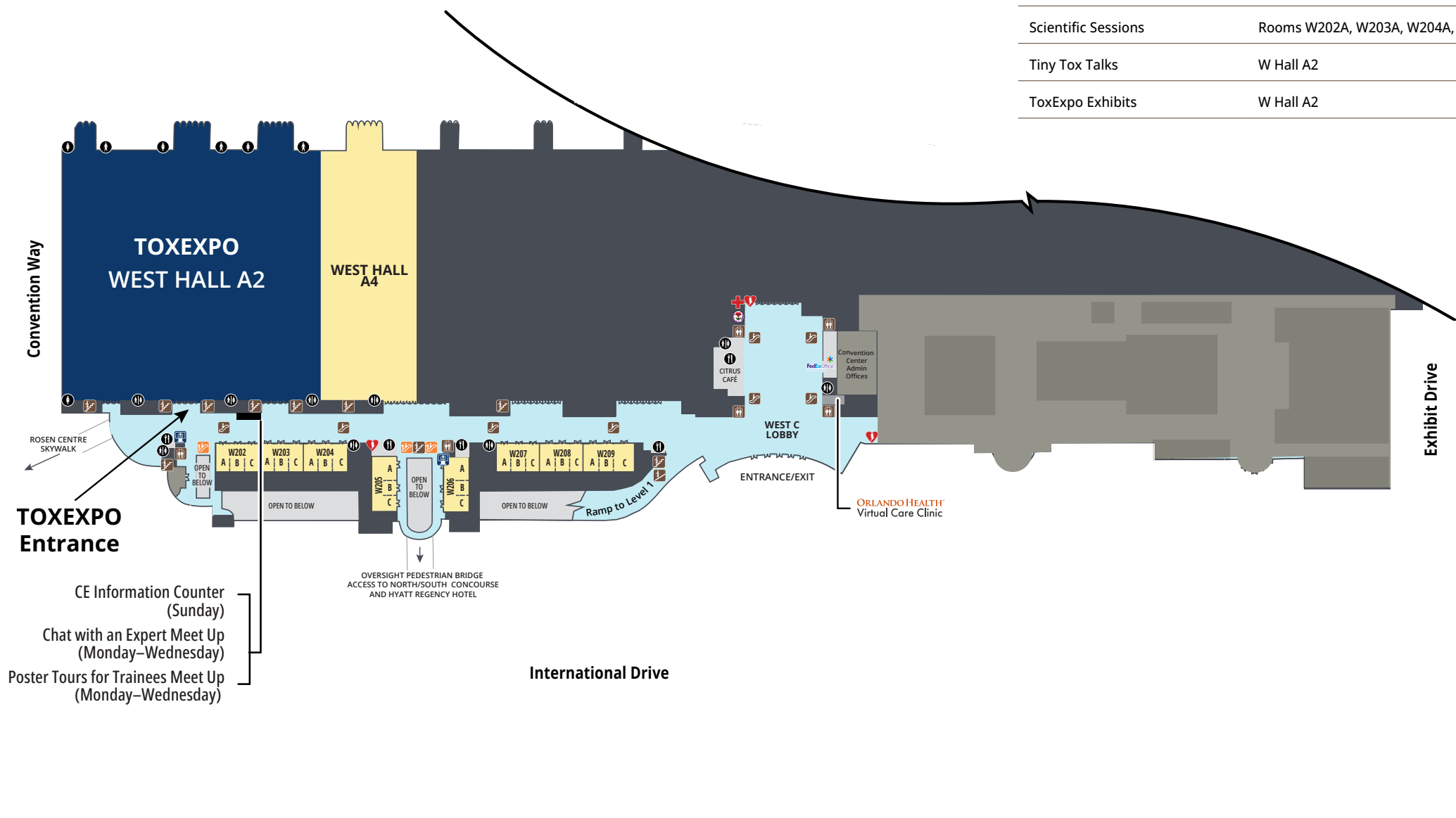


Orlando Convention Center

West Concourse Level 2

In This Space

Continuing Education (CE) Courses (Add-On Events)	Rooms W202A, W203A, W204A, and W205A
Exhibitor-Hosted Sessions	Rooms W208A, W208B, W208C, and W209A
Late-Breaking Poster Sessions	W Hall A4
Opening Plenary Session	W Hall A4
Research Funding Insights Room	Room W209C
Scientific Sessions	Rooms W202A, W203A, W204A, and W205A
Tiny Tox Talks	W Hall A2
ToxExpo Exhibits	W Hall A2



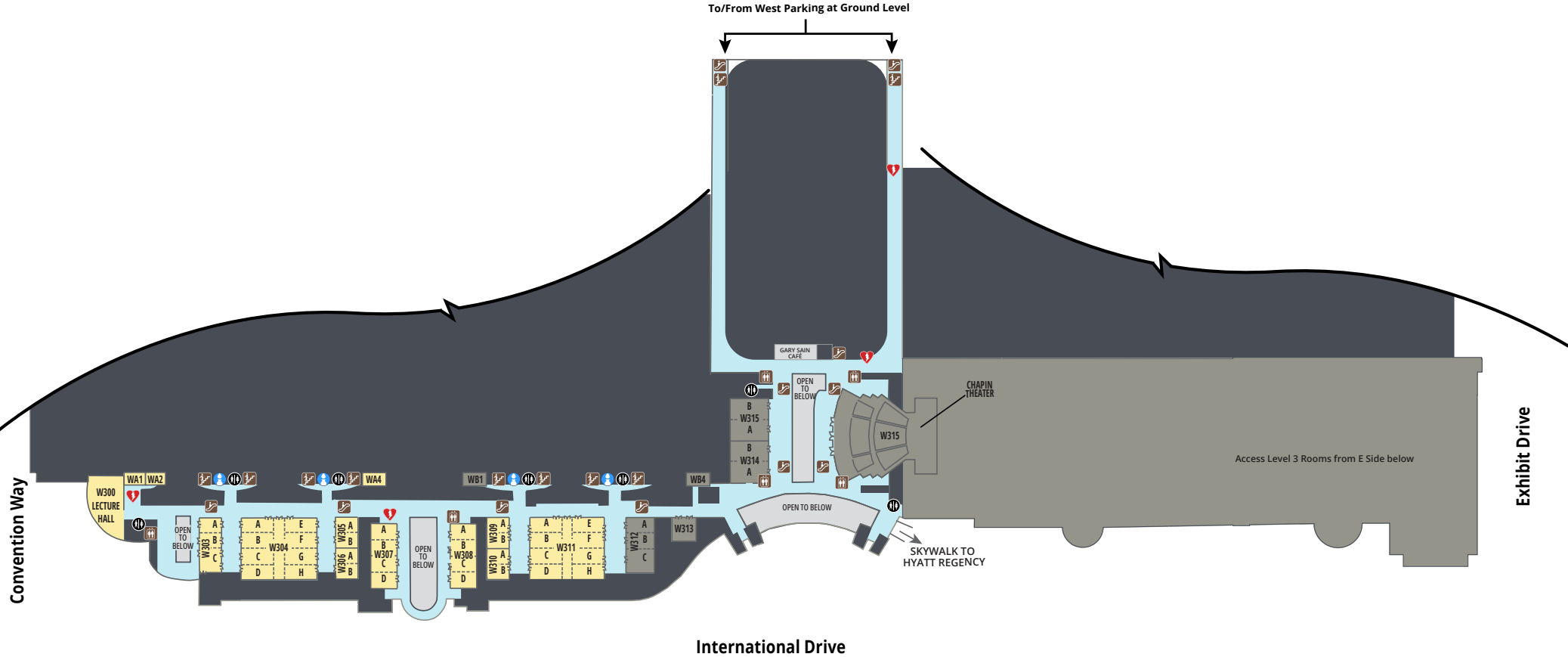


Orlando Convention Center

West Concourse Level 3

In This Space

Continuing Education (CE) Courses (Add-On Events)	Rooms W307A and W308A
Scientific Sessions	Room W304A, W304E, W307A, and W308A
Speaker Ready Room	Room W305A



Hyatt Regency Orlando Hotel

Level One/Convention Level

In This Space	
Ancillary Meetings	See SOT Event App for Room Info
Regional Chapter Events	See SOT Event App for Room Info
Special Interest Group Events	See SOT Event App for Room Info
Specialty Section Events	See SOT Event App for Room Info

Icon Key

—ATM

—Concessions Stands/
Coffee Bar/Grab & Go

—Elevator

—Escalator

—Information

—Restroom (FAMILY)

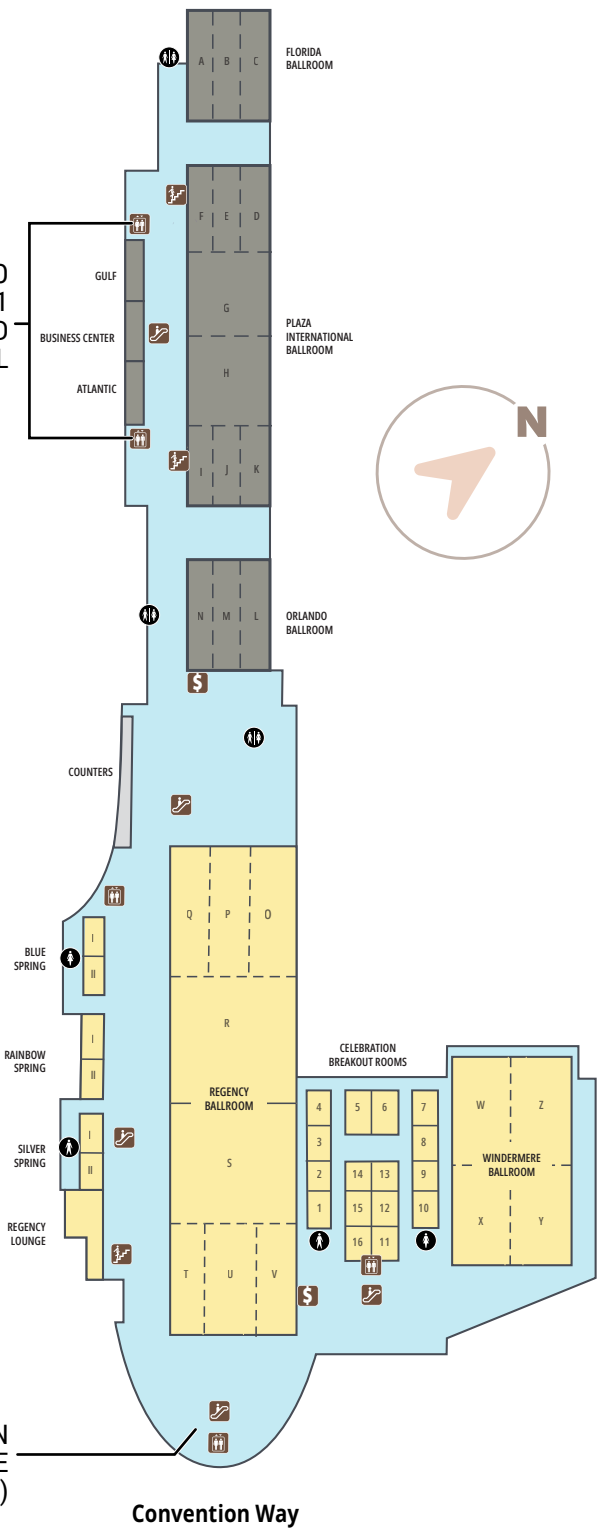
—Restrooms

—Stairs

ACCESS TO OVERSIGHT PEDESTRIAN
BRIDGE TO WEST CONCOURSE
(CONVENTION CENTER)

ELEVATORS TO
TOWER 1
GUEST ROOMS AND
LOBBY LEVEL

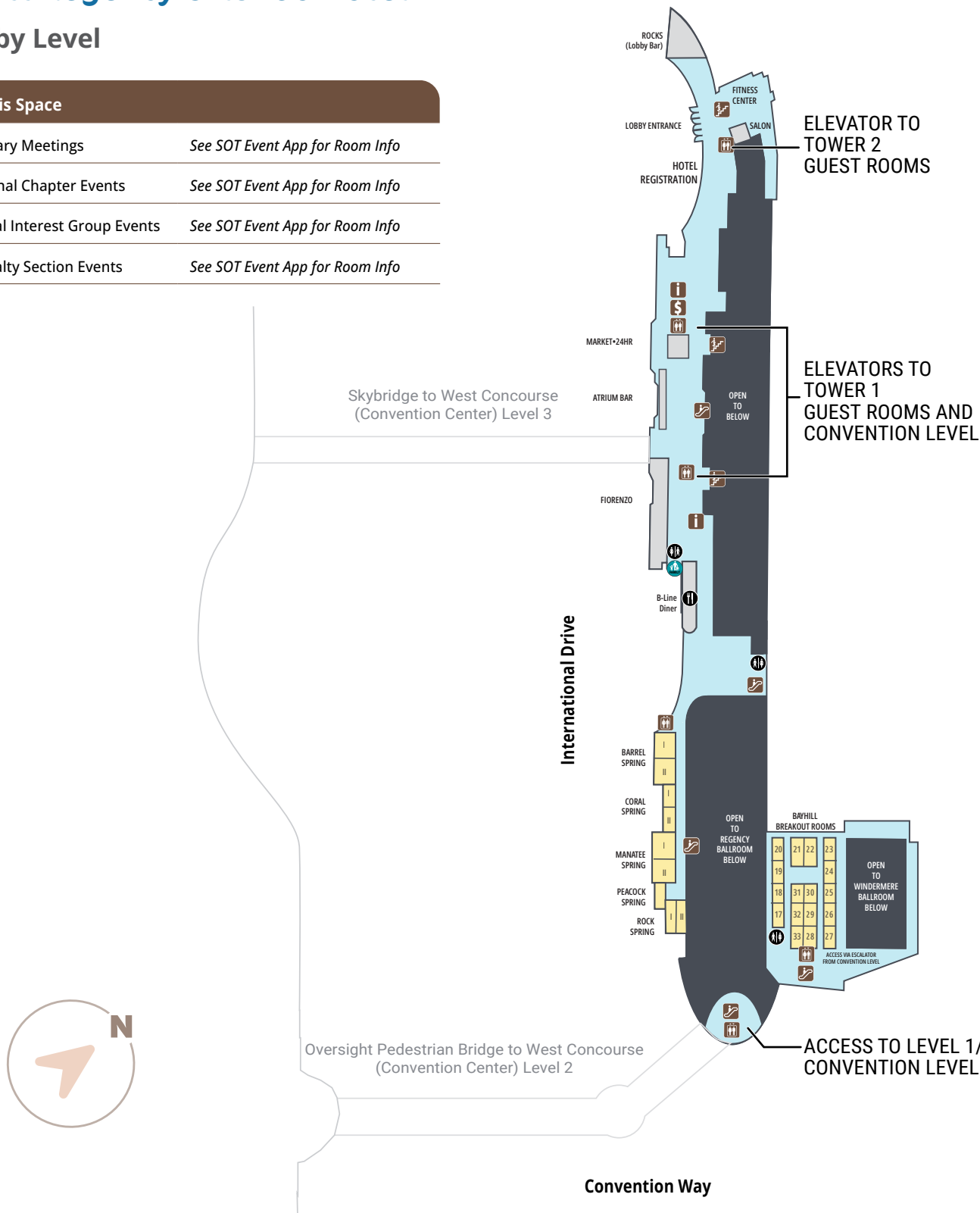
International Drive



Hyatt Regency Orlando Hotel

Lobby Level

In This Space	
Ancillary Meetings	See SOT Event App for Room Info
Regional Chapter Events	See SOT Event App for Room Info
Special Interest Group Events	See SOT Event App for Room Info
Specialty Section Events	See SOT Event App for Room Info



Rosen Centre Hotel

Level 1

In This Space	
Ancillary Events	See SOT Event App for Room Info
Undergraduate Diversity and Education Programs (Undergrads Only)	Executive Ballroom H

Icon Key

—ATM

—Elevator

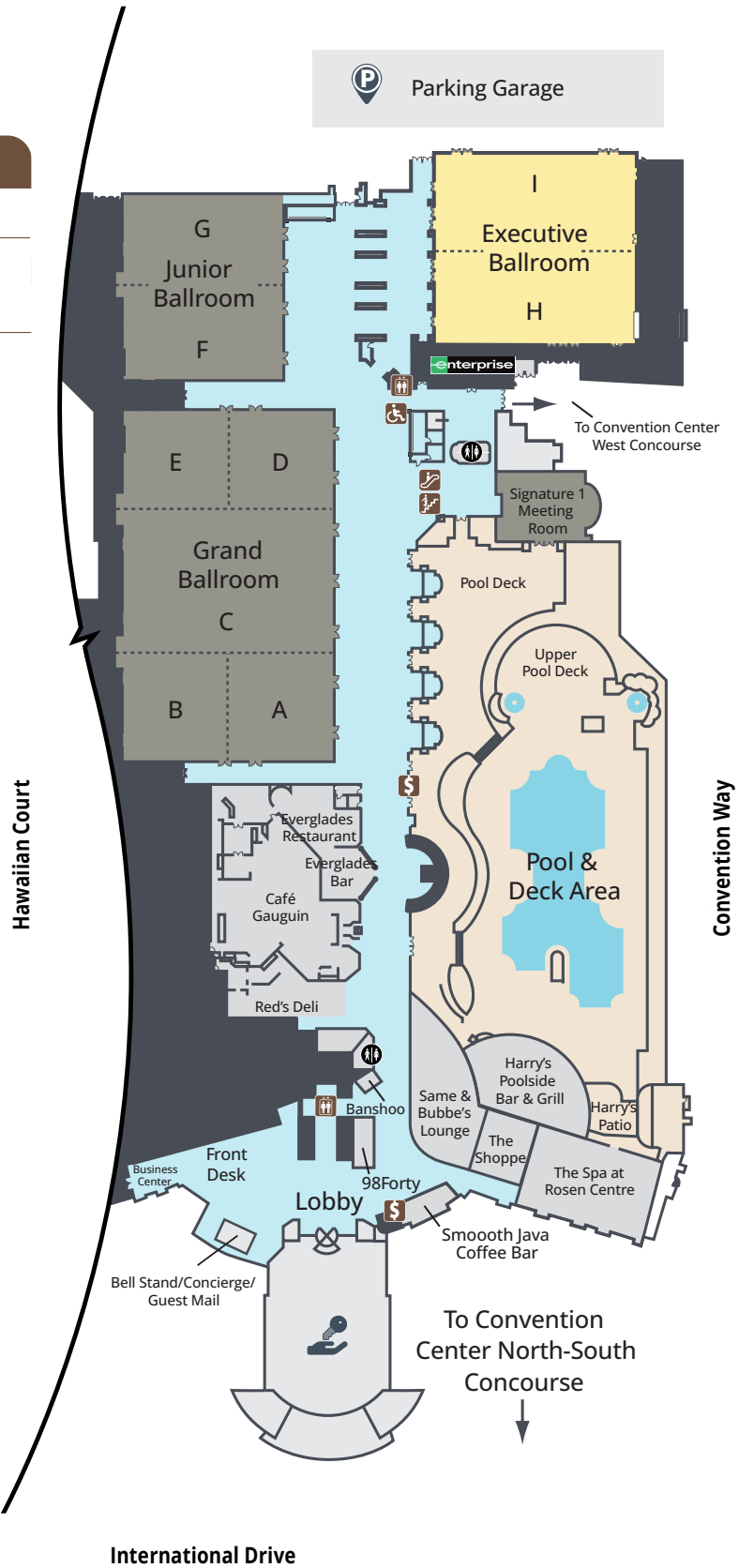
—Escalator

—Parking

—Parking (Valet)

—Restrooms

—Stairs



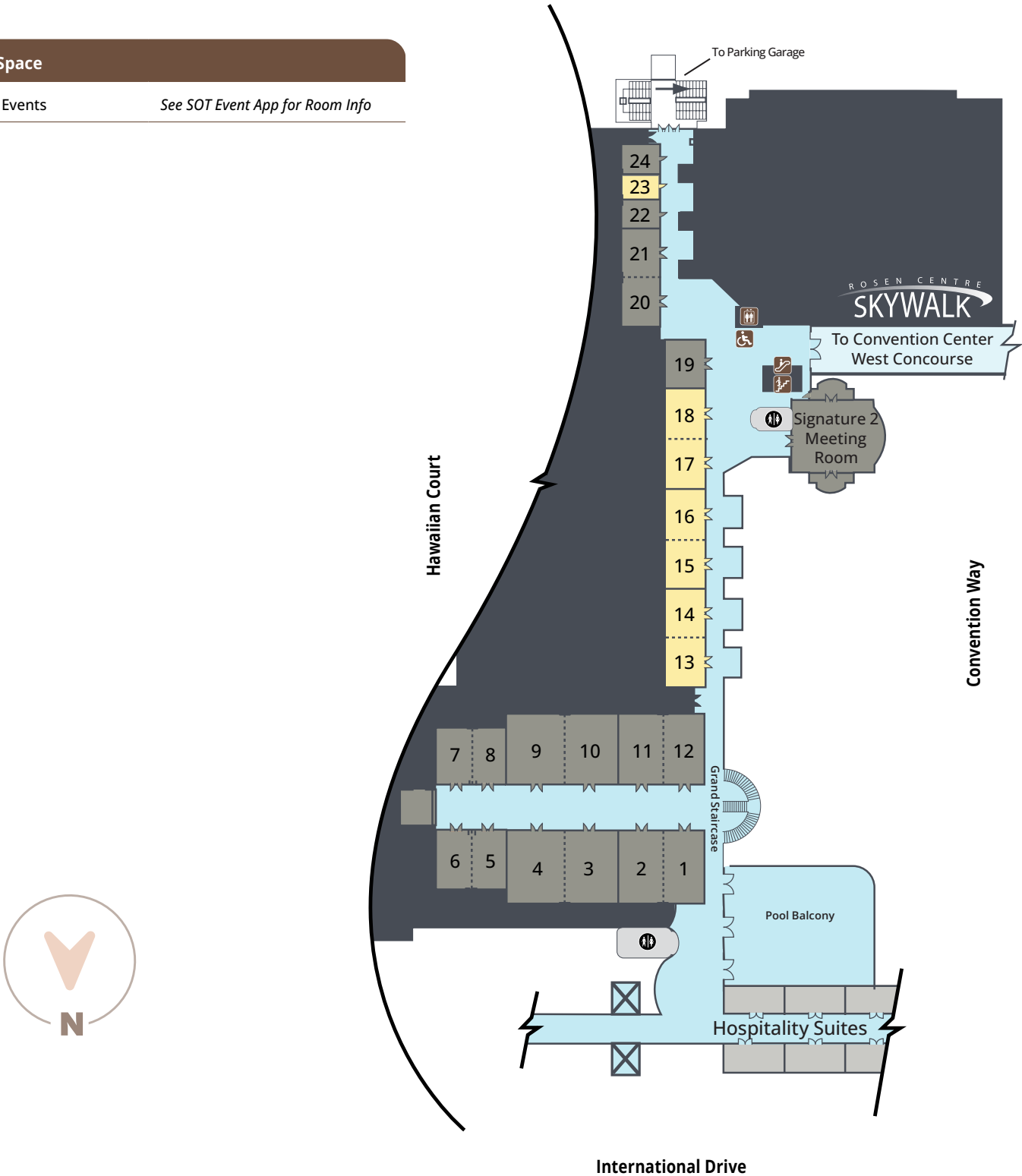
Rosen Centre Hotel

Level 2

In This Space

Ancillary Events

See SOT Event App for Room Info



Annual Meeting Support



Become an Annual Meeting Supporter

Annual Meeting Supporters enable the Society to facilitate the attendance of more scientists at various career levels at the Annual Meeting—while helping keep attendee registration fees low.

Supporters receive prominent recognition throughout the SOT Annual Meeting and ToxExpo, with visibility varying by the level of support. In addition, Silver-level Supporters and above are invited to attend the SOT President's Reception, an invitation-only event, as an expression of appreciation for their support.

If you are interested in supporting the SOT Annual Meeting, contact [Jenna Pelsey by email](#) or by phone at [703.438.3115](tel:703.438.3115).

Strengthen Your Visibility

Increase awareness of your organization during the meeting through [SOT marketing and advertising opportunities](#). SOT offers opportunities to fit all budgets. Escalator clings and charging cube branding are some of the on-site possibilities, while banner ads in the SOT Event App and on the Wi-Fi welcome page are available for those looking for an online presence.



Pledge Your Support

There are five categories of support available, with the higher levels providing greater visibility for your organization:

- » Diamond (\$10,000+)
- » Platinum (\$5,000–\$9,999)
- » Gold (\$2,500–\$4,999)
- » Silver (\$2,000–\$2,499)
- » Contributor (\$1,000–\$1,999)

www.toxicology.org/support

Thank you to our Diamond Supporters.*

**As of November 20, 2024*

BURROUGHS
WELLCOME
FUND 


COLGATE-PALMOLIVE


ELSEVIER

Genentech
A Member of the Roche Group






SOT | Society of
Toxicology
ENDOWMENT
Investing in the Future...


WuXi AppTec

View all our generous Supporters by visiting www.toxicology.org/support.

Registration



Toxicologists, trainees, individuals from related fields, and others working in toxicology are invited to register to attend the SOT 64th Annual Meeting and ToxExpo, where you will have access to:

- 70+ Featured and Scientific Sessions (*begin Monday, March 17*)
- 30+ Poster Sessions (*begin Monday, March 17*)
- 275+ ToxExpo Exhibits (*begin Monday, March 17*)
- 40+ Exhibitor-Hosted Sessions and other exhibitor-hosted events (*begin Monday, March 17*)
- Special events, such as the Welcome Reception, Awards Ceremony, and Tox ShowDown (*begin late afternoon Sunday, March 16*)
- Luncheons, mentoring events, and receptions hosted by SOT Regional Chapters, Special Interest Groups, and Specialty Sections (*begin the evening of Sunday, March 16*)

SOT Registration Department



Mail:

SOT Headquarters
11190 Sunrise Valley Drive, Suite 300
Reston, VA 20191



Tel:

[703.438.3115](tel:703.438.3115)



Fax:

703.438.3113



Email:

sotmeetings@toxicology.org

Three Ways to Register in Advance

 Online:

www.toxicology.org/register

Requires payment by credit card

 Mail or Fax:

Registration form must be received by March 13.

 Tel:

Monday–Friday, 9:00 AM–5:00 PM (ET)
Available through March 13

Add-On Activities

All registrants can add on additional meeting experiences when registering or any time before or during the meeting, pending space availability. Some of these events are complimentary but require a reservation; others have an associated fee. Also, some events are limited to student and postdoc registrants. If you have already registered for the meeting, to add a special activity, visit the “[My Events](#)” area of your SOT account. Select “Annual Meeting 2025” and then “Add Tracks/Sessions” to register for one of the add-on events.

The add-on events are:

- Continuing Education courses (*Sunday, March 16*)
- Career Exploration through Speed Informational Interviews (*Tuesday, March 18; complimentary but limited space for graduate student and postdoc attendees; registration required*)
- *In Vitro* Lecture and Luncheon (*Monday, March 17; \$10 and limited to student and postdoc attendees*)
- Postdoctoral Luncheon (*Tuesday, March 18; \$12 per attendee; limited to postdoc attendees*)
- SOT Mentoring Breakfast (*Tuesday, March 18; \$10 per attendee and limited to SOT members*)
- Student/Postdoctoral Scholar Mixer (*Sunday, March 16; complimentary but reservation required*)
- Trainee Discussion with the Plenary Speaker (*Monday, March 17; complimentary but limited to graduate student and postdoc attendees; reservation required*)
- Undergraduate Education Program (*Sunday, March 16; complimentary but limited to undergraduate students*)

Registration Form*

R2025

(Page 1)

SOT 64th Annual Meeting and ToxExpo • March 16–20, 2025

PLEASE PRINT CLEARLY OR TYPE

(Required: Please check the appropriate box)

☐ SOT Member ☐ Nonmember Badge Name: _____

First Name/Middle Initial: _____ Last Name: _____

Title: _____ Professional Degree(s): _____

Organization/University: _____

(Is this a new employer and/or new address? ☐ Yes ☐ No)

Organization/University (second line, if needed): _____

Department: _____

Street Address: _____

City/Region: _____ State/Prov: _____ Postal Code: _____ Country: _____

Area Code/Telephone Number: _____ Fax Number: _____

Email Address: _____

Special Accessibility Requirements: _____

If you are a Student or Postdoc registrant, please complete the following information:

☐ Postdoc ☐ Graduate Student ☐ Undergraduate/High School Student; Expected Graduation Date _____ (Fax or mail a copy of student ID with the form)

Institution: _____ Advisor's Name: _____

Advisor's Telephone Number: _____ Advisor's Email: _____

REGISTRATION FEES

☐ I'm Already Registered

	Early-Bird Registration (Received by Jan. 24)	Standard Registration (Jan. 25 to Feb. 21)	Final Registration (After Feb. 21)	
SOT Member	\$495	\$560	\$620	\$ _____
Nonmember**	\$890	\$955	\$1,020	\$ _____
SOT Retired/Emeritus Member	\$125	\$185	\$235	\$ _____
SOT Postdoctoral Member	\$125	\$175	\$225	\$ _____
Postdoctoral Nonmember**	\$225	\$285	\$335	\$ _____
SOT Graduate Student Member	\$105	\$155	\$205	\$ _____
Graduate Student Nonmember**	\$185	\$235	\$295	\$ _____
Undergraduate Student (Copy of Student ID Required)	\$0	\$0	\$0	\$ _____
High School Student (Copy of Student ID Required)	\$0	\$0	\$0	\$ _____
SOT Global Partner (One Complimentary Registration per Company)	\$0	\$0	\$0	\$ _____
Press (Contact the SOT Communications Director for approval)	\$0	\$0	\$0	\$ _____
Guest/Spouse (Nonscientist/No Access to the Scientific Sessions or ToxExpo)	\$70	\$85	\$100	\$ _____

Guest/Spouse Name: _____

METHOD OF PAYMENT

All registrations submitted by hard copy or fax will be processed online by SOT staff.

Registration Fees (from page 1) \$ _____

☐ Check or Money Order #: _____
(PAYABLE TO "SOCIETY OF TOXICOLOGY")

Continuing Education Courses (from page 2) \$ _____

☐ Government Purchase Order #: _____
(US GOVERNMENT PO FORM MUST BE ATTACHED)

Add-On Events (from page 2) \$ _____

☐ American Express ☐ Diner's Club ☐ Discover ☐ MasterCard ☐ Visa

TOTAL DUE \$ _____

Credit Card #: _____ Expiration Date: _____

Signature: _____ Cardholder's Printed Name: _____

By registering for the SOT Annual Meeting and ToxExpo, you agree to the terms and conditions outlined in the registration policies on the third page.

* SOT will accept faxed Registration Forms until March 13. Online registration will be open until March 20. On-Site registration will be available at Orange County Convention Center in Orlando.

** Apply for SOT membership by December 31, 2024, to enjoy discounted member registration rates. Those who are accepted are notified in late February when you can register for the meeting with substantial savings over the nonmember rate. If you miss the December 31, 2024, deadline, nonmember 2025 Annual Meeting and ToxExpo attendees can submit applications for the March review cycle (deadline March 31, 2025), and upon acceptance, SOT will waive your 2025 membership dues!

RETURN THIS TWO-PAGE FORM WITH PAYMENT TO:

SOT Headquarters Registration Dept., 11190 Sunrise Valley Drive, Suite 300, Reston, VA 20191-4375

Faxed forms are accepted only if using a credit card. Fax form to 703.438.3113.

US GOVERNMENT PURCHASE ORDERS MUST BE FAXED OR MAILED WITH THE REGISTRATION FORM.

Questions? Contact SOT. • Tel: 703.438.3115 • Email: sothq@toxicology.org

Registration Form

(Page 2)

SOT 64th Annual Meeting and ToxExpo • March 16–20, 2025

CONTINUING EDUCATION COURSES

☐ Yes, I would like to attend the indicated CE courses. (Only meeting registrants may enroll in a CE course.) (One per time slot) AM # _____ PM # _____
Visit www.toxicology.org/sot-ce to view course list and numbers.

	Early-Bird Registration (Received by Jan. 24)	Standard Registration (Jan. 25 to Feb. 21)	Final Registration (After Feb. 21)	# of Courses	
SOT Member/Global Partner	\$175 each	\$210 each	\$245 each	x _____	\$ _____
SOT Retired/Emeritus Member	\$130 each	\$165 each	\$200 each	x _____	\$ _____
Nonmember	\$325 each	\$360 each	\$395 each	x _____	\$ _____
Postdoctoral (SOT Member/Nonmember)	\$110 each	\$145 each	\$180 each	x _____	\$ _____
Student (SOT Member/Nonmember)	\$65 each	\$100 each	\$135 each	x _____	\$ _____
Press	\$0	\$0	\$0	x _____	\$ _____

☐ Yes, I would like to attend the indicated CE Sunrise Minicourse (includes continental breakfast). SR # _____

SOT Member/Global Partner	\$70	\$105	\$140	\$ _____
SOT Retired/Emeritus Member	\$65	\$100	\$135	\$ _____
Nonmember	\$90	\$125	\$160	\$ _____
Postdoctoral (SOT Member/Nonmember)	\$65	\$100	\$135	\$ _____
Student (SOT Member/Nonmember)	\$35	\$70	\$105	\$ _____
Press	\$0	\$0	\$0	\$ _____

ADD-ON EVENTS

- ☐ Yes, I am an undergraduate student and would like to attend the Sunday Undergraduate Education Program. (Limited seating; ticket required) \$ _____ 0
- ☐ Yes, I am a student or postdoctoral registrant and would like to attend the Student/Postdoctoral Mixer on Sunday, 7:30 pm–9:00 pm. (Ticket required) \$ _____ 0
- ☐ Yes, I am a graduate student or postdoctoral member registrant and would like to attend the Trainee Discussion with Opening Plenary Speaker on Monday—event details still being confirmed. (Limited seating; ticket required) \$ _____ 0
- ☐ Yes, I am a student or postdoctoral registrant and would like to attend the *In Vitro* Lecture and Luncheon on Monday, 12:00 noon–1:30 pm. (Limited seating; ticket required) \$ _____ 10
- ☐ Yes, I would like to attend the Mentoring Breakfast on Tuesday, 7:30 am–9:00 am, as a mentee. (SOT members only; limited seating; ticket required) \$ _____ 10
- ☐ Yes, I am a postdoctoral registrant and would like to attend the Postdoctoral Luncheon on Tuesday, 12:00 noon–1:15 pm. (Limited seating; ticket required) \$ _____ 12
- ☐ Yes, I am a graduate student or postdoctoral registrant and would like to attend the Career Exploration session on Tuesday, 1:45 pm–3:00 pm. (Limited seating; ticket required) \$ _____ 0

REGISTRANT—CHECK ALL THAT APPLY: (YOU MUST MAKE ONE SELECTION PER CATEGORY)

A. Type of Organization:

- ☐ 1. Academia
☐ 2. Consultant
☐ 3. Contract Research
☐ 4. Government
☐ 5. Military
☐ 6. Private Industry
☐ 7. Other _____

B. Job Function:

- ☐ 8. Analytical
☐ 9. Financial/Purch.
☐ 10. Computer/Statistics
☐ 11. Health and Safety
☐ 12. Mgmt. Corporate
☐ 13. Mgmt. Facilities
☐ 14. Mgmt. Personnel
☐ 15. Marketing/Sales
☐ 16. Quality Assurance
☐ 17. Regulatory
☐ 18. R&D Admin.

C. Field of Work:

- ☐ 19. R&D Operations
☐ 20. R&D Technical
☐ 21. Teaching
☐ 22. Other _____
☐ 23. Biological Modeling
☐ 24. Biotechnology
☐ 25. Carcinogenesis
☐ 26. Cardiovascular
☐ 27. Clinical and Transl. Tox.
☐ 28. Comparative and Vet.
☐ 29. Computational Tox.
☐ 30. Dermal Tox.
☐ 31. Drug Discovery Tox.
☐ 32. Epidemiology
☐ 33. Ethical, Legal, Forensics, and Societal Issues
☐ 34. Exposure
☐ 35. Food Safety

C. Field of Work:

- ☐ 36. General Tox.
☐ 37. Genetic Tox.
☐ 38. Immunotoxicology
☐ 39. Infusion Tox.
☐ 40. Inhalation Tox.
☐ 41. *In Vitro* and Alt. Methods
☐ 42. Mechanisms
☐ 43. Medical Devices
☐ 44. Metals
☐ 45. Methods
☐ 46. Mixtures
☐ 47. Molecular Biology
☐ 48. Mutagenicity
☐ 49. Nanotoxicology
☐ 50. Neurotoxicology
☐ 51. Occup. and Public Health
☐ 52. Ocular Tox.
☐ 53. Pathology
☐ 54. Pharmacokinetics

D. Product Interest:

- ☐ 55. Pharmacology
☐ 56. Risk Assessment
☐ 57. Reg. and Safety Eval.
☐ 58. Repro. and Develop. Tox.
☐ 59. Stem Cells
☐ 60. Other _____
☐ 61. Publications
☐ 62. Contract Services:
☐ a. Analytical
☐ b. Aquatic Tox.
☐ c. Clinical Tox.
☐ d. Computer
☐ e. *In Vitro* Tox.
☐ f. Metabolic Profile
☐ g. Pathology
☐ h. Preclinical Tox.
☐ i. Quality Assurance
☐ j. Wildlife Tox.

E. Purchasing Responsibilities:

- ☐ 63. Supplies/Equipment
☐ a. Analytical
☐ b. Clinical Chem.
☐ c. Hardware
☐ d. Software
☐ e. *In Vitro*
☐ f. *In Vivo*
☐ g. Lab Animal
☐ h. Neurotoxicology
☐ i. Pathology
☐ j. Radioactive Isotope
☐ 64. Other _____
☐ 65. ☐ a. I make purchasing decisions
☐ b. I influence purchasing decisions
☐ c. I do not participate in purchasing decisions

**Refund or cancellation requests must be received at SOT Headquarters by February 21, 2025.
Requests received after February 21, 2025, will not be processed.**

SOT will accept faxed Registration Forms until March 13. Online registration will be open until March 20.
Registration Forms also will be available on-site at Orange County Convention Center in Orlando.

2025 SOT Annual Meeting and ToxExpo Policies

Attendee Qualifications

The Society of Toxicology (SOT) reserves the right to review applications for participation at the SOT Annual Meeting and ToxExpo to confirm that the applicant meets the SOT attendance qualifications. The Society may reject a registration by any individual or organization or withdraw registration privileges at any time if the individual or organization is found to be inconsistent with or in violation of the Society's principles, interests, and policies.

Individuals

Participation is available only to bona fide individuals who are engaged in or promote the field of toxicology or biotechnology research and support the growth and development of the toxicology field.

Organizations

Participation is available only to bona fide organizations with public policy positions and business practices that are generally consistent with the [SOT mission](#), goals, and reputation, as well as the Society's [policies and principles](#).

Attendance Requirements

SOT reserves the right to implement policies, procedures, and requirements to protect the health of all individuals associated with the meeting. If such policies are developed, all registrants will be notified of the changes and new requirements, and these policies will be updated to reflect the new requirements.

Attendance Terms and Conditions

By registering for the SOT Annual Meeting and ToxExpo, you are agreeing to abide by the SOT [Code of Conduct](#) policy and to the terms and conditions outlined here, granting SOT permission to:

- Reproduce, copy, and publish your image, voice, and any or all media taken at the Annual Meeting and ToxExpo.
- Share your contact information with organizations that the Society believes might have a product or service of interest to you. Limited data provided to third parties include name, title, affiliation, and business address. Your telephone and fax numbers and email address will not be disclosed to third parties.
- Share your name and affiliation with [ToxExpo exhibitors](#) and Annual Meeting Supporters.
- Include your name and affiliation in the attendee list, which will be accessible to meeting registrants using the SOT Event App.

SOT Annual Meeting and ToxExpo registrants:

- Will conduct a self-health assessment before arriving at any in-person events and will not participate at any in-person sessions if they are experiencing any symptoms of contagious or transmittable illness.
- Acknowledge that participating in this event and interacting with people place you at risk of exposure to or illness from infectious diseases regardless of your or their vaccination status.
- Acknowledge that SOT may need to share your contact information with public health authorities or other associated personnel if a public health event becomes associated with the meeting.
- Confirm, acknowledge, and will abide by all applicable regulations and health and safety protocols instituted by SOT and local and national authorities.
- Assume the risk of injury, harm, and loss associated with the event, including any injury, harm, and loss caused by the negligence, fault, or conduct of any kind on the part of SOT, its vendors, and its partners.

SOT Annual Meeting and ToxExpo registrants (excluding registered guests) are allowed to bring children under full parental/guardian control into Scientific Sessions and the ToxExpo Exhibit Hall during open hours only.

- Full control entails ensuring that children do not interfere with exhibits and sessions or display disruptive behavior (i.e., no running, no excessive noise).
- Parents/guardians will be liable for any damage to exhibits.
- In consideration of other participants, disruptive children should be removed from the hall or session.

SOT Annual Meeting and ToxExpo registrants are prohibited from:

- Inviting guest/spouse registrants into Scientific Sessions and the ToxExpo Exhibit Hall.
- Soliciting in the ToxExpo Exhibit Hall unless registered as an exhibitor. SOT retains the right to remove any company or individual that has not duly contracted for exhibit space.
- Speaking on electronic devices while attending Scientific Sessions. Attendees are asked to silence all electronic devices while attending Scientific Sessions.

These policies will be enforced by the Society. Individuals who do not comply will be asked to leave the session and/or ToxExpo Exhibit Hall. To request an exemption from any of the Annual Meeting and ToxExpo policies, the registrant must submit written notification to SOT Headquarters before the Annual Meeting and ToxExpo or while on-site. If you have any questions regarding these policies, please contact the [SOT Headquarters Office](#).

Photography and Other Media Policies

The Society does not permit photography or media capture—such as video or audio recordings or screenshots—of Scientific Sessions, the ToxExpo Exhibit Hall, or any virtual presentations (e.g., ePosters, livestreams, on-demand videos) without the consent of the session Chair, the presenter(s)/author(s), and/or the exhibitor(s). Failure to follow these policies may result in the removal of an individual from the meeting without warning or refund of any expenses, prohibition of attendance at future SOT meetings, and notification to the individual's employer. In addition:

- Photographing colleagues against the backdrop of scientific posters on display without the express consent of the presenting author(s) is prohibited, as is photographing, capturing, or screenshotting posters and ePosters on display physically or virtually.
- Photographing or recording ToxExpo exhibit booths without the consent of a representative of the exhibiting organization is prohibited.
- Media capture of Scientific Sessions or Exhibitor-Hosted Sessions via any method is prohibited, including capturing any element of any session that may be presented virtually, without the permission of the session Chair(s), presenter(s), and/or exhibitor(s).

SOT Code of Conduct

The Society of Toxicology (SOT) is committed to providing a safe and productive environment for all its meetings—one that fosters open dialogue, the free exchange of scientific ideas, the promotion of equal opportunity and is free of any sort of harassment, coercion, and discrimination. The [SOT Code of Ethics](#) requires all members to act with integrity, and it is expected that all meeting participants treat others with respect and consideration; follow venue rules; and alert SOT staff, officers, or security of any potentially dangerous situations, individuals in stress, or instances of harassment, coercion, or discrimination. SOT is fully cognizant that there are areas of science that are controversial. SOT meetings will serve as a forum to consider and debate scientifically relevant viewpoints in an orderly, respectful, and fair manner. The policies herein apply to all meeting attendees, speakers, exhibitors, guests, staff, contractors, and volunteers.

What is harassment?

Harassment includes any communication or behavior that is not welcome or is personally offensive. Harassment for any reason is not tolerated by the Society. Behavior acceptable to one person may not be acceptable to others. Therefore, meeting attendees must use discretion to ensure that respect is clearly communicated. Harassment expressed in a joking manner still constitutes unacceptable behavior. Retaliation for reporting harassment is a violation of this policy, as is reporting an incident in bad faith.

Reporting harassment

SOT is committed to providing a safe environment for everyone at any SOT meeting. If an individual experiences or witnesses harassment of any kind, they should contact SOT staff [by email](#) or by calling [703.438.3115](#) or should use a venue phone or personal cell phone to contact venue security. All complaints will be treated seriously and responded to promptly according to SOT policies and procedures.

To file a grievance of harassment:

- Notify [meeting staff by email](#) or by calling [703.438.3115](#).
- SOT staff will discuss any grievance first with the individual filing the grievance, then with the alleged offender; seek counsel if the appropriate action is unclear; and report the incident and any findings to SOT Council and the Society's legal counsel.
- SOT will consult with the individual filing the grievance before taking any action.

SOT reserves the right to remove an individual from a meeting without warning or refund of any expenses, to prohibit attendance at future SOT meetings, and to notify the individual's employer.

If there are questions related to this policy, please send an email to [SOT Headquarters](#) to the attention of the SOT Executive Director or call [703.438.3115](#).

SOT Privacy Policy and Disclaimer

The SOT Annual Meeting and ToxExpo adheres to the Society's [general privacy policy and disclaimers](#).



The Society of Toxicology has established a special category for private, public, and not-for-profit organizations that wish to contribute to the success of the Society through year-round support. You, too, can become among those organizations that demonstrate their commitment to the SOT mission of “creating a safer and healthier world by advancing the science and increasing the impact of toxicology.” Organizations interested in becoming an SOT Global Partner should contact [SOT Headquarters](#).

Here’s Why You Should Support SOT

By becoming an SOT Global Partner, organizations are:

- Supporting the premiere toxicology society in increasing the scientific impact of and advocating for the value of toxicology
- Contributing to the success of scientific meetings in toxicology and attracting scientists at all stages of their careers from around the globe
- Promoting the importance of education and building for the future of toxicology
- Encouraging activities aligned with the prediction and prevention of toxicity and disease

AbbVie, Inc.
North Chicago, Illinois

Bristol Myers Squibb
Princeton, New Jersey

**Chemical Insights Research Institute
of UL Research Institutes**
Marietta, Georgia

Chevron Technical Center
Houston, Texas

Colgate-Palmolive Company
Piscataway, New Jersey

Corteva Agriscience
Indianapolis, Indiana

DuPont de Nemours, Inc.
Wilmington, Delaware

**ExxonMobil
Biomedical Sciences, Inc.**
Annandale, New Jersey

Genentech, Inc.
South San Francisco, California

Gilead Sciences, Inc.
Foster City, California

Inotiv
West Lafayette, Indiana

J.S. Held LLC
Redmond, Washington

Lonza Bioscience
Walkersville, Maryland

Novartis Pharma AG
Basel, Switzerland

Oxford University Press
Oxfordshire, United Kingdom

Pfizer, Inc.
Cambridge, Massachusetts

Procter & Gamble Company
Mason, Ohio

Regeneron Pharmaceuticals, Inc.
Tarrytown, New York

Sanofi
Cambridge, Massachusetts

Syngenta Crop Protection, Inc.
Greensboro, North Carolina

As of November 12, 2024

Hotel and Travel



Housing

SOT has reserved rooms and negotiated exclusive rates at many hotels near the Orange County Convention Center.

While SOT recognizes that other housing arrangements are possible, booking through [Connections Housing](#) helps reduce SOT expenses and provides you with the benefit of free housing assistance before or during the meeting.



The deadline to reserve your housing through Connections Housing is February 7, 2025.

Hotel Reservation Information

Connections Housing is the only SOT-approved partner designated to make reservations at the hotel that best meets your needs for the SOT Annual Meeting and ToxExpo. You can book your reservation at no additional cost, 24-7 through the [SOT and Connections Housing website](#), which offers real-time availability with full hotel descriptions, amenity listings, distances from the Orange County Convention Center, maps, and other information to help make your decision easier.

You may make new reservations or modify or cancel existing reservations by using the [online housing system](#) or by contacting Connections Housing directly.

Book Online:

www.toxicology.org/housing

Tel:

404.842.0000

Mail:

[Housing Reservation Form](#)

Hours of Operation:

Monday–Friday,
9:00 AM–6:00 PM (ET)

Fax:

725.218.1546

Connections Housing
950 Scales Road, Building 200
Suwanee, GA 30024

A reservation acknowledgment will be emailed, faxed, or mailed to you once your reservation has been booked. You will not receive a confirmation from your hotel. If you do not receive an acknowledgment within three business days, please call Connections Housing.

Transportation

Air Transportation

[Orlando International Airport](#) (MCO) is 11 miles east of downtown Orlando and is home to 42 airlines. [Orlando Sanford International Airport](#) (SFB) is located 45 miles north of Orlando, servicing two small airlines. [Tampa International Airport](#) (TPA) is two hours from Orlando, hosts 22 airlines, and can be accessed through [Amtrak](#).

Preferred-Carrier Airfare Discounts

For the latest information on available discounts from select carriers, as well as instructions on how to secure reduced airfare prices, please visit the [“Travel”](#) web page on the SOT Annual Meeting website.

Hotel Map



Orange County Convention Center
West Concourse
9800 International Drive, Orlando, FL 32819

1	Castle Hotel, Autograph Collection by Marriott 8602 Universal Boulevard	5	Residence Inn by Marriott Orlando Convention Center 8800 Universal Boulevard
2	Embassy Suites by Hilton Orlando International Drive Convention Center 8978 International Drive	6	Rosen Centre Hotel 9840 International Drive
3	Hilton Orlando 6001 Destination Parkway	7	Rosen Plaza Hotel 9700 International Drive
4	Hyatt Regency Orlando (SOT Headquarters) 9801 International Drive	8	Springhill Suites by Marriott Orlando Convention Center/I-Drive Area 8840 Universal Boulevard



Hotel Services

SOT Hotel Name and Address		Rewards Program	Distance to Convention Center (Miles by Car)	Single/Double Rate*	Restaurant on Property	Complimentary Breakfast	In-Room Safe	Complimentary Fitness Center	Swimming Pool	Business Center	Complimentary In-Room Wi-Fi	Room Service	Gift Shop	Self-Parking per Night*	Valet Parking per Night*	AAA Rating
1	Castle Hotel, Autograph Collection by Marriott 8602 Universal Boulevard	Marriott Bonvoy	1.3 miles	\$249	✓		✓	✓	✓	✓	✓	✓		Discounted to \$51 per day	N/A	4 Diamond
2	Embassy Suites by Hilton Orlando International Drive Convention Center 8978 International Drive	Hilton Honors	1.0 mile	\$263	✓	✓	✓	✓	✓	✓	✓	✓	✓	Discounted to \$11 per day	N/A	3 Diamond
3	Hilton Orlando 6001 Destination Parkway	Hilton Honors	1.0 mile Connected through the North Concourse and then by Sky Bridge	\$285	✓		✓	✓	✓	✓	✓	✓	✓	\$35 per day (SOT Guests will receive 25% off prevailing parking rates.)	\$45 per day (SOT Guests will receive 25% off prevailing parking rates.)	4 Diamond
4	Hyatt Regency Orlando (SOT Headquarters Hotel) 9801 International Drive	World of Hyatt	0.3 mile Connected via Sky Bridge to West Concourse	\$289	✓		✓	✓	✓	✓	✓	✓	✓	Prevailing rate at time of event. (\$35 per night on May 13, 2024)	Prevailing rate at time of event. (\$50 per night on May 13, 2024)	4 Diamond
5	Residence Inn by Marriott Orlando Convention Center 8800 Universal Boulevard	Marriott Bonvoy	1.2 miles	\$239		✓	✓	✓	✓	✓	✓			\$5	N/A	3 Diamond
6	Rosen Centre Hotel 9840 International Drive	iprefer.com	0.2 mile Connected via Sky Bridge to West Concourse	\$279	✓		✓	\$15 for Length of Stay	✓	✓	✓	✓	✓	\$28	\$40	3 Diamond
7	Rosen Plaza Hotel 9700 International Drive	iprefer.com	0.6 mile Connected via Sky Bridge to West Concourse	\$259	✓		✓	✓	✓	✓	✓		✓	\$20	\$30	3 Diamond
8	SpringHill Suites by Marriott Orlando Convention Center/I-Drive Area 8840 Universal Boulevard	Marriott Bonvoy	1.2 miles	\$234		✓		✓	✓	✓	✓			\$5	N/A	3 Diamond

*All hotel accommodations, room types, bed types, rates, taxes, internet access, and parking pricing are subject to change without notice. Rates shown are for single and double occupancy; additional fees may apply for additional guests. Early departures are subject to penalty fees set by the hotels. Parking rates are for hotel guests only, are subject to availability, and do not include taxes. The tax rate is 12.5% per night at all hotels, except the Hyatt Regency, Rosen Centre, and Rosen Plaza which is 13.5% per night and the Hilton Orlando which includes a \$2.25 per room per night marketing fee. This document was compiled in July 2024; SOT and Connections Housing are not liable if a service or amenity listed is not accurate. If there is a specific service or amenity you require, it is best to confirm this directly with the hotel, as services listed herein can be changed or discontinued without notice.

General Information



Meeting Overview

This event brings together 5,000+ toxicologists and those working in areas related to toxicology to share the latest science and technology in the field, as well as to make new connections, gather with friends, and engage in mentoring and professional development.

More than 70 Featured and Scientific Sessions will take place alongside 2,000+ poster presentations and the three-day ToxExpo.

The atmosphere during the SOT Annual Meeting and ToxExpo is relaxed, yet lively, with attendees dressed in business casual attire. The science is taken seriously, but presenters and registrants are friendly and approachable.

The SOT Annual Meeting and ToxExpo website contains details on dozens of resources and services that will be available during the meeting, including:

- » [Coat/Luggage check](#)
- » [FedEx Office Print & Ship Center](#)
- » [First-Aid and emergency services](#)
- » [Food vendors and options](#)
- » [Health and safety](#)
- » [Inclusivity and accessibility](#)
- » [Lost and found](#)
- » [Orlando attractions](#)
- » [SOT Office](#)
- » [Sustainability at the Orange County Convention Center](#)

Inclusivity

A Commitment to All Meeting Participants

SOT and the Orange County Convention Center are committed to providing an inclusive, accessible, and enjoyable experience during the SOT Annual Meeting and ToxExpo. Information on available resources, as well as health, safety, and equality in Orlando, is available on [Annual Meeting website](#). If you need any services not listed on this page or the website to support your full participation in the meeting, please indicate your needs while registering for the meeting and contact Maureen Bayley at SOT Headquarters by [email](#) or phone [703.438.3115](#). Resources available to promote inclusivity and accessibility include:

- Hearing-Assistance headsets in all Scientific Session rooms
- On-Site motor scooter and wheelchair rentals through Scootaround
- Quiet Room that offers an escape from the meeting activity
- Wellness Rooms for nursing mothers, prayers, and other personal needs



ToxExpo Exhibits



Key Details

WHO:
Exhibitors supporting
scientists and researchers

WHAT:
Access to first-rate resources,
products, and connections

WHEN:
Monday, March 17
Tuesday, March 18
Wednesday, March 19
9:00 AM–4:30 PM

WHERE:
Orange County Convention Center
W Hall A2

www.toxexpo.com

Visit the ToxExpo Exhibit Hall to connect with organizations and individuals who can support you with innovative solutions, services, and opportunities.

The Exhibitors

Exhibiting organizations are experts in a variety of toxicology services and products, including:

- » Contract research
- » Preclinical research and testing
- » Pharmaceutical product safety and toxicology
- » Safety assessment
- » *In vitro* research and testing

Discover the exhibiting organizations by visiting the ToxExpo website and remember that the ToxExpo website is available year-round to connect you with valued partners.

Exhibitor-Hosted Sessions

For the most up-to-date list of Exhibitor-Hosted Sessions, use the [SOT Online Planner](#) or the [SOT Event App](#).

Smoothie Schmooze

On Tuesday, March 18, join the ToxExpo exhibitors at 3:00 pm for dedicated networking time and smoothies!



**TOX
EXPO**

View the up-to-date exhibitor list and floor plan on the ToxExpo website.



Other Activities in the ToxExpo Exhibit Hall

Networking Space

With small seating areas throughout, the ToxExpo Exhibit Hall also serves as a space for spontaneous conversations, scheduled appointments, and impromptu exchanges.

Poster Presentations

The ToxExpo Exhibit Hall features poster presentations over three days. Posters are displayed all day, with authors available during assigned Poster Sessions.

SOT Pavilion

Visit the SOT Pavilion (Booth #823) to hold scheduled and impromptu meetings, learn about SOT programs and activities, and meet with *Toxicological Sciences* Editors.

Tiny Tox Talks

The ToxExpo Exhibit Hall hosts the Tiny Tox Theater (Booth #1059). Seating less than 40 people, this venue features short presentations (no longer than 20 minutes, including Q&A) by SOT members on topics ranging from career insights and publishing advice to how to support toxicology and toxicologists.

The "Program Schedule" portion of this publication contains information on when Tiny Tox Talks are occurring, as well as their topics.

SOT 64TH ANNUAL MEETING
& ToxExpo • March 16–20, 2025
ORLANDO, FLORIDA



Pledge Your 2025 Support

**Supporter Contributions Keep Registration Fees Low
—Meaning Scientists at ALL Career Levels Can Attend!**

Supporters receive prominent recognition* throughout the SOT Annual Meeting and ToxExpo.

Make your contribution today!

www.toxicology.org/support

**Benefits vary by level of support*



Program Schedule



Session Types (Listed by date, then time, then session type)

CE Continuing Education Courses	IS Informational Sessions	W Workshop Sessions
EC Education-Career Development Sessions	PL Platform Sessions	IAT Innovations in Applied Toxicology
E Exhibitor-Hosted Sessions	PS Poster Sessions	ITS Innovations in Toxicological Sciences
FS Featured Sessions	R Roundtable Sessions	
	S Symposium Sessions	

For the most up-to-date information on all Annual Meeting sessions, events, and activities, consult the [SOT Online Planner](#) and the [SOT Event App](#).

Program Schedule Reference

The Program Schedule layout is ordered by date and start time. Each Scientific Session listing includes a session abstract and list of speakers.

» Session Type and Title

Session type and title display in large white type within a solid blue banner.

» Primary Endorser

This notation identifies the SOT Committee, Regional Chapter, Special Interest Group, or Specialty Section that developed and/or recommended the session.

» Other Endorser(s)

This notation identifies other SOT groups that endorsed the session.

» Abstract Number or Presentation Time

The first number listed is the abstract number. For Scientific Sessions (but not Continuing Education courses or poster presentations), the second number is the presentation time. Individual abstracts can be found using the SOT Event App or SOT Online Planner or in *The Toxicologist* PDF via the [SOT Annual Meeting website](#) (free to all attendees).

More details and the most up-to-date information related to the 2025 Annual Meeting program schedule are available in the [SOT Online Planner](#) and the [SOT Event App](#).

SOT Membership and Abstract Sponsors

Author names in italic font indicate that those individuals hold SOT membership. SOT members may sponsor abstracts that do not include an author with SOT membership. Authors who are members of designated organizations can serve as the sponsor of the abstract if an SOT member is not a co-author; these types of sponsorships are displayed with an organization name after the sponsor name (e.g., Sponsor: A. Smith, EUROTOX).

Reviewing the Schedule

The two best and most up-to-date resources for viewing the 2025 Annual Meeting schedule are the [SOT Online Planner](#) and [SOT Event App](#). Both can be used anywhere, anytime.

SOT Online Planner

The SOT Online Planner is updated continually throughout the year and is designed to operate on a desktop or laptop computer. With the SOT Online Planner, you can:

- » **View the Schedule**

The planner includes the full meeting schedule and all session details such as the presentation titles, speakers, and abstracts.

- » **Search by Keyword**

You can search by keyword and filter the schedule by activity type (e.g., sessions, receptions).

- » **Build Your Calendar**

Once you have registered for the meeting, you can log in to the planner to build your customized schedule. Plus, you can add bookmarks and notes. Your customized schedule, bookmarks, and notes also will transfer to the SOT Event App once you log in to it.



For more information on the SOT Online Planner and to watch tutorials on how to use it, visit the [SOT Annual Meeting website](#).

SOT Event App

The 2025 SOT Event App is your all-in-one tool for managing your time and maximizing your experience at the meeting. Build a custom schedule, access session and abstract descriptions, watch on-demand recordings, find speaker information, view venue maps, and more. With the SOT Event App, you can:

- » **View the Meeting Program**

The App provides full access to the meeting schedule, abstracts, presentation titles, and more.

- » **Build a Custom Schedule**

Use the App to access the schedule that you built with the SOT Online Planner (log in required), add sessions to your schedule, bookmark presentations of interest, and more.

- » **View On-Demand Recordings**

Recordings of select Featured and Scientific Sessions will be available exclusively for meeting registrants through the SOT Event App and the SOT Online Planner.

- » **Plan Your ToxExpo Exhibit Hall Visit**

The App contains the full list of ToxExpo exhibitors—sortable by name, product or service offered, and booth number—as well as the complete map of exhibitor locations.

- » **Begin Discussions**

Through the App's Chat Dashboard, you can send a message to any registrant, including speakers.

- » **Get Directions and Room Locations**

The App's Route Me feature provides directions on how to get from one meeting room to another. You also can view every event's location directly on the venue maps within the App.

For more details on the capabilities of the App, visit the [SOT Annual Meeting website](#).

On-Demand Content

Session Recordings

Select Featured and Scientific Sessions will be available to registrants as on-demand recordings through the SOT Online Planner and SOT Event App. These sessions will go online after the meeting and will be available for viewing through June 2025. No Poster Sessions, Exhibitor-Hosted Sessions, or other Annual Meeting events or activities will be recorded. Continuing Education (CE) courses will not be available on demand as part of a meeting registration unless you registered for the CE course in question, but all CE courses will be available, for a fee, as part of [SOT CE_d-Tox](#), the Society's online Continuing Education program.

Scientific ePosters

As in years past, poster presenters can share their research electronically, as well as during their assigned Poster Session, by uploading an ePoster. These ePosters are accessible through the SOT Online Planner and SOT Event App only. No Poster Sessions will be recorded on-site, and Poster Sessions will not be available on demand.



Join SOT to engage with more than 7,500 members from 70+ countries and advance toxicology research.



Member Benefits Include:



Discounted Registration Rates for SOT-Hosted Meetings

Included or Discounted Access to *Toxicological Sciences*, the Society's Official Journal



Exclusive Award Opportunities

Nominate and Be Nominated for Prestigious Awards



Career and Education Resources, such as the SOT Job Bank and SOT Mentor Match, for all Career Levels



Saturday to Monday, March 15 to March 17, Times and Locations Vary

(Open to IDEC Travel Awardees and Invited Guests)

Undergraduate Diversity Program

Chair(s): Tynisha D. Glover, Johnson & Johnson Innovative Medicines; and Checo J. Rorie, North Carolina Agricultural & Technical State University

Hosted by: Inclusion, Diversity, and Engagement Committee

Recipients of the Undergraduate Diversity Program Student and Advisor Travel Awards participate in a three-day program to learn more about toxicology and careers in biomedical research. The program begins Saturday evening with networking in mentoring groups; an introduction to toxicology; and the Undergraduate Diversity Program Reunion, which is open to all SOT members and celebrates current and past program participants and organizers. On Sunday, students and advisors participate in the all-day Undergraduate Education Program. On Monday, the students and advisors attend Scientific Sessions, visit posters, and join the *In Vitro* Toxicology Lecture and Luncheon. The students continue to network with toxicologists and have a special session to conclude this concentrated exposure to toxicology and opportunities in the biomedical sciences after graduate studies. For schedule details, see the "[Undergraduate Diversity Program](#)" web page on the SOT Annual Meeting website.

Saturday, March 15, 5:00 PM to 5:15 PM, Executive Ballroom H, Rosen Centre Hotel

Undergraduate Diversity Program: Check in for Undergraduate Diversity Program Travel Awardees

Saturday, March 15, 5:15 PM to 7:30 PM, Executive Ballroom H, Rosen Centre Hotel

(IDEC Travel Awardees and Invited Guests Only)

Undergraduate Diversity Program: Opening Event

Chair(s): Tynisha D. Glover, Johnson & Johnson Innovative Medicines; and Checo J. Rorie, North Carolina Agricultural & Technical State University

Hosted by: Inclusion, Diversity, and Engagement Committee

This is the kick-off event to a three-day program during which recipients of the Undergraduate Diversity Program Student and Advisor Travel Awards learn about toxicology and careers in biomedical research. This Saturday evening event includes networking in mentoring groups and an introduction to toxicology.

Saturday, March 15, 7:30 PM to 8:30 PM, Executive Ballroom H, Rosen Centre Hotel

Undergraduate Diversity Program Reunion

Chair(s): Tynisha D. Glover, Johnson & Johnson Innovative Medicines; and Checo J. Rorie, North Carolina Agricultural & Technical State University.

Hosted by: Inclusion, Diversity, and Engagement Committee

Join the Inclusion, Diversity, and Engagement Committee in celebration of the 36th year of the Undergraduate Diversity Program (UDP) and the people who have made and continue to make it successful. The UDP Reunion is a special opportunity for former students, organizers, and volunteers of the program to gather to celebrate the Society's success in encouraging the next generation of scientists and welcome this year's undergraduate student participants and mentors. This event will include the presentation of the 2025 Perry J. Gehring Diversity Student Travel Award. Dessert, coffee, and tea will be served. Mark your calendars and begin the 64th Annual Meeting and ToxExpo by visiting with friends and colleagues at this energetic event highlighting the successes made possible by so many SOT members.

SOT Provides Opportunities for Undergraduates



SOT Undergraduate Student Affiliate status, providing access to toxicology news and resources



Poster presentation and other award opportunities through SOT and its Regional Chapters, Special Interest Groups, and Specialty Sections



Internships and research experiences in SOT members' labs



Activities at the SOT Annual Meeting and Regional Chapter meetings, as well as professional development opportunities and resources



www.toxicology.org/undergraduate



Sunday, March 16, 7:00 AM to 7:45 AM, Room W307A, Convention Center

CE Continuing Education Course SR01: Implementing Machine-Learning Approaches in PBPK and QSAR Models to Predict ADMET Properties of Xenobiotics

Chair(s): Zhoumeng Lin, University of Florida; and Wei-Chun Chou, University of California.

Primary Endorser: Biological Modeling Specialty Section

Other Endorser(s): Computational Toxicology Specialty Section; Risk Assessment Specialty Section

Machine-learning and artificial-intelligence approaches have substantially advanced many scientific disciplines, including toxicology and risk assessment. Integration of machine-learning algorithms with traditional toxicological models, such as physiologically based pharmacokinetic (PBPK) and quantitative structure-activity relationship (QSAR) models can generate more robust models that can be used to predict absorption, distribution, metabolism, excretion, and toxicity (ADMET) of hundreds or thousands of chemicals or nanoparticles in a highly efficient manner. Many toxicologists from academia, industry, and governmental agencies have leveraged machine-learning approaches to different applications, including development of new computational toxicology models and drug discovery and development, as well as regulatory approvals of drugs and medical devices. The importance of machine-learning approaches is also highlighted by the fact that there have been multiple Symposium and Workshop Sessions on machine learning in toxicology during the last few SOT Annual Meetings. However, the challenge of properly using machine-learning approaches to support toxicological studies lies in the need of multidisciplinary expertise, including computer science, programming, machine-learning algorithms, toxicology, mechanisms of toxicokinetics and toxicity, PBPK modeling, QSAR modeling, and risk assessment. Collaboration between computational scientists and mechanistic toxicologists are common and important to complete machine learning-based projects. However, it is not easy for computational scientists to understand ADMET mechanisms of xenobiotics, and likewise, it is not a simple task for mechanistic toxicologists to understand and implement machine-learning models. To address this barrier and to facilitate applications of existing machine-learning approaches to further support toxicological studies, the objective of this Continuing Education (CE) minicourse is to introduce the fundamental concepts of machine-learning approaches and how these approaches can be applied to support toxicological studies. The first talk will give an overview on the basics of commonly used machine-learning approaches in the field of toxicology, including k-nearest neighbors, support vector machine, decision tree, random forest, artificial neural network, and deep learning. The first talk will also give an example of applying machine learning to predict a key pharmacokinetic property (i.e., the plasma half-life) of drugs and another example of building a machine learning-assisted PBPK model for nanoparticles. The second talk will introduce how to build machine learning-based QSAR models to predict carcinogenic and noncarcinogenic toxicities of xenobiotics. The second talk will also do a software demonstration to show what a machine learning-based QSAR model looks like and how to use it to perform predictions of ADMET properties of chemicals. This demonstration will be through Google Colab, so no software installation is required. This CE course will be focused on examples that are relevant to toxicology. It is expected that this course will be beneficial for a diverse population of SOT attendees, including both experimental toxicologists and computational toxicologists at different career stages (e.g., students, postdocs, and senior scientists) across various sectors, including academia, industry, and regulatory agencies.

Abstract #

#1001

Implementing Machine-Learning Approaches in PBPK and QSAR Models to Predict ADMET Properties of Xenobiotics.

Basics of Machine-Learning Algorithms and Their Applications in Toxicological Sciences and Physiologically Based Pharmacokinetic Modeling. Z. Lin. University of Florida, Gainesville, FL.

Introduction to Multitask Neural Network and Its Application in Quantitative Structure-Activity Relationship for Multi-organ Toxicity Prediction.

W. Chou. University of California, Riverside, CA.

Sunday, March 16, 7:00 AM to 7:45 AM, Room W308A, Convention Center



Continuing Education Course SR02: Navigating Data Management and Sharing in Computational and Predictive Toxicology

Chair(s): Shannon Bell, RTI International; and Oswaldo Lozoya, RTI International.

Primary Endorser: Biological Modeling Specialty Section

Other Endorser(s): *In Vitro* and Alternative Methods Specialty Section

Data management and sharing are critical components that ensure transparency, reproducibility, and broader scientific impact in biomedical and toxicological research. How to collect, report, and share data are critical components to the research process but can be challenging when considering computational approaches that take in multiple data streams to generate a diversity of results. This course is designed for individuals who are utilizing computational and predictive modeling in their research projects to review some best practices to ensure their results can have maximal impact within the community as well as cover how to meet the US National Institutes of Health (NIH) data management and sharing (DMS) requirements in the context of predictive modeling. The course will delve into strategies for handling metadata and data standards, navigating how to share your data, leveraging secondary data for analysis, and identifying reporting standards, with a specific focus on predictive modeling. By the end of this course, participants will be equipped with the knowledge and tools necessary to effectively manage and share data generated from computational and predictive modeling activities in alignment with NIH DMS requirements, fostering greater collaboration and impact within the scientific community. We will work through examples together, and participants are encouraged to bring laptops to access materials during the workshop. Resources will be made available as part of the course materials to reserve time for working through examples. Learning Objectives: (1) Understand the role of data sharing in advancing toxicology research Define research benefits to data sharing, the key components of the NIH DMS policies, and implications of data sharing for researchers using computational and predictive modeling approaches (2) Implement metadata and data standards in modeling workflows Learn how to structure and document data using appropriate metadata and data standards to facilitate interoperability and reuse (3) Navigate data repositories and utilize secondary data Explore relevant data repositories suitable for biomedical data and understand the ethical and practical considerations of using secondary data in computational modeling 4. Adhere to reporting standards for predictive models Identify and apply best practices for reporting predictive models, including data quality assurance, model validation, and transparent documentation

Abstract #

#1002

Navigating Data Management and Sharing in Computational and Predictive Toxicology. Integrating Data Management and Sharing into the Computational Modeling Framework.
S. Bell. RTI International, Durham, NC.

Navigating Metadata and Repositories for Managing Predictive Toxicology Data. *O. Lozoya.*
RTI International, Durham, NC.

Sunday, March 16, 7:15 AM to 7:45 AM, Salon 18, Rosen Centre Hotel

(SOT Undergraduate Research Award Recipients and EEOC Members Only)

SOT Undergraduate Research Award Welcome

Chair(s): Robert Roth, Michigan State University (Emeritus), Chapel Hill, NC.

Hosted by: Education and Experiential Opportunities Committee

The SOT Education and Experiential Opportunities Committee (EEOC) will welcome and recognize the students who received the SOT Undergraduate Research Award before they attend the Undergraduate Education Program.

Sunday, March 16, 8:00 AM to 5:00 PM, Various Rooms, Rosen Centre Hotel

(Open to UDP Travel Awardees, Registered Undergraduates, and Invited Guests)

Undergraduate Education Program

Chair(s): Tynisha D. Glover, Johnson & Johnson Innovative Medicines; and Checo J. Rorie, North Carolina Agricultural & Technical State University

Hosted by: Inclusion, Diversity, and Engagement Committee

This daylong program introduces undergraduates to topics in various toxicology disciplines through three scientific presentations about diverse toxicological research and a case study that provides an opportunity for students to explore and interpret data. Students also meet with graduate students and academic program directors to learn how to submit strong graduate school applications and the merits of different types of graduate programs, as well as how to succeed in graduate school. During the program, students are given the opportunity to network with SOT mentors and toxicologists in various employment sectors to become more familiar with what life is like in different career paths in toxicology. Lastly, students will meet with toxicology graduate program directors and internship hosts from various institutions. For schedule details, see the "[Undergraduate Education Program](#)" web page on the SOT Annual Meeting website.

Sunday, March 16, 8:15 AM to 12:00 Noon, Room W202A, Convention Center



Continuing Education Course AM03: Dosimetry for Inhaled Substances: Advancing *In Silico* Modeling and Quantitative *In Vitro* Workflows

Chair(s): Jessica Murray, US EPA; and Monita Sharma, PETA Science Consortium International e.V.

Primary Endorser: Biological Modeling Specialty Section

Other Endorser(s): *In Vitro* and Alternative Methods Specialty Section; Women in Toxicology Special Interest Group

In vitro methods are increasingly being deployed to assess the toxicity of inhaled substances, but it can be challenging to ensure their relevance to human exposure scenarios. The use of *in vitro* data to predict human health effects due to inhalation requires the consideration of several parameters including physicochemical properties of the inhaled substance, target exposure scenarios, anatomy of the respiratory system, and understanding of deposition and uptake mechanisms in both the respiratory tract and *in vitro* exposure systems. Inhaled substances are incredibly diverse and include aerosols and various gases (e.g., reactive, volatile organic compounds [VOCs], and "Category 2"), all of which possess distinct physicochemical properties that must be considered when selecting dosimetry models to predict human exposure and when optimizing *in vitro* assay conditions. This Continuing Education course is intended for those who conduct or interpret data from *in vitro* inhalation studies and new approach methods (NAMs). This course will introduce how various dosimetry models are applied in risk assessment workflows and how *in silico* approaches can be utilized to predict human exposures and improve *in vitro* study design. Attendees will learn the fundamentals of the US EPA multiple-path particle dosimetry (MPPD) model, computational fluid dynamics (CFD), physiologically based pharmacokinetic (PBPK) models, hybridized modeling approaches (e.g., CFD-PBPK), and the *in vitro* sedimentation, diffusion, dissolution, and dosimetry model. This course will begin with a risk assessor's perspective that includes an overview of inhalation toxicology and dosimetry, highlighting how physicochemical properties interact with features of respiratory anatomy and physiology to determine deposition and uptake. We will cover how data availability coupled with these considerations dictate dosimetry model selection and requirements for their use. Following this critical background information, a practical demonstration of the US EPA MPPD v.2.0 model will be included. Subsequent presentations will share technical features and best applications for CFD, PBPK, and hybridized CFD-PBPK models, along with case studies for a broad array of inhalable compounds including soluble and insoluble aerosols, reactive gases, and vapors. Finally, the last two speakers will focus on dosimetry modeling approaches and quantitative workflows for *in vitro* test systems and will share best methods to translate *in vitro* doses to human exposure scenarios. Attendees will learn how

to incorporate these methods when designing *in vitro* studies and how to improve *in vitro* to *in vivo* extrapolation (IVIVE) for inhalation. This course will be of interest to those engaged in the development of *in vitro* and alternative test methods, inhalation toxicology, risk assessment, regulatory and safety evaluation, and dosimetry modeling.

Abstract

#1003

Dosimetry for Inhaled Substances: Advancing *In Silico* Modeling and Quantitative *In Vitro* Workflows.

Modernizing Inhalation Risk Assessment Workflows: Role of Dosimetry Modeling. A. Jarabek. US EPA, Research Triangle Park, NC.

Applications of Computational Fluid Dynamics: Considerations for Predicting Aerosol Deposition Along the Human Respiratory Tract and the Development of Lung-on-Chip Platforms. J. Sznitman. Technion – Israel Institute of Technology, Haifa, Israel. Sponsor: J. Murray

PBPK Models for Inhalation Exposures and Their Applications for IVIVE. K. Krishnan. California Environmental Protection Agency, Sacramento, CA. Sponsor: J. Murray

Coupling Inhalation Dosimetry and PBPK Models to Predict Deposition and Absorption of Reactive Gases. J. Schroeter. Applied Research Associates, Durham, NC.

A Workflow to Determine and Translate Nanoparticle Dose from Conventional Aqueous Cell Culture Systems to Humans. J. Smith. Pacific Northwest National Laboratory, Richland, WA.

Advancing *In Vitro* Dosimetry Methods and Reporting Standards for Air-Liquid Interface Exposures. J. Murray. US EPA, Research Triangle Park, NC.

Sunday, March 16, 8:15 AM to 12:00 Noon, Room W203A, Convention Center



Continuing Education Course AM04: Key Considerations of NAM Development for Global Regulatory Harmonization

Chair(s): Emily Reinke, Inotiv; and Donna Macmillan, International Collaboration on Cosmetics Safety.

Primary Endorser: *In Vitro* and Alternative Methods Specialty Section

Other Endorser(s): Risk Assessment Specialty Section; Women in Toxicology Special Interest Group

The global push toward the 3Rs and increased restrictions on animal methods requires the development of nonanimal methods that can fulfill regulatory requirements for specific toxicity endpoints. As methods have been developed and processed through global harmonization pipelines, like the Organisation for Economic Co-operation and Development (OECD) Test Guidelines Programme, multiple lessons have been learned, and the processes by which methods are developed, validated, and implemented have been refined. In this course, attendees will learn the key factors that must be considered in developing methods, concepts of method readiness, validation and peer review, and the processes that are available within OECD to bring methods to a stage where they can be implemented by industry and the regulatory community. After a short introduction, the first talk will highlight the major aspects to determine if a developed method is ready for the next step, prevalidation and peer review with case examples of developed tests for endocrine disruptors identification. The next speaker will provide insight into the process of validation, the key concepts, and how validation is changing to become more efficient and robust, with reference to the current efforts to update OECD Guidance Document 34. The scientific confidence, context of use, and efforts to standardize new approach methodologies (NAMs) to address complex endpoints can be evaluated within the OECD project on integrated approaches for testing and assessment (IATA), a way to evaluate methods in a chemical-agnostic approach, as will be covered by the third speaker. The fourth speaker will address mechanisms by which methods, including IATAs, can be evaluated under the OECD test guideline program and developed into a defined approach, which relies on a strict data interpretation procedure for determination of the endpoint outcome. Finally, the last speaker will give the perspective of industry on implementation of accepted

NAMs and the impact on testing requirements. Upon completion of the course, attendees will have a better understanding of how to bring a method from development to validation, build confidence, and standardize aspects of the approach on the path to harmonization.

Abstract

#1004

Key Considerations of NAM Development for Global Regulatory Harmonization.

Introduction. *E. Reinke.* Inotiv, Morrisville, NC.

Assay Readiness Assessment and Related Development Implications. P. Hubert. PEPPER, Paris, France. Sponsor: *E. Reinke*

Validation Under the New and Improved OECD GD34. *N. Kleinstreuer.* NIEHS/NICEATM, Morrisville, NC.

The IATA Framework Template to Standardize and Build Scientific Confidence in Complex NAMs. P. Browne. OECD, Paris, France. Sponsor: *E. Reinke*

From IATA Case Study to Defined Approach—Leveraging the OECD Test Guideline Program. C. Kovatch. US EPA, Washington, DC. Sponsor: *E. Reinke*

The Evolving Landscape of Toxicological Testing: Impact of Nonanimal Methods and Defined Approaches. D. Macmillan. International Collaboration on Cosmetics Safety, New York, NY. Sponsor: *E. Reinke*

Sunday, March 16, 8:15 AM to 12:00 Noon, Room W204A, Convention Center



Continuing Education Course AM05: Roadmap for Safety Evaluation of Emerging Consumer Products: Application and Adaptation of Existing Practices

Chair(s): Madhavi Billam-Mukhi, Meta Platforms, Inc.; and Janet Zang, US FDA.

Primary Endorser: Dermal Toxicology Specialty Section

Other Endorser(s): American Association of Chinese in Toxicology Special Interest Group; Medical Device and Combination Product Specialty Section

Building on the success of an Informational Session titled “From My Cosmetics to Smart Watch: Toxicology Touches It All” held during the 2024 SOT Annual Meeting and ToxExpo, this Continuing Education (CE) course expands from the basic concepts offered at the Informational Session to an in-depth and hands-on course to evaluate the safety of diverse categories of products, ranging from medical devices to cosmetics and consumer products, such as virtual reality headsets. In an era with novel products constantly being developed, toxicologists are often challenged with the absence of standardized assessment approaches when assessing the safety of emerging day-to-day consumer products with skin contact, such as virtual reality headsets and other wearable digital devices. This broadreaching course aims to provide extensive knowledge along with relevant case studies, risk assessment approaches, and best practices drawn from established sectors like medical devices and cosmetics that can be adapted to evaluate new product categories. The session will start with an overview of the diverse spectrum of consumer products and considerations for their safety evaluation. The second presentation will focus on skin sensitization, a common adverse effect following dermal contact. The speaker will elucidate the toxicological mechanisms of chemical-induced sensitization, along with examples of diverse types of dermal sensitizers across various product categories. Next, the session will delve into three consecutive talks that provide in-depth knowledge and practical safety assessment approaches in medical devices, cosmetic products, and wearables. These talks will include examples, case studies, or exercise problems to guide the attendees through highlighted principles and methods. The session will end with a final presentation on the US FDA adverse event reporting system for cosmetic products, which underlines the importance of postmarket surveillance as a critical element that complements premarket safety evaluation and risk assessment to protect consumer health. This CE course's main objective is to provide a comprehensive overview of toxicological review considerations across diverse product categories. From

material selection to adverse event reporting, the session offers a holistic understanding of consumer product safety assessment. Importantly, this session represents a strong collaboration across academia, industry, expert consultants, trade associations, and government, marking the first time such diverse expertise has been brought together for training on consumer product safety evaluation at the SOT Annual Meeting and ToxExpo. It underscores the practical application of nonanimal approaches and highlights the broader role of toxicology beyond traditional sectors like pharmaceuticals and agrochemicals. Notably, this CE course explores uncharted territory, addressing areas where traditional textbooks lack coverage. It serves as a valuable resource for both budding toxicologists and experienced risk assessors who plan to expand their skills to diverse sectors, including less mainstream product categories where toxicology is pivotal.

Abstract

#1005

Roadmap for Safety Evaluation of Emerging Consumer Products: Application and Adaptation of Existing Practices.

Overview: Diverse Spectrum of Consumer Products and Considerations for Their Safety Evaluation. *M. Krishan.* Meta Platforms, Inc., Broomfield, CO.

Skin Sensitization: From Mechanism to Chemistries. *V. Galbiati.* University of Milan, Milan, Italy.

Fundamentals of the Safety Assessment of Standard and Emerging Cosmetics. *K. Norman.* Personal Care Product Council, Washington, DC.

Biocompatibility Assessment of Skin-Contacting Medical Devices. *M. Ghosh.* US FDA, Silver Spring, MD.

Case Studies for Addressing Potential Biocompatibility Risks of Skin Contacting High-Tech Products. *T. Lewandowski.* Gradient, Seattle, WA.

Postmarket Regulation of Cosmetic Products: The Who, What, When, Why, and How of Adverse Event Reporting. *J. Zang.* US FDA, College Park, MD.

Sunday, March 16, 8:15 AM to 12:00 Noon, Room W205A, Convention Center



Continuing Education Course AM06: The Tox Side of Food: Building Comprehensive Safety Assessments

Chair(s): Esther Haugabrooks, Coca-Cola Company; and Matthew Linman, Trinity Consultants - SafeBridge.

Primary Endorser: Food Safety Specialty Section

Other Endorser(s): Regulatory and Safety Evaluation Specialty Section

If we are what we eat, then ensuring we are safe is essential. Food toxicologists in academia, industry, and government face unique challenges and drivers that influence the evaluation or reevaluation of raw materials, ingredients, or articles associated with food or beverages. The category of food is not only broad but also dynamic, with thousands of food matrices of varying compositions generating critical interactions between consumer demands, idiosyncrasies across susceptible populations, and sometimes varying regional regulatory requirements. How do safety professionals safeguard the food supply and address the diverse risk considerations across different food types? This course, geared toward toxicologists in the food industry, aims to enhance expertise in evaluating toxicology studies while honing critical-thinking skills in assessing the weight of evidence and study design. It is also for those toxicologists curious about how toxicology is applied to food safety or who want to learn from another subdiscipline in the field. Presentations will include establishing food safety for ingredients, developing safety narratives that align with regulatory requirements, and optimizing regulatory approvals within food additives, color additives, and GRAS substances. The course will culminate in an interactive case study where participants apply the concepts covered to test if we can find consensus in food toxicology evaluations.

Abstract

#1006

The Tox Side of Food: Building Comprehensive Safety Assessments.

Introduction. *E. Haugabrooks*¹, and *M. Linman*². ¹Coca-Cola Company, Mt. Dora, FL; and ²Trinity Consultants - SafeBridge, Washington, DC.

From Raw Ingredients to Finished Products: Success Is in the Details. *A. Eapen*¹, and *B. Geter*². ¹Cargill, Wayzata, MN; and ²PepsiCo, Plano, TX.

Considerations when Developing Safety Narratives to Support Regulatory Submissions. *L. Navarro*, and *D. Tonucci*. Ramboll, Cincinnati, OH.

Evaluating Regulatory Submissions to Ensure Food Ingredient Safety. *T. Hubbard*. US FDA, College Park, MD.

Applying Expert Judgment Within a Weight of Evidence. *J. Zagorski*¹, and *G. Ahlborn*². ¹Michigan State University, East Lansing, MI; and ²Brigham Young University, Provo, UT.

Sunday, March 16, 8:15 AM to 12:00 Noon, Room W307A, Convention Center



Continuing Education Course AM07: Fit-for-Purpose Methods to Fulfill 21st-Century Chemical Risk Assessment

Chair(s): Anna Lowit, US EPA; and Gina Hilton, PETA Science Consortium International e.V., Germany.

Primary Endorser: Risk Assessment Specialty Section

Other Endorser(s): Exposure Specialty Section; Regulatory and Safety Evaluation Specialty Section

Risk assessment is a critical tool used worldwide in the safety evaluation of agrochemicals, environmental chemicals, pharmaceuticals, cosmetics, and metabolites/degradates/leachates along with other materials and sectors. This course aims to delve into advancements in risk assessment and risk characterization to highlight the current state-of-the-science regarding the paradigms, methodologies, and technologies available for enhancing the safety evaluation of chemicals. This course departs from conventional risk assessment training, which typically offers cookie-cutter descriptions on topics such as hazard characterization and identification, dose-response assessment, and default uncertainty factors. Rather, this course will introduce the use of problem formulation to leverage innovative, fit-for-purpose approaches for chemical risk assessment in the 21st century. Specifically, it will introduce advances in applying new approach methods (NAMs) to derive regulatory guidance values; developing computational tools to integrate mechanistic data in chemistry and biology to better predict exposures, hazards, and dose-response relationships; using novel modeling and monitoring approaches for exposure assessment; drawing weight of evidence-based conclusions about potential health risks; and evaluating context-specific uncertainty in lieu of defaults. This training will also provide examples of narrative-based descriptions of risk characterizations essential for effective engagement with stakeholders and decision-makers. The first presentation will cover the fundamental principles of risk assessment with a contemporary twist, including discussions on the continuum of various types of risk assessments that support different risk management purposes, tiered approaches for addressing risk assessment questions, the importance of problem formulation, and types of toxicology used in hazard assessment (including traditional animal studies, human studies, and NAMs), along with hazard assessment and hazard characterization. The second presentation will provide an in-depth background for exposure assessment and risk characterization, emphasizing advancements in these areas such as computational modeling, cell-based assays, and nonmammalian systems. Following the two introductory presentations, this training will take a deep dive into case studies representing the risk assessment spectrum with respect to data availability, allotted time and resources, decision context, and associated uncertainty. The third presentation will feature a case study based on new chemicals exposure and risk assessment (e.g., like those performed under the US Toxic Substances Control Act) where there are no data requirements and the statute requires risk assessments and decision-making within 90 days. This presentation will also highlight the use of a variety of NAMs and rapid exposure assessment. The final presentation will showcase case studies demonstrating weight of evidence-based risk assessment for agrochemicals (e.g., like those conducted for registration review under the US Federal Insecticide, Fungicide, and Rodenticide Act), including the use of NAMs. Presentations three and four will include example narrative descriptions appropriate for use in risk characterization to support risk communication. The weight of evidence approach involves highly refined exposure assessment and extensive hazard data obtained from both traditional *in vivo* animal studies and NAMs. Where applicable, computational

tools are used to integrate mechanistic data from multiple sources for the retrospective interpretation or extrapolation of dose-response data, as well as the prospective design of studies to address data and knowledge gaps. At the end of presentations three and four, a hands-on exercise will provide attendees with the opportunity to work as a team, using mock data provided to them to make risk assessment decisions and offer rationales to justify their decisions. The session will close with time for general questions from attendees.

Abstract

#1007

Fit-for-Purpose Methods to Fulfill 21st-Century Chemical Risk Assessment.

Fundamental Principles: Overview of Risk Assessment and Hazard Assessment. *A. Lowit.*
US EPA, Washington, DC.

Fundamental Principles: Exposure Assessment and Risk Characterization. *T. Ramanarayanan.*
Syngenta Crop Protection LLC, Greensboro, NC. Sponsor: *A. Lowit*

New Chemicals Risk Assessment: The Use of NAMs and Rapid Exposure Assessment in Characterizing Risk. *E. Freeman.* Exponent and University of Southern California, Washington, DC.

Pesticide Risk Assessment. *C. Tan.* US EPA, Durham, NC.

Sunday, March 16, 8:15 AM to 12:00 Noon, Room W308A, Convention Center



Continuing Education Course AM08: Environmentally Focused Knowledgebases: Past, Present, and Future

Chair(s): Stephen Edwards, US EPA; and Clemens Wittwehr, European Commission Joint Research Centre, Italy.

Primary Endorser: Biological Modeling Specialty Section

Other Endorser(s): Exposure Specialty Section; Risk Assessment Specialty Section

Environmental science research is becoming increasingly more integrated to address complex, 21st-century problems. This, coupled with an exponential increase in research outputs, makes it impossible for an individual researcher to comprehensively review the existing knowledge relevant for their research. Computational models can support researchers by integrating data, but they require structured inputs based on our existing knowledge of toxicological mechanisms and exposure pathways. Knowledgebases address this challenge by aggregating existing knowledge from a given research area and providing it in a more generally usable form. This increases the user base for that existing knowledge and prevents a duplication of effort by many research teams assembling the same information independently. The ultimate goal for environmental knowledgebases is to provide knowledge in a computable form that can support models used to improve human health and the environment. Current trends in funding and emphasis on scientific impact have shifted existing and new knowledgebase efforts toward more applied uses and should accelerate the pace toward reaching this goal. This course will include a series of presentations that demonstrate the rich history of environmentally focused knowledgebases as well as new and emerging resources. The first knowledgebase for discussion will be the ChemExpo knowledgebase, which was first released in 2023. This resource integrates exposure data from a variety of sources and makes it readily available to support risk assessment applications. This represents an example of an early stage knowledgebase and highlights the value of structured exposure information to support regulatory decisions. The next talk will connect exposure information with biological effects via the Comparative Toxicogenomics Database (CTD). Over the last two decades, CTD has expanded to include not only toxicogenomics data but also associations among chemicals, exposure, phenotypes, and adverse outcomes. More recent tools have focused on integrating data across these categories to enable scientists to design testable hypotheses regarding mechanisms of toxicity, including adverse outcome pathways. This will be followed by a similar survey of the Adverse Outcome Pathway Wiki that was first released in 2013 with a goal to support the use of new alternative methods for environmental decision-making. This will include examples showing direct impact on regulatory decisions and the development of computational models and upcoming changes to increase the utility of this resource in the future. The next talk will highlight the use of knowledgebases to enhance decision-making within the agrochemical sector. Finally, a knowledgebase that is emerging from the European Partnership for the Assessment of Risks from Chemicals funded through the Horizon Europe Programme will highlight

a new theme where knowledgebases are developed as part of these large transdisciplinary projects to increase the impact of their collective research. This will provide a glimpse into the earliest stages of knowledgebase development with an emphasis on community engagement and defining the purpose and features of the knowledgebase. The learning objectives for this course are to (1) enable participants to navigate three public knowledgebases covering the full source to outcome continuum, (2) show participants how they can develop custom knowledgebases to support their research, (3) help participants understand the state-of-the-science regarding environmental knowledgebases and what to expect in the coming years, and (4) demonstrate the value of environmental knowledgebases and the importance of community participation in expanding these resources.

Abstract

#1008

Environmentally Focused Knowledgebases: Past, Present, and Future.

Introduction. *S. Edwards.* US EPA, Research Triangle Park, NC.

The Chemicals and Products Database and the Chemical Exposure Knowledgebase: Organizing and Disseminating Chemical-Use Data for Informing Exposure Pathways.

K. Isaacs. US EPA, Research Triangle Park, NC.

Using the Comparative Toxicogenomics Database to Distill Complex Chemical-Exposure Information to Apprise the Environmental Health Continuum from Populations to Molecular Mechanisms. *A. P. Davis.* North Carolina State University, Raleigh, NC.

AOP-Wiki: The Keystone of Mechanistic Toxicology in Regulatory Frameworks. *C. Wittwehr.* European Commission Joint Research Centre, Ispra, Italy. Sponsor: *S. Edwards*

Establishing an Agrochemical Knowledge Base to Optimally Leverage Regulatory Toxicology Data. *A. Elizalde-Velazquez.* Syngenta Crop Protection LLC, Greensboro, NC. Sponsor: *S. Edwards*

Bridging the Chemical Risk Assessment Community through PARCopedia. *M. Herzler.* Bundesinstitut für Risikobewertung, Berlin, Germany. Sponsor: *S. Edwards*

Sunday, March 16, 1:15 PM to 5:00 PM, Room W202A, Convention Center



Continuing Education Course PM09: Physiologically Based Kinetic Modeling Made Simple: A Nonprogrammer's Guide to Chemical Risk Assessment

Chair(s): Cecilia Tan, US EPA; and Zhoumeng Lin, University of Florida.

Primary Endorser: Biological Modeling Specialty Section

Other Endorser(s): Computational Toxicology Specialty Section; Risk Assessment Specialty Section

Physiologically based kinetic (PBK) models predict the time course profile of a chemical by considering its absorption, distribution, metabolism, and excretion of chemicals within the body. PBK modeling is a versatile tool that provides a mechanistic understanding of chemical disposition and its implications on subsequent toxicity, thus reducing uncertainty in chemical risk assessment. Despite the steady growth in the development and application of PBK models for environmental chemicals, only a handful of models have gained acceptance to support regulatory risk assessment. This limited acceptance can be attributed to numerous challenges, with one major obstacle being computational implementation. The perceived or real complexity in programming or reviewing model codes can deter many nonprogrammers, leading to a lack of trust in PBK modeling. Additionally, the preference or familiarity of model developers often dictates the choice of computing software. However, this individualized selection poses challenges for regulatory agencies during detailed code reviews, as they often lack the resources to acquire and maintain multiple software packages. Furthermore, it places additional burden on model reviewers to familiarize themselves with specific software used by the modelers. The PBK modeling community has grappled with these challenges for years, prompting several research groups to address them by developing open-source platforms with user-friendly interfaces. This course will start with a brief introduction to the basic principles and common applications of PBK modeling, followed by the first presentation focusing on sensitivity,

variability, and uncertainty analyses using multiple common software programs for PBK modeling. While learning about these topics, attendees will also have the opportunity to delve into the structure of model code, potentially overcoming the misconception that coding is intimidating or inaccessible. The second presentation will instruct on the fundamentals of model structure and model parameterization. This, along with subsequent presentations, will further introduce common PBK application in chemical risk assessment, such as interspecies, intraspecies, and route-to-route extrapolations, quantitative *in vitro* to *in vivo* extrapolation, safety assessment of food-producing animals, and dose-response prediction. The instructors will teach these applications using various modeling platforms with user-friendly interfaces, accessible to all or certain groups for free. Links to these modeling platforms along with instructions for downloading and installing will be shared prior to the course. Participants are encouraged to set up these platforms on their laptops so that they will have the opportunity to follow along with the instructors during the course. The course materials will also include step-by-step instructions for participants to use at home. This course stands out from others offered in previous years because while other courses either require attendees to read model codes or do not have a computational implementation component, in this course, attendees will learn about the process of building and running PBK models in multiple platforms, all while gaining insight into PBPK capabilities. The objective of this course is to empower potential practitioners and reviewers, irrespective of their programming proficiency, to confidently engage with and apply PBK modeling in their respective fields.

Abstract

#1009

Physiologically Based Kinetic Modeling Made Simple: A Nonprogrammer's Guide to Chemical Risk Assessment.

Understanding the Fundamentals of Physiologically Based Kinetic Modeling and Breaking Down the Coding Barrier. C. Tan. US EPA, Durham, NC.

Sensitivity, Uncertainty, and Variability Analyses of Physiologically Based Kinetic Models. Z. Lin. University of Florida, Gainesville, FL.

Unlocking the Power of PBK Modeling: Simplifying Complexity for Advanced Next-Generation Risk Assessment. S. Schaller. esqLABS, Saterland, Germany.

Ready, Steady, PBK Model-Leveraging Machine Learning to Jump Start Your Simulations. M. Lawless. Simulations Plus Inc., Lancaster, CA.

Tools to Facilitate High-Throughput PBPK Modeling for Various Exposure Scenarios. X. Chang. Inotiv, Durham, NC.

Advancing Food Safety: Harnessing PBK Models for Precise Withdrawal Interval Estimation. W. Chou. University of California, Riverside, Riverside, CA.

Integrating New Approach Methodologies Using Toxicokinetic and Toxicodynamic Modeling of Chemicals for Next-Generation Chemical Risk Assessment. J. Dorne. European Food Safety Authority, Parma, Italy. Sponsor: C. Tan

Sunday, March 16, 1:15 PM to 5:00 PM, Room W203A, Convention Center



Continuing Education Course PM10: Complexity of Food Packaging: Formulation, Safety, Regulation, Innovation, and Recycling

Chair(s): Laura Markley, US FDA; and René Viñas, UPSIDE Foods.

Primary Endorser: Food Safety Specialty Section

Other Endorser(s): Regulatory and Safety Evaluation Specialty Section; Risk Assessment Specialty Section

Food packaging protects food from physical damage and microbial contamination, extends product shelf life, and prevents tampering or adulteration. Ensuring food packaging meets safety standards involves navigating regulatory requirements, addressing technical challenges, and considering sustainability and innovation. From choosing materials that minimize migration into food to designing packaging that reduces environmental impact, there's a complex interplay

of factors involved in creating safe, sustainable, and innovative food packaging solutions. The aim of this course is to provide participants with an understanding of the regulatory requirements to ensure food packaging safety while also understanding the complexities of developing sustainable and innovative food packaging. By covering fundamental concepts, providing case studies, and addressing challenges, participants will gain a valuable insight into ensuring food packaging meets the current safety, sustainability, and regulatory standards. The introductory talk will set the stage for the discussion on the complexities of food packaging while ensuring food safety and regulatory compliance by giving a brief overview of food-packaging components. The second talk, by a polymer chemist, will discuss the technical development of food packaging, including formulation, design, and chemical aspects. The third talk, by a regulatory toxicologist, will present an overview of the safety assessment of food contact substances with consideration of when a substance is generally recognized as safe (GRAS). The fourth speaker, a regulatory toxicology expert, will provide an overview of postmarket safety evaluations of food contact materials. The fifth talk, by a regulatory toxicologist, will address specialized topics during a safety assessment of food contact substances, including infant exposure, use of nanotoxicology, and the incorporation of new approach methodologies. Finally, an industry expert will discuss food contact material innovation, recycling, and sustainability challenges from the consumer product industry perspective. This will be a crash course on the current regulatory and safety approaches to evaluate food contact materials considering formulation, safety, new approach methodologies, innovation, recycling, and sustainability challenges. This introductory overview is intended for food industry professionals, regulatory authorities, academic professionals, and anyone interested in gaining a basic understanding of the components of food packaging and their safety requirements.

Abstract

#1010

Complexity of Food Packaging: Formulation, Safety, Regulation, Innovation, and Recycling.

Overview of Food Contact Materials. *L. Markley.* US FDA, College Park, MD.

Food Contact Material Development: Formulation, Design and Chemical Aspects. *K. Vorst.* University of Iowa, Iowa City, IA. Sponsor: *L. Markley*

Food Contact Material Safety and Regulation. *C. Bast.* Keller & Heckman, Washington, DC.

Postmarket Safety Evaluations of Food Contact Materials. *K. Magurany.* NSF International, Ann Arbor, MI.

Challenges and Considerations During the Safety Assessment of Food Contact Substances. *P. Rice.* US FDA, College Park, MD.

Reassessing the Safety of Recycled Plastics in an Era of Circular Economy. *J. Huang.* Coca-Cola Company, Atlanta, GA. Sponsor: *L. Markley*

Sunday, March 16, 1:15 PM to 5:00 PM, Room W204A, Convention Center



Continuing Education Course PM11: Tackling Risk Communication Challenges: Lessons from Expert Voices and Case Studies

Chair(s): Kelly Salinas, SRC Inc.; and Anna Lowit, US EPA.

Primary Endorser: Regulatory and Safety Evaluation Specialty Section

Other Endorser(s): Hispanic Organization of Toxicologists Special Interest Group; Risk Assessment Specialty Section

Chemical risk assessment is a difficult, multifaceted, technical activity often involving thousands of hazard and exposure data points derived from technical models, experimental studies, and monitoring programs. Several years of training is required for risk assessment practitioners to fully understand the inherent complexity associated with the risk assessment process. Furthermore, risk characterizations are nuanced and can be confusing even for the most experienced scientists. Right-to-Know programs and the rapid dissemination of information (and frequently misinformation) through social media, traditional media, and other outlets means that nontechnical stakeholders have ever-increasing access

to the results of chemical risk assessments, without the context of hazard vs. risk. As such, effective risk communication—defined by the US EPA as “the formal and informal processes of communication among various parties who are potentially at risk from or are otherwise interested in the site”—is more important than ever. This course is being presented as a follow up to an 2024 SOT Informational Session on risk communication challenges and opportunities for per- and polyfluoroalkyl substances (PFAS). Because of the growing challenges with risk communication, attendees of the 2024 session expressed substantial interest in a deeper dive into the discussion of risk communication issues, including having insights from risk communication experts. This course will begin with a presentation by an internationally recognized risk communication expert from academia with substantial policymaking experience who understands all aspects of risk assessment, the critical role science plays in informing public health choices, and the importance of communicating those choices effectively to citizens, journalists, and lawmakers. A representative from the European Food Safety Authority will discuss approaches for assessing and communicating uncertainty in risk assessment to nontechnical audiences using a variety of formats. These presentations will be followed by case studies in risk communication, demonstrating the application of risk communication techniques, with a representative from state government and a consultant providing guidance on risk communication strategies associated with PFAS and COVID-19, respectively. Finally, a representative from federal government will discuss innovative approaches to communicating risk in clinical and public health settings using examples from the National Cancer Institute research portfolio and insights from an upcoming Innovation Lab on the topic of communicating evolving cancer-related information.

Abstract

#1011

Tackling Risk Communication Challenges: Lessons from Expert Voices and Case Studies.

Risk Communication: Communicating Risk in Understandable Language. *S. Gannon.*
Chemours, Wilmington, DE.

Overcoming the Challenges When Communicating Risk and Uncertain Science to Nontechnical Audiences. *M. Binaglia.* European Food Safety Authority, Parma, Italy.
Sponsor: *K. Salinas*

A Statewide PFAS Risk Communication Effort Decades in the Making. *T. Eshenaur.*
Minnesota Department of Health, St. Paul, MN. Sponsor: *K. Salinas*

Risk Communication: A Case Study Involving Three Labor Sectors in Three Separate Phases of the COVID-19 Pandemic. *M. Lumpkin.* CTEH LLC, Golden, CO.

Communicating Uncertainty in a Complex Information Environment. *N. Senft Everson.*
National Cancer Institute, Rockville, MD. Sponsor: *K. Salinas*

Why Risk Communication Is Hard. *G. Gray.* George Washington University, Washington, DC.

Sunday, March 16, 1:15 PM to 5:00 PM, Room W205A, Convention Center



Continuing Education Course PM12: Utilizing New Approach Methodologies (NAMs) for Regulatory Assessment of Developmental Neurotoxicity: Progress and Prospects

Chair(s): Helena Hogberg, NIEHS; and Ellen Fritsche, Swiss Centre for Applied Human Toxicology (SCAHT), Switzerland.

Primary Endorser: *In Vitro* and Alternative Methods Specialty Section

Other Endorser(s): Neurotoxicology Specialty Section; Women in Toxicology Special Interest Group

The increase in neurodevelopmental disorders among children in recent years has been linked to exposure to environmental chemicals. However, the current *in vivo* test guidelines, such as Organisation for Economic Co-operation and Development (OECD) TG 426 and 443, face challenges like high costs and extended timelines, hindering comprehensive developmental neurotoxicity assessment. Consequently, regulatory bodies in Europe and the United States are advocating for the adoption of new approach methodologies (NAMs) to mitigate reliance on animal experiments and bridge

critical data gaps on chemical-induced developmental neurotoxicity. Supported by EU and US governmental agencies, an *in vitro* battery of assays measuring key neurodevelopmental processes, including proliferation, migration, differentiation, and neural network formation, was recently published in an OECD guidance document “Initial Recommendations on Evaluation of Data from the Developmental Neurotoxicity (DNT) *In-Vitro* Battery.” Moreover, integrated approaches to testing and assessment (IATA) case studies have been developed to illustrate the regulatory application and interpretation of these assays. The field is finally at a stage where data from the developmental neurotoxicity *in vitro* battery (DNT-IVB) have been used in weight of evidence approaches for regulatory decisions. This course will describe the latest advancements in developmental neurotoxicity assessment using NAMs, with a focus on the implementation of such data for regulatory purposes, with speakers representing diverse stakeholders. Furthermore, current uncertainties from using NAMs for developmental neurotoxicity regulatory applications such as the limited number of compounds tested through the whole *in vitro* battery, lack of human developmental neurotoxicity *in vivo* reference compounds to evaluate its performance, the need to demonstrate reproducibility and transferability of the assays, and the transparency of data analysis and interpretation will be addressed. The first speaker will introduce the *in vitro* battery described in the OECD guidance document and the ongoing effort to make these assays accessible to end users by transferring them to contract research organizations. The second speaker will give an update on screening efforts in the DNT-IVB to reduce the uncertainties and prioritize chemicals for further testing and IATA case study development. The third speaker will introduce and provide hands-on training on a publicly available tool for visualizing data from the DNT-IVB. This will be followed by a presentation describing the biological interpretation of the DNT-IVB data using machine-learning models and application in a regulatory context. The final speaker will give examples of how the industry has integrated *in silico* approaches with results from the DNT-IVB to assess chemicals for developmental neurotoxicity. As experts in their field, the speakers will offer key insights into the development of the OECD DNT-IVB, its usage, interpretation, and regulatory application to the course attendees.

Abstract

#1012

Utilizing New Approach Methodologies (NAMs) for Regulatory Assessment of Developmental Neurotoxicity: Progress and Prospects.

The DNT-IVB—A Challenging Road Leading to Change. *E. Fritsche.* Swiss Centre for Applied Human Toxicology (SCAHT), Basel, Switzerland.

Developmental Neurotoxicity Screening Efforts in a Battery of New Approach Methodologies to Reduce Uncertainties for Regulatory Application. *H. Hogberg.* NIEHS, Morrisville, NC.

Exemplifying a User-Friendly Online Tool for Generating Point-of-Departure Data from DNT-IVB Assays. *K. Koch.* IUF—Leibniz Research Institute for Environmental Medicine, Düsseldorf, Germany.

A Machine-Learning Approach for Developmental Neurotoxicity: Promise and Limitations of Integrating Multidimensional *In Vitro* Data Streams. *K. Carstens.* US EPA, Durham, NC.

Early Screening Using Cheminformatics in an Integrated Assessment for Neurotoxicity/ Developmental Neurotoxicity: Two Case Study Chemicals. *S. Marty.* Dow Chemical Company, Midland, MI.

Sunday, March 16, 1:15 PM to 5:00 PM, Room W307A, Convention Center

**CE Continuing Education Course PM13: Seeing Ocular Pathology:
Best Practices for Ophthalmic Endpoints in Ocular Toxicity Studies**

Chair(s): Napoleon Alejandro, Labcorp; and Jonathan Luisi, University of Texas Medical Branch at Galveston.

Primary Endorser: Ocular Toxicology Specialty Section

Other Endorser(s): Biological Modeling Specialty Section; Regulatory and Safety Evaluation Specialty Section

There are numerous ophthalmic endpoints used to assess ocular toxicity after ocular dosing during the development of ocular pharmaceutical and medical device products. The current best practices for each of these ophthalmic endpoints have evolved over decades and have now been in place for several years. Regulatory guidelines should be considered in the establishment of best practices, or standard operating procedures (SOPs), the refinement of which is based on institutional knowledge and experience from prior studies. However, the lack of guidance with respect to the conduct, including the grading standardization used for ophthalmic endpoints, of ocular toxicity studies allows flexibility and science-based justification for the implementation of best practices. This also allows tests to be adapted or optimized based on emerging therapeutic approaches such as cell and gene therapy. This same flexibility also makes it challenging for sponsors to identify the standards best suited for their product. The ophthalmic endpoints used in ocular toxicity studies, historically, as well as with newer modalities, often include ophthalmoscopic examinations (i.e., slit lamp biomicroscopy examination and indirect ophthalmoscopy), electroretinography (ERG), optical coherence tomography (OCT), fundus photography, and microscopic tissue histopathology. Regulatory precedents through the years have shown that current best practices for incorporating these ophthalmic endpoints in ocular toxicity studies, which are often standards with appropriate updates, are acceptable as long as they are based on sound fundamental science. Sponsors interested and unfamiliar with the development of ocular therapeutics may not appreciate the complexities and challenges with ocular safety studies. In addition, sponsors developing traditional ocular therapeutics may not fully appreciate the best practices with the ever-expanding landscape of the development of newer modalities. To guide the selection of ophthalmic grading scales, this course will gather experts to present case studies in how to effectively interpret the data and create a coherent report to the sponsors. This course will allow attendees interested in developing ocular therapeutics, from traditional to newer complex modalities, to understand and appreciate the necessary resources for conducting ocular toxicity studies for the development of an ocular pharmaceutical or medical device product. The presenters will focus on relevant, common ophthalmic endpoints, mainly ophthalmoscopic examinations; imaging, including OCT and fundus photography; ERG; and ocular histopathology. The course will close with a focus on the integration of all the data from the contributing scientists and principal investigators to generate a coherent and integrative ocular study toxicity report. In the absence of specific guidance, regulatory precedence is often the driver of standards to be adopted. Therefore, this course will give attendees a chance to learn from experts with a proven track record of conducting successful ophthalmic toxicity endpoints and use that learning in their drug development programs.

Abstract #

#1013

Seeing Ocular Pathology: Best Practices for Ophthalmic Endpoints in Ocular Toxicity Studies.

Best Practices for Ophthalmoscopic Examination to Assess Ocular Toxicity in Preclinical Safety Studies. J. Bartoe. Northern Biomedical Research, Northern Shores, MI. Sponsor: *N. Alejandro*

Best Practices for Imaging Endpoints for Assessing Ocular Toxicity in Preclinical Safety Studies in Light of Advanced Technologies. T. Nork. University Of Wisconsin–Madison and Ocular Services On Demand (OSOD), Madison, WI. Sponsor: *N. Alejandro*

Best Practices for Noninvasive Electrophysiology in the Evaluation of Visual Function in Preclinical Safety Studies. J. Ver Hoeve. University of Wisconsin–Madison and Ocular Services On Demand (OSOD), Madison, WI. Sponsor: *N. Alejandro*

Best Practices in Toxicologic Pathology for Ocular Drug Development. *H. Booler.* Novartis, Basel, Switzerland.

Overall Integration of Ocular Endpoints into Toxicology Reports. *P. Sonnentag.* Labcorp, Madison, WI.

Sunday, March 16, 1:15 PM to 5:00 PM, Room W308A, Convention Center

CE Continuing Education Course PM14: Advances and Applications of Proteomics in Toxicity Assessment

Chair(s): Ruili Huang, NIH/NCATS; and Dingyin Tao, NIH/NCATS.

Primary Endorser: American Association of Chinese in Toxicology Special Interest Group

Other Endorser(s): Computational Toxicology Specialty Section; Molecular and Systems Biology Specialty Section

The large number of chemicals in the environment and lack of understanding on the mechanisms of chemical- or drug-induced toxicity demand new assessment methodologies for exposure risk evaluation and subsequent regulatory decision-making. Proteomics has emerged recently as an efficient method for biological target identification and mechanism deconvolution from which the field of toxicology could benefit tremendously. Toxicologists have long focused on one or several proteins as biomarkers, but the recent advances in the mass spectrometry field shifted risk assessment from narrow, single-endpoint analyses to whole-proteome screen using relatively high-throughput strategies. Major advances have been made to improve the sensitivity of mass analyzers, spectral quality, and speed of data processing, enabling more comprehensive proteome discovery and quantitation and allowing the testing of thousands of samples in a time- and cost-efficient manner. In addition, the development of a highly automated 96- or 384-well plate sample preparation platform with high reproducibility and adaptability for extraction of proteins from cells within a culture plate makes the proteomics sample processing more feasible in a high-throughput manner. A unique advantage of proteomics is that not only tissues (cells) but also body fluids (e.g., serum, urine, saliva, tears, cerebrospinal fluid) can be analyzed to investigate the molecular correlates between diseases, toxicity, and drug actions. This is possible because many proteins, unlike mRNA, are secreted in profiles that vary predictably with physiological state. As a result, proteomic analysis can be carried out in large numbers of patients on the basis of simple body fluid tests, rather than by the much more hazardous and expensive approach of taking biopsy samples. This Continuing Education course will provide attendees with insight on the latest progress in various proteomics technologies, including high-throughput sample preparation, enrichment technologies, and example applications of proteomics in biomarker identification for diseases and toxicology research.

Abstract #

#1014

Advances and Applications of Proteomics in Toxicity Assessment.

Advances of Mass Spectrometry-Based Technologies in Toxicology Assessment. D. Tao. NIH/NCATS, Rockville, MD. Sponsor: *R. Huang*

Discovering the Secrets of Extracellular Vesicles for Biomarkers. F. Liu. Harvard Medical School, Boston, MA. Sponsor: *R. Huang*

Novel Safety Biomarker Applications in Drug Discovery and Development: Exploration to Regulatory Readiness. S. Ramaiah. Pfizer Inc., Cambridge, MA.

Identification of Biomarkers of Chemotherapy-Induced Cardiotoxicity Using High-Throughput Proteomics Approaches. L. Yu. US FDA/NCTR, Jefferson, AR.

'Omics Approaches to Discovery of Aging Biomarkers. C. Ubaida-Mohien. NIH/NIA, Baltimore, MD. Sponsor: *R. Huang*

Sunday, March 16, 4:45 PM to 6:30 PM, Room W304A, Convention Center

(All Attendees Welcome)

SOT Awards Ceremony and Music

Join SOT in honoring this year's SOT Award recipients. Beginning at 4:45 pm, a musician will be performing as the Awards Ceremony attendees gather for the event.

At 5:15 pm, the ceremony will formally begin, and dozens of individuals will be recognized. Throughout the week, more individuals will be honored with awards bestowed by the SOT Committees and Component Groups.

Sunday, March 16, 6:30 PM to 7:30 PM, W Hall A4, Convention Center

Welcome Reception

Partake in the complimentary hors d'oeuvres while connecting with friends, colleagues, and new acquaintances. A cash bar is available during this event.

Sunday, March 16, 7:00 PM to 8:00 PM, Room W311E, Convention Center

(By Invitation Only)

25-Year (or More) Member Reception

If you have been an SOT member for 25 years or more, please join your colleagues to celebrate and recognize the contributions that you have made to the Society, helping it become the association that it is today. Be sure to wear your anniversary pin.

Sunday, March 16, 7:30 PM to 9:00 PM, Room W311A, Convention Center

(Free Reservation Required)

Student/Postdoctoral Scholar Mixer

Hosted by: Graduate Student Leadership Committee (GSLC)

This is an opportunity for all students and postdoctoral scholars to gather, meet new colleagues, and reestablish relationships in an informal atmosphere at the beginning of the meeting. Learn about being involved in SOT, recognize the recipients of the GSLC Outstanding Graduate Student Leadership Award, and enjoy complimentary refreshments and a cash bar with other students and postdocs! Sign-up may be completed at no cost by registering for the mixer as part of your Annual Meeting Registration. A meeting badge is required to attend.

100+ Online Continuing Education Courses

Enhance your knowledge-base with the SOT CEd-Tox courses



Enroll at: www.toxicology.org/cedtox

SOT | Society of
Toxicology



Monday, March 17, Various Times and Locations

Poster Tours for Trainees

(Students and Postdoctoral Scholars Only. Advance sign-up is required)

Hosted by: Postdoctoral Assembly

Graduate students and postdoctoral scientists participate in one-hour guided poster tours with an expert guide. These small group tours provide the opportunity for trainees to take part in critical evaluation of cutting-edge toxicology methods and research findings and network with a senior toxicologist.

SOT Committee and Component Group Leadership Activities

SOT Committees, including Regional Chapter, Special Interest Group, and Specialty Section leadership, often hold business meetings and discussions as breakfast or lunch events. These meetings are limited to Committee members and Component Group officers. More specific information about these meetings, including the time, date, and location, is available in the [SOT Online Planner](#) and [SOT Event App](#).

SOT Regional Chapter, Special Interest Group, and Specialty Section Events

Many Regional Chapters, Special Interest Groups, and Specialty Sections host breakfasts, luncheons, or receptions and/or facilitate mentoring events during the meeting. These activities act as social events, award ceremonies, and career development sessions all in one. These events are a great way to connect with colleagues and other members of your Component Group. The days, times, and locations of the SOT Component Group activities are available in the "[Program Overview](#)" section of this publication, as well as in the [SOT Online Planner](#) and [SOT Event App](#).

Monday, March 17, 6:30 AM to 8:00 AM, Room W104A, Convention Center

(By Invitation Only)

Past Presidents' Breakfast

Monday, March 17, 7:00 AM to 4:00 PM, Room W109B, Convention Center

Mentorship Lounge

Hosted by: Career Advancement, Mentoring, and Networking Committee

Locating a quiet and available space for mentors and mentees to meet can be a challenge for attendees. This space is intended to provide a meeting destination for attendees to foster new or continuing mentor relationships.

Monday, March 17, 8:00 AM to 9:00 AM, W Hall A4, Convention Center

FS Opening Plenary Session—Presentation Topic: Climate Risks to Human Health

Speaker: Kimberley R. Miner, Climate Scientist, NASA Jet Propulsion Lab, Pasadena, CA.



Kimberley Miner, PhD, is a Climate Scientist at the NASA Jet Propulsion Lab (JPL) in Pasadena, California, and a Climate Change Institute Research Assistant Professor. At JPL, Dr. Miner works on the Arctic Methane Project looking at the impacts of climate change in the Arctic.

Dr. Miner is a graduate of Columbia University and the University of Maine. She is also a Fellow at the Center for Climate and Security in DC and Co-chair of the NASA Interagency Forum on Climate Change Risks, Impacts, and Adaptation.

Dr. Miner has studied climate change with multi-national teams in Canada, Switzerland, and Alaska. During her PhD, she developed the first health assessment of glacial meltwater pollution. For this groundbreaking work, Dr. Miner was awarded fellowships from the Fulbright Foundation, the National Science Foundation, the Department of Defense, and the Switzer Foundation.

Prior to her PhD, Dr. Miner worked at the Lamont-Doherty Earth Observatory and the New York City Office of Emergency Management. In these roles, she developed platforms for science communication after Hurricane Sandy. In 2014, she traveled by boat from Chile to Palmer Station in Antarctica to participate in research on oceans during climate change.

Monday, March 17, 9:00 AM to 4:30 PM, W Hall A2, Convention Center

ToxExpo Exhibits

Incorporating visits to the ToxExpo while at the SOT Annual Meeting connects attendees with 275+ exhibitors who support the toxicology community with cutting-edge solutions and services. Visit the ToxExpo to:

- Connect with exhibitors for product, service, and career insights
- Learn about the latest research from 700+ daily poster presentations
- Network with colleagues in the SOT Pavilion and ask questions about the Society
- Check out the Tiny Tox Theater for brief talks focused on a variety of topics
- Enjoy morning coffee and afternoon refreshments
- Grab lunch and relax with others
- Win big by visiting exhibitors with raffles and by dropping your business card in the SOT Diamond-Level Supporter boxes
- And experience much, much more

Global Gallery of Toxicology

Toxicology societies from around the world participate in the Global Gallery of Toxicology, where they display posters showcasing their upcoming meetings, key accomplishments, strategic initiatives, journals, awards, and more.

SOT Regional Chapter, Special Interest Group, and Specialty Section Posters

Dedicated poster space showcases the activities of the SOT Regional Chapters, Special Interest Groups, and Specialty Sections.

Monday, March 17, 9:15 AM to 12:00 Noon, Room W304E, Convention Center

Symposium Session: Beyond Inflammation: Toxicities Associated with Ocular Therapeutics

Chair(s): Eunice Musvasva, F. Hoffmann-La Roche Ltd, Switzerland; and Helen Booler, Novartis AG, Switzerland.

Primary Endorser: Ocular Toxicology Specialty Section

Other Endorser(s): Biotechnology Specialty Section

Over the last decade, there has been a significant change in the landscape of ocular therapeutics in development. The field has evolved from portfolios of predominantly intravitreal large molecule biologics to more diverse portfolios of potential therapeutics, containing novel modalities and formats including long-acting conjugates, viral vector-based gene therapies, RNA therapies, and cell therapies intended to improve durability and/or delivery to target cells or subcellular compartments. Over the years, by far the most common finding in nonclinical toxicology studies with intravitreal humanized biologics has been ocular inflammation associated with immunogenicity—a finding that is not predictive of the occurrence immunogenicity in humans. However, with the evolution in modalities and approaches to delivery and the evaluation of novel targets with more traditional modalities, there have been substantial associated changes in the patterns and type of toxicities observed in nonclinical studies. In this session, we look beyond ocular inflammation to explore some of the more common target and class-related toxicities observed with ocular therapeutics, their manifestations (histological and in-life), translatability and the potential mechanisms underpinning them (where known), and in-life techniques that can be used in their assessment and monitoring.

Abstract #

- #1015 9:15 AM **Beyond Inflammation: Toxicities Associated with Ocular Therapeutics.**
9:15 AM **Introduction.** *E. Musvasva.* F. Hoffmann-La Roche Ltd, Basel, Switzerland.
- #1016 9:20 AM **Detection of In-Life Ocular Toxicities.** *J. Bartoe.* Northern Biomedical Research, Norton Shores, MI. Sponsor: *H. Booler*
- #1017 9:50 AM **Regulatory Considerations for Ocular Therapies.** *R. Allen.* US FDA/CBER, Silver Spring, MD. Sponsor: *H. Booler*
- #1018 10:20 AM **The Chicken or the Egg: Deciphering Toxicities Associated with Ocular AAV-Based Therapies.** *H. Booler.* Novartis AG, Basel, Switzerland.
- #1019 10:50 AM **Toxicities Associated with Ocular Oligonucleotide Therapies.** *K. Yekkala.* J&J Innovative Medicine, Spring House, PA. Sponsor: *H. Booler*
- #1020 11:20 AM **Nonclinical Ocular Safety Evaluation of Novel TrkB Agonist and Clinical Translation in the Geographic Atrophy Patients.** *Q. Huang.* Boehringer Ingelheim Pharmaceuticals Inc., Ridgefield, CT.
- 11:50 AM **Panel Discussion/Q&A.** *H. Booler.* Novartis AG, Basel, Switzerland.

Monday, March 17, 9:15 AM to 12:00 Noon, Room W202A, Convention Center

S Symposium Session: Evolution of Human Health Risk Assessment: New Science and Approaches That Are Ready for Primetime

Chair(s): Russell Thomas, US EPA/ORD; and Matthew Gagné, Health Canada, Canada.

Primary Endorser: Regulatory and Safety Evaluation Specialty Section

Other Endorser(s): Risk Assessment Specialty Section

Chemical risk assessment is foundational to safely regulating chemicals and protecting human health. However, the traditional toxicology studies and risk assessment process is time and resource intensive and takes six to 14+ years depending on the complexity of the studies and the assessment. As a result, less than 25% of the chemicals identified in the environment and less than 5% of chemicals in active commerce have human health assessments from US federal agencies. To address these gaps, chemical risk assessment has been evolving to incorporate new science and approaches, bringing the field to an inflection point where enough confidence has been built in the technologies to allow for application in commercial and regulatory settings. New technologies, such as transcriptomics, are being used to evaluate dose-effect relationships associated with exposure and to identify chemical modes of action. *In vitro* and *in silico* methods are being used to rapidly identify points of departure and toxicokinetic properties for hundreds of chemicals. Probabilistic methods are being used to quantitatively estimate health burdens on human populations. In this Symposium Session, four real-world examples will be presented that demonstrate a reliance on new science and approaches to inform chemical risk assessment and human health assessments. In the first example, a combination of *in vitro* and *in silico* methods are being applied for prioritization and screening level risk assessment in the Chemicals Management Plan in Canada. In the second example, short-term *in vivo* transcriptomic studies are being used to derive quantitative reference values for data poor chemicals at the US EPA. In the third example, a transcriptomic biomarker was used to set a protective chronic reference dose for a pesticide. In the fourth example, probabilistic methods are used by the US FDA for exposure assessment and risk ranking on chronic chemical hazards in food. In each of the examples, presentations will provide a description of the overall uncertainties and value of the methods for each specific decision context. Finally, in the last talk of the session, a decision analysis framework and case study will be presented to contextualize the human health and economic trade-offs between the time needed to test the chemical and develop the human health assessment, uncertainties in the methods used, and the costs associated with testing and exposure mitigation when faced with a choice between toxicity testing methods (traditional versus new methods).

Abstract #

- | | | |
|-------|----------|--|
| #1021 | 9:15 AM | Evolution of Human Health Risk Assessment: New Science and Approaches That Are Ready for Prime Time. |
| | 9:15 AM | Introduction. R. Thomas. US EPA/ORD, Research Triangle Park, NC. |
| #1022 | 9:20 AM | Application of <i>In Vitro</i> and <i>In Silico</i> Methods for Prioritization and Screening Level Risk Assessment Using the Health Canada Automated Workflow for Prioritization. M. Gagné. Health Canada, Ottawa, ON, Canada. Sponsor: R. Thomas |
| #1023 | 9:50 AM | Development of a New US EPA Human Health Assessment Product Using Transcriptomics and Short-Term <i>In Vivo</i> Studies. A. Harrill. US EPA, Research Triangle Park, NC. |
| #1024 | 10:20 AM | Applying Subchronic Study Gene Expression Data to Identify a Chronic Reference Dose Protective of Human Health for Agrochemicals. K. Johnson. Corteva Agriscience, Indianapolis, IN. |
| #1025 | 10:50 AM | An Overview of US FDA-iRISK: Application for Exposure Assessment and Risk Ranking on Chemical Hazards in Food. Y. Chen. US FDA, Washington, DC. Sponsor: S. Fitzpatrick |
| #1026 | 11:20 AM | A Value of Information Framework to Evaluate Human Health and Economic Trade-Offs of New Toxicity Testing and Risk Assessment Methods. D. Krewski. University of Ottawa, Ottawa, ON, Canada. Sponsor: R. Thomas |
| | 11:50 AM | Panel Discussion/Q&A. R. Thomas. US EPA/ORD, Research Triangle Park, NC. |

Symposium Session: Into the Wild: Exploring Toxic Chemical Effects in Wildlife Species

Chair(s): James Wise, Louisiana State University; and Emma Martínez López, Universidad de Murcia, Spain.

Primary Endorser: Metals Specialty Section

Toxic chemicals in the environment not only impact human health but have lasting and harmful effects on wildlife health. The effects of these toxic chemicals on wildlife can vary compared with effects on human health and standard laboratory animal models. Many of the species that are affected by toxic chemicals in the environment are essential not only to both our overall ecosystem and environment but to our economy as well, as some are food sources (e.g., sea trout and alligators) or are popular wildlife for tourists to see (e.g., marine mammals and alligators). Some of these wildlife species are apex predators or keystone species, and their health is vital to the overall ecosystem health. For many of these species, loss of the species population would result in billions of lost revenues due to loss of food sources and tourism. By understanding how toxic chemicals (e.g., per- and polyfluoroalkyl substances and heavy metals) affect these wildlife species, we can develop better regulatory and remediation efforts to reduce pollution in heavily impacted areas. Additionally, these studies can help us understand how the interconnectedness of wildlife species' health may be related to the overall ecosystem impacts and potential exposure effects on human health through the One Environmental Health framework. However, not only is it important to understand how toxic chemicals in the environment have an impact on ecosystems and wildlife health, but these species may also provide insight into the mechanisms underlying how these toxic chemicals cause diseases in humans and can provide data where some species may have developed protective mechanism against these contaminants. These topics would be of interest not just to metals researchers but also to those studying other carcinogens and how these compounds may cause hepatotoxicity, neurotoxicity, developmental toxicity, etc. The session will start with a talk on PFAS and nanoplastics exposures in the liver and brain of sea trout. Then, this session will cover the biomonitoring of marine mammals (data presented from two separate groups for different ecosystems) for multiple chemicals, including metals (found in EV batteries), PAHS, PFAS, and others. Then, we will transition from *in vivo* related studies to *in vitro* for a talk on chromium (VI) impact on whale lung cells metabolomics and how it relates to metals, carcinogenesis, and human cells and a talk on chromium (VI) impacts on alligator cells as it relates to its carcinogenic mechanism in humans. This Symposium Session will introduce the concept of ecotoxicology to those unfamiliar with the subject and explain how it is important to many fields of toxicology and how ecotoxicology studies intersect with other toxicology areas like metals, neurotoxicology, and carcinogenesis. It will also attract an expanded SOT audience of metals, environmental health, and other toxicology researchers and provide a platform for graduate students and postdoctoral fellows to learn about how ecotoxicology relates to the other fields of toxicology.

Abstract #

- #1027 9:15 AM **Into the Wild: Exploring Toxic Chemical Effects in Wildlife Species.**
9:15 AM **Introduction.** J. Wise. Louisiana State University, Baton Rouge, LA.
- #1028 9:20 AM **Synergistic Exposure to PFAS and Nanoplastics Alters Brain and Liver Functionality in the Common Food Fish Species Spotted Seatrout (*Cynoscion nebulosus*).** R. Griffitt¹, T. Sherwood², J. Johnson¹, and D. Wetzel². ¹University of Southern Mississippi, Ocean Springs, MS; and ²Mote Marine Laboratory, Sarasota, FL. Sponsor: J. Wise
- #1029 9:50 AM **A Whale of a Tale: Impacts of Hexavalent Chromium Exposure on Bowhead Whale Lung Cells Metabolome.** J. Wise¹, D. Chiarugi², H. Gu³, and J. Wise Sr⁴. ¹Louisiana State University, Baton Rouge, LA; ²GeneVia Technologies, Tampere, Finland; ³Arizona State University, Phoenix, AZ; and ⁴University of Louisville, Louisville, KY.
- #1030 10:20 AM **Effects of Particulate Hexavalent Chromium in Alligator Lung Cells.** A. Williams¹, I. Meaza¹, S. Wise¹, J. T. Wise², H. Gu³, D. Chiarugi⁴, and J. Wise Sr¹. ¹University of Louisville, Louisville, KY; ²Louisiana State University, Baton Rouge, LA; ³Arizona State University, Phoenix, AZ; and ⁴GeneVia Technologies, Tampere, Finland.

- #1031 10:50 AM **Historic and Emerging Pollutants in Cetaceans from Western Mediterranean Sea: 15 Years of Experience in Contaminant Biomonitoring.** E. Martínez López, G. López-Berenguer, and J. Peñalver. Universidad de Murcia, Murcia, Spain. Sponsor: J. Wise
- #1032 11:20 AM **Assessment of Metal Contamination in Whale Samples from the Gulf of Maine, Sea of Cortez and Off the Coast of Santa Barbara: A Comparative Study.** I. Meaza, J. Wise Jr., J. Wise, S. Wise, R. Wise, J. T. Wise, C. Wise, M. Bras, and J. Wise Sr. University of Louisville, Louisville, KY.

Monday, March 17, 9:15 AM to 12:00 Noon, Room W206A, Convention Center

S Symposium Session: Navigating Complexity: How 'Omics in Short-Term Animal Studies Are Optimizing and Accelerating Chemical Risk Assessment

Chair(s): Leah Wehmas, US EPA; and David Rouquie, Bayer Cropsience, France.

Primary Endorser: Risk Assessment Specialty Section

Other Endorser(s): Molecular and Systems Biology Specialty Section; Regulatory and Safety Evaluation Specialty Section

Short-term *in vivo* mechanistic studies constitute a cornerstone in the field of toxicology, offering profound insights into the physiological and molecular dynamics that drive adverse outcomes following chemical exposure. These studies are primarily conducted using animal models to explore the effects of substances over shorter dosing periods (~5 to 28 days). By meticulously observing molecular, cellular, and tissue-level alterations, researchers in molecular toxicology can decode the complex biochemical pathways and interactions that mediate responses to treatments while reducing reliance on large 90-day and two-year animal studies. These investigations are pivotal in identifying points of departure (PODs) that are crucial for toxicological evaluations, forming a robust basis for risk assessment and regulatory decisions. Such assessments are instrumental in protecting public health, preserving environmental integrity and promoting animal welfare. During this session, we will delve into the emerging methodologies and frameworks that enhance the interpretation and application of these studies starting with an introduction to the next-generation risk assessment landscape and impact of cutting-edge molecular toxicology techniques on regulatory decision frameworks. This will be followed by a presentation on how multi-sector initiatives led by HESI are advancing the use and acceptance of molecular PODs in risk assessment. The third presentation will provide overview of the US EPA transcriptomic assessment product, with a specific focus on new research into adapting the short-term exposure paradigm to study other toxicological domains and application of new techniques to reduce uncertainties in using this type of data. The fourth presentation will introduce the European Centre for Ecotoxicology and Toxicology of Chemicals efforts in investigating the utility of combining 'omics endpoints and short-term *in vivo* studies with *in silico* and *in vitro* techniques to enhance OECD guideline studies. We will conclude with discussing advanced 'omics interpretation frameworks and how they are reshaping our understanding of molecular toxicology in the context of contemporary scientific challenges and regulatory requirements.

Abstract #

- #1033 9:15 AM **Navigating Complexity: How 'Omics in Short-Term Animal Studies Are Optimizing and Accelerating Chemical Risk Assessment.**
9:15 AM **Introduction.** L. Wehmas. US EPA, Research Triangle Park, NC.
- #1034 9:25 AM **Deciphering Toxicological Mechanisms: Innovations in Short-Term *In Vivo* Studies and Regulatory Science.** D. Rouquie. Bayer Cropsience, Sophia Antipolis, France.
- #1035 9:50 AM **A Vision for the Use of Molecular Points of Departures for Chemical Testing.** C. Mitchell. HESI, Washington, DC.
- #1036 10:15 AM **Application and Advancement of the US EPA Transcriptomic Assessment Product to Support Rapid Risk Assessment of Data-Poor Chemicals.** L. Wehmas. US EPA, Research Triangle Park, NC.

- #1037 10:40 AM **Toward “Smart” *In Vivo* Toxicology Studies: Improving the Quality and Value of Existing Screening Regulatory Studies with Additional Endpoints.** R. Currie. Syngenta, Bracknell, United Kingdom.
- #1038 11:05 AM **‘Omics Data and Regulatory Frameworks: Success and Challenges.** F. Caiment. Maastricht University, Maastricht, Netherlands. Sponsor: L. Wehmas
- 11:30 AM **Panel Discussion/Q&A.** L. Wehmas. US EPA, Research Triangle Park, NC.

Monday, March 17, 9:15 AM to 12:00 Noon, Room W307A, Convention Center

S Symposium Session: When *In Vitro* Applied Dose ≠ Actual Dose: Overcoming Challenges for Next-Generation Risk Assessment for Difficult-to-Test Substances

Chair(s): Ming Kung, ExxonMobil Biomedical Sciences Inc.; and Ivan Rusyn, Texas A&M University.

Primary Endorser: *In Vitro* and Alternative Methods Specialty Section

Other Endorser(s): Biological Modeling Specialty Section; Risk Assessment Specialty Section

Next-Generation risk assessment seeks to deploy *in vitro* methods, and through *in vitro* to *in vivo* extrapolation (IVIVE) and reverse dosimetry enable the translation of those data to toxicity reference values, which can then be compared to predicted exposures to a given chemical(s). Such approaches require quantitative estimates, with well-characterized exposures throughout. However, a number of technological and methodological barriers exist, particularly for chemicals with properties not amenable to such testing due to volatility, water solubility, or other considerations. For context, approximately 8% of Tox21 library chemicals were deemed unsuitable due to technical challenges such as solubility in DMSO, volatility, or reactivity. Even if testing can be achieved, such chemicals, due to their differential partitioning to cell culture system components, transience, or a combination of the two can produce inaccurate concentration-response information when basing assessments on the nominal concentration applied. Therefore, improved approaches to optimize dosing, as well as to fully characterize that dosing are required to enable better coverage of the chemical space. A number of methodological approaches are being established to overcome many of these challenges. These range from enhanced dosing methods to establish and maintain steady concentrations of volatile and/or hydrophobic test materials for the duration of bioassays to the continued optimization of analytical and modeling approaches to quantify chemical concentrations reaching biological receptors in bioassay and biological systems. This essential work will enable high throughput IVIVE to be reliably applied and interpreted on the universe of chemicals in the exposome, regardless of their physical properties. The purpose of this session is to provide a venue to share the latest developments in optimizing the conduct and interpretation of *in vitro* studies for “difficult-to-test” substances. Challenges to be discussed include optimized strategies for achieving and maintaining steady concentrations in cell culture systems of poorly water-soluble substances and volatile substances, as well as multi-component/UVCB substances; methods to quantify bioavailable concentrations of chemicals, including modeling and high-throughput analytical measurements to improve concentration-response quantitation; and advances in models improving physiologically based toxicokinetic modeling of volatile substances for IVIVE.

Abstract #

- #1039 9:15 AM **When *In Vitro* Applied Dose ≠ Actual Dose: Overcoming Challenges for Next-Generation Risk Assessment for Difficult-to-Test Substances.**
- 9:15 AM **Introduction.** M. Kung. ExxonMobil Biomedical Sciences Inc., Annandale, NJ.
- #1040 9:20 AM **A Framework for Improving the Quality of *In Vitro* Toxicity Data for Quantitative *In Vitro* to *In Vivo* Extrapolation of “Difficult” Chemicals.** N. Kramer¹, M. Jonker², Y. Staal³, E. Poppelaars⁴, M. Wildwater⁵, N. Moelijker⁶, and G. Hendriks⁷. ¹Wageningen University, Wageningen, Netherlands; ²Universiteit Utrecht, Utrecht, Netherlands; ³Rijksinstituut voor Volksgezondheid en Milieu (RIVM), Bilthoven, Netherlands; ⁴Vivaltes, La Bunnik, Netherlands; ⁵Vivaltes, La Bunnik, Netherlands; ⁶Toxys B.V., Oegstgeest, Netherlands; and ⁷Toxys, B.V., Oegstgeest, Netherlands.

- #1041 9:45 AM **Regulatory Needs vs. Practical Limitations of Testing Petroleum UVCBs in Human Cell-Based Assays.** *I. Rusyn.* Texas A&M University, College Station, TX.
- #1042 10:10 AM **Optimizing Dosing and Modeling Dissolution of Complex Hydrocarbon Substances *In Vitro*.** *M. Kung*¹, *M. Ruhmel*¹, *A. Redman*¹, and *B. Hedgpeth*². ¹ExxonMobil Biomedical Sciences Inc., Annandale, NJ; and ²ExxonMobil Guyana Ltd., Georgetown, Guyana.
- #1043 10:35 AM **Measuring and Controlling Exposure in Cell-Based Bioassays.** *B. Escher.* Helmholtz Centre for Environmental Research, Leipzig, Germany. Sponsor: *M. Kung*
- #1044 11:00 AM **IVIVE Approaches for Semi-volatile and Volatile Chemicals.** *J. Wambaugh.* US EPA, Research Triangle Park, NC.
- 11:25 AM **Panel Discussion/Q&A.** *I. Rusyn.* Texas A&M University, College Station, TX.

Monday, March 17, 9:15 AM to 12:00 Noon, Room W203A, Convention Center

W Workshop Session: Developmental Immunotoxicology: A Comparison Between Traditional and New Approach Methods

Chair(s): Fenna Sillé, Johns Hopkins University Bloomberg School of Public Health; and Mark Collinge, Pfizer Inc.

Primary Endorser: Immunotoxicology Specialty Section

Other Endorser(s): Comparative Toxicology, Pathology, and Veterinary Specialty Section; Reproductive and Developmental Toxicology Specialty Section

Interest in developmental immunotoxicology (DIT) has surged in the last two decades due to the rising incidence of immune-mediated developmental disorders in children linked to environmental chemical exposures. The developing immune system is particularly sensitive to environmental stressors, and exposure during critical periods during prenatal and postnatal development can lead to long-term immune dysfunction. This has led to the need to understand the mechanisms underlying age-related vulnerability to various potentially immunotoxic compounds and assessing the risk to the developing immune system. Traditionally, the potential risk for DIT from pharmaceutical and environmental exposures has been evaluated in specific mammalian models, including mice, rats, dogs, minipigs, and nonhuman primates. For example, the current Organisation for Economic Co-operation and Development testing guideline methods for developmental immunotoxicity depend mainly on the extended one-generation study. However, only a select set of assays, such as T cell-dependent antibody response (the TDAR) in experimental animal models, have been proven to be reliably translatable to human relevance. As interest in DIT grows, our understanding of the mammalian immune system expands, necessitating comprehension of immune developmental timelines across species. Although the general stages of immune development share similarities across mammalian species, it is evident that temporal immune development differs among species—what applies to mice and rats may not necessarily apply to dogs, monkeys, or humans. Therefore, comprehending these distinctions is crucial for optimizing the use of (historical) animal experimental data for weight of evidence evaluations of potentially immunotoxic agents, as well as for accurately conducting and interpreting nonclinical safety studies. Traditional animal DIT studies also face limitations in cost, scalability, and high-throughput capabilities. The emergence of alternative animal systems for rapid toxicology screening offers valuable chances to assess their synergistic potential. Integrated alternative models like zebrafish, nematodes, and planarians have emerged to address these gaps due to their small size, ease of breeding and maintenance, cost effectiveness, rapid development, and shared characteristics with the mammalian immune system. Similarly, marine fish models, such as *Oryzias melastigma*, which are capable of both an innate and adaptive cellular immune defense, provide holistic models for evaluating risk of environmental immunotoxicants. Understanding sensitive immune development windows in marine fish aids in aquatic risk assessment, potentially translating to human DIT risk. These alternative models, each with their own unique strengths and limitations, may effectively bridge *in vitro* and mammalian testing methods, facilitating exploration of adverse outcome pathways across multiple species. Comparative screening in multiple of such animal models covers more chemical-biological space, thus providing greater weight of evidence for prioritization of chemical hazards. The DIT field also looks to the future with NAMs-targeting initiating events and key perturbations responsible for DIT. Sensitive, translatable *in vitro* assays hold significant value, aiding in the translation of findings to

human relevance. If data from conventional *in vivo* toxicology studies suggest that a specific developmental immune pathway is targeted, then a validated *in vitro* test for that specific pathway and species would be useful. When findings from conventional *in vivo* toxicology studies are recapitulated *in vitro*, then a similar human *in vitro* assay may allow translation to human relevance. This session will convene developmental immuno(toxico)logists to discuss the present state of science and latest advances of both traditional and unconventional DIT models, bridging old and new approach methods. The conversation will focus on challenges, advancements, and regulatory adoption of precise, predictive, and translatable DIT models to support human DIT hazard identification and risk evaluation.

Abstract

- #1045 9:15 AM **Developmental Immunotoxicology: A Comparison Between Traditional and New Approach Methods.**
- #1046 9:15 AM **Closing Information Gaps for Developmental Immunotoxicity Testing and Human Translatability with Comparative Developmental Immunology.** *M. Collinge.* Pfizer Inc., Groton, CT.
- #1047 9:40 AM **T Cell-Dependent Antibody Response and Cell-Based Alternatives to Understand the Immunosuppressive Effects Exogenous Agents Have on the Adaptive Immune System.** *J. DeWitt.* Oregon State University, Corvallis, OR.
- #1048 10:00 AM **The Amenability and Utility of Zebrafish Larvae for High-Throughput Immunotoxicology Screens.** *J. Yoder.* North Carolina State University, Raleigh, NC.
- #1049 10:20 AM **Long-Term Effects of Exposure to Polyethylene Terephthalatemicroplastic Water Contaminants During Early Development in Xenopus.** *J. Robert, F. De Jesus Andino, A. Vu, J. McGrath, and S. Romanick.* University of Rochester, Rochester, NY.
- #1050 10:40 AM **Critical Developmental Windows of PFAS Immunotoxicity: Insights from the Marine Medaka Model.** *F. Seemann.* Texas A&M University-Corpus Christi, Corpus Christi, TX.
- #1051 11:00 AM **Charting the Future: Leveraging Comparative Immunotoxicology in the Advancement of New Approach Methods for Assessing Risk and Regulating Developmental Immunotoxicants.** *F. Sillé.* Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD.
- 11:20 AM **Panel Discussion/Q&A.** *F. Sillé.* Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD.

Monday, March 17, 9:15 AM to 12:00 Noon, Room W205A, Convention Center

W Workshop Session: Neurotoxicology and Brain Health Outcomes of Nanoparticles

Chair(s): Andrew Ottens, Virginia Commonwealth University; and Jonathan Shannahan, Purdue University.

Primary Endorser: Nanoscience and Advanced Materials Specialty Section

Other Endorser(s): Inhalation and Respiratory Specialty Section; Neurotoxicology Specialty Section

The brain is distinct in its susceptibility to toxicant exposures. A highly vascularized and energy-demanding organ, it is prone to functional dyshomeostasis with changes in blood flow and energy substrate from acute insults and chronic disease. Moreover, its protective blood-brain barrier (BBB) is susceptible to maladaptation from circulating mediators with resultant inflammation and xenobiotic entry. Recent evidence supports that inhaled nanoparticles can augment circulating factors to cause indirect maladaptation of the BBB and neuroinflammation. Separately, inhaled or ingested nanoparticles with diameters somewhere below 50 nm are readily endocytosed into and across the endothelium, resulting in further maladaptation at the neurovascular unit. This session will focus on neurological outcomes of nanoparticle exposures across the lifespan, how they directly or indirectly impact the brain, and ultimately how their properties may be advantageous for biomedical interventions. The session will be led by individuals with expertise looking from

neuroscience to nanotoxicology and vice versa, respectively. The Workshop Session will touch on a wide variety of nanomaterials from metal/metal oxides used in industrial and consumer products to hot-topic environmental concerns on wildfire smoke and nanoplastic pollutants. Speakers will address direct and indirect mechanisms of nanotoxicological brain outcomes, cover a wide variety of materials, and discuss brain health outcomes. The intersection of nanomaterial toxicology in the brain is an emerging area of study, thus speakers will represent a breadth of topics from across academia. The final speaker will present the commercial application of nanoparticles in biomedical therapeutics for neurodegenerative disease, considering the toxicological challenges and future potential of this burgeoning industry. The session will close with a panel discussion among the presenters and Chairs on the state of this emerging field, challenges, and future directions. The session is of broad interest to a number of audiences. Specifically, individuals interested in neurotoxicity and/or systemic mediators of inflammation and/or performing research on nanoparticle toxicology will gain novel and current information from this session. The session as structured will benefit those actively performing research in this field, those in adjacent fields, and those considering introducing these concepts into their ongoing research programs. Importantly, the presenters will cover numerous emerging exposures in their topics (nanomaterials, wildfire smoke, nanoplastics) and utilize innovative research methods. The ending discussion panel will be in response to audience questions and prompts. The intentions are for this discussion to be high level, integrating research topics and concepts across presentations. The goals are to get perspectives on major gaps related to this research area, strategies and technologies to address these gaps, and the impact/benefits of addressing these deficiencies in our knowledge. Additionally, the panel will describe the interdisciplinary nature of this research field and how individuals who are experts in a single component can engage within this area. Finally, the session will address the following questions: (1) What are the largest gaps in our current understanding of nanoparticle-induced systemic effects? (2) How does our current toxicological knowledge on this subject reflect on therapeutic applications? (3) Based on the mechanisms described, are their potential susceptible subpopulations of concern? (4) What are future directions for research in this area? (5) Are there methodological advancements that could be uniquely employed in this area that would substantially move the field forward? (6) Are there other emerging exposures of neurological concern? (7) Are observed effects reversible? (8) How translatable are these research findings?

Abstract

- | | | |
|-------|----------|---|
| #1052 | 9:15 AM | Neurotoxicology and Brain Health Outcomes of Nanoparticles. |
| | 9:15 AM | Introduction. A. Ottens. Virginia Commonwealth University, Richmond, VA. |
| #1053 | 9:20 AM | The Consequences of Ambient Ultrafine Particle Air Pollution on the Developing Brain. |
| | | D. Cory-Slechta. University of Rochester Medical Center, Rochester, NY. |
| #1054 | 9:45 AM | Inhaled Wildfire Nanoparticulate Induces Dementia-Like Pathogenesis in the Aged Brain. |
| | | A. Ottens. Virginia Commonwealth University, Richmond, VA. |
| #1055 | 10:10 AM | Lipid Dysregulation is Associated with Silica Nanoparticle Inhalation-Induced Neurotoxicity. |
| | | J. Swihart. Purdue University, West Lafayette, IN. Sponsor: J. Shannahan |
| #1056 | 10:35 AM | Nanoplastic Accumulation in the Brain: Perspectives on Mechanisms and Human Health Impacts. |
| | | M. Garcia. University of New Mexico, Albuquerque, NM. Sponsor: A. Ottens |
| #1057 | 11:00 AM | Therapeutic Modulation of Brain Energy Metabolites by CNM-Au8, a Suspension of Catalytically Active Gold Nanocrystals. |
| | | K. Ho. Clene Nanomedicine, Salt Lake City, UT. Sponsor: A. Ottens |
| | 11:25 AM | Panel Discussion/Q&A. J. Shannahan. Purdue University, West Lafayette, IN. |

Monday, March 17, 9:15 AM to 12:00 Noon, Room W308A, Convention Center

W Workshop Session: Protecting Those Who Serve: Advances in Military Environmental Exposures Research

Chair(s): Samantha Snow, ICF International Inc.; and Terra Vincent-Hall, US Department of Veteran Affairs.

Primary Endorser: Occupational and Public Health Specialty Section

Other Endorser(s): Inhalation and Respiratory Specialty Section; Out Toxicologists and Allies Special Interest Group

Military service represents a unique occupational exposure experience whether in conflict theaters during deployments or in garrison settings. While in uniform, service members are potentially exposed to myriad health hazards as a result of their duties, including chemical, physical, biological, and even mental stressors. Available data suggest that health effects can be observed not only while these exposures are occurring but also years after separation from the military. Military environmental exposures have gained increasing attention over the years, as evidenced by the recent signing of the Sergeant First Class Heath Robinson Honoring Our Promise to Address Comprehensive Toxics Act of 2022, the most comprehensive legislation to address military exposures in US history. The US Departments of Defense and Veterans Affairs are coordinating to better understand the effects of military-relevant exposures on both the short- and long-term health of those who serve the US. In this session, the first presentation will provide an overview of clinical assessments used to evaluate veterans presenting with deployment-related respiratory diseases. The second presentation will focus on data supporting the association between burn pit smoke and respiratory toxicity as determined by *in vitro* models, *in vivo* models, and *in silico* analysis. The third presentation will provide an overview of the health effects associated with jet fuel exposure, with a deeper look on the effects of central auditory processing followed by jet fuel and noise co-exposure. This presentation will also touch upon whether the use of alternative and renewable jet fuels results in reduced adverse effects compared to petroleum-derived jet fuels. The fourth presentation will provide an overview of the various assays deployed by the Defense Centers for Public Health-Aberdeen to develop toxicological profiles and fill data gaps for chemicals that are encountered by service members. The final presentation will discuss an overview of the use of new approach methodologies to identify risks associated with emerging chemicals in the military space.

Abstract #

- | | | |
|-------|----------|--|
| #1058 | 9:15 AM | Protecting Those Who Serve: Advances in Military Environmental Exposures Research. |
| | 9:15 AM | Introduction. S. Snow. ICF International Inc., Durham, NC. |
| #1059 | 9:20 AM | Have You Served in the Military, and Did You Experience Toxic Exposures? Approach to the Symptomatic Veteran. M. Falvo. US Department of Veteran Affairs, East Orange, NJ. Sponsor: S. Snow |
| #1060 | 9:45 AM | Respiratory Health Effects of Burn Pit Smoke. I. Jaspers. University of North Carolina at Chapel Hill, Chapel Hill, NC. |
| #1061 | 10:10 AM | Potential Health Effects Associated with Military Jet Fuel Exposures. K. Mumy. Naval Medical Research Unit Dayton, Dayton, OH. |
| #1062 | 10:35 AM | Operational Toxicology and Chemical Exposures: When the Boots Are on the Ground. V. Adams. Defense Centers for Public Health-Aberdeen, Aberdeen, MD. |
| #1063 | 11:00 AM | Toward Proactive Chemical Management and Sustainable Practices: The Road Ahead. N. Vinas. Office of the Assistant Secretary of Defense, Washington, DC. |
| | 11:25 AM | Panel Discussion/Q&A. T. Vincent-Hall. US Department of Veteran Affairs, Washington, DC. |

Monday, March 17, 9:15 AM to 11:45 AM, W Hall A2, Convention Center

PS Poster Sessions

The presenting authors are available to discuss their research for Poster Sessions. Posters will be displayed from 9:00 am to 4:30 pm, with the author in attendance during the assigned Poster Session. See the *Program: Platform and Poster Session Supplement* PDF, the [SOT Online Planner](#) and [SOT Event App](#) for details.

Monday, March 17, 9:15 AM to 10:15 AM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Monday, March 17, 9:30 AM to 11:30 AM, Room W207A, Convention Center

Global Collaboration Coffee

Chair(s): Emanuela Corsini, Università degli Studi di Milano, Italy.

Organized by: International Union of Toxicology (IUTOX)

This annual event organized by IUTOX and hosted by SOT helps IUTOX Member Societies and other international attendees put ideas into action to advance information sharing and to solve common problems with available resources.

Monday, March 17, 9:30 AM to 3:00 PM, Room W209C, Convention Center

(Hours May Vary; Check Posted Information in the Research Funding Insights Room)

Research Funding Insights Room: Network with Grant Program Officers

Representatives from federal agencies will be available in the Research Funding Insights Room to answer general grant-related questions. Check the posted information in the Research Funding Insights Room to make an appointment with a program officer who can discuss aspects of scientific review or specific grant opportunities. New investigators are especially encouraged to meet with program staff.

Monday, March 17, 9:30 AM to 10:30 AM, Room W209B, Convention Center

(Free Reservation Required; Limited Seating; SOT Student and Postdoc Members Only)

Trainee Discussion with Plenary Session Speaker Kimberley Miner

Kimberley Miner will meet informally for discussion with graduate students and postdoctoral scholars after the Plenary Session.

Participation is limited to SOT Student and Postdoctoral members; you can register when registering for the SOT Annual Meeting and ToxExpo or by adding the event to your registration later. Visit the SOT Annual Meeting website for more information.

Monday, March 17, 10:00 AM to 10:20 AM, W Hall A2, Convention Center

Tiny Tox Talk: Networking at SOT for Trainees

Speaker(s): Kel DeShong, SRC Inc., Rochester, NY.

Monday, March 17, 10:40 AM to 11:00 AM, W Hall A2, Convention Center

Tiny Tox Talk: Finding the “Perfect” Postdoc and Transitioning Afterward!

Speaker(s): Esther Omaiye, University of California Riverside, Riverside, CA.

Monday, March 17, 10:45 AM to 11:45 AM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Monday, March 17, 11:00 AM to 12:00 Noon, Room W304A, Convention Center

FS Distinguished Toxicology Scholar Award Lecture

This lecture will be delivered by the 2025 SOT Distinguished Toxicology Scholar Award recipient.

Monday, March 17, 11:20 AM to 11:40 AM, W Hall A2, Convention Center

Tiny Tox Talk: Academia Ain’t All Publications and Grants

Speaker(s): Lizzie Bowdridge, West Virginia University, Morgantown, WV.

Monday, March 17, 12:00 Noon to 1:30 PM, Room W311A, Convention Center

(Add-On Event; Limited Seating; Students and Postdocs Only)

**FS In Vitro Toxicology Lecture and Luncheon for Students:
Leveraging In Vitro Methods to Advance Antimicrobial Product Safety**

Lecturer: Kathryn E. Page, Clorox Company, Pleasanton, CA.

Supported by: An Educational Grant from the Colgate-Palmolive Company

Chair(s): Helen Haggerty, Janssen, Spring House, PA.

Hosted by: Career Advancement, Mentoring, and Networking Committee



The goal of the *In Vitro* Toxicology Lecture series is to feature important research using *in vitro* and alternative techniques to study mechanisms of toxicity and to develop test methods for shifting away from research with animals whenever feasible. Undergraduate students, graduate students, postdoctoral scholars, and recipients of Colgate-Palmolive awards are among those invited to this event. After a brief presentation providing background on consumer product safety and the testing necessary for product labels, attendees will assume the role of regulators to determine if a new testing method should be accepted.

Monday, March 17, 12:10 PM to 1:30 PM, Room W304E, Convention Center

**IS Informational Session: A Cross-Industry Perspective on Exposure-Driven
Human Safety Evaluation on Polymer Chemical Additives**

Chair(s): Xiaoling (Sharlene) Dai, Abbott; and Jiwen Zheng, US FDA/CDRH.

Primary Endorser: Regulatory and Safety Evaluation Specialty Section

Other Endorser(s): American Association of Chinese in Toxicology Special Interest Group; Risk Assessment Specialty Section

Chemical additives are used in the production of polymers to manufacture food packaging, drug containers, medical devices, consumer products, etc. Humans are potentially exposed to a variety of chemicals through daily food consumption, medicinal treatment, disease prevention and treatment by medical devices, or skin contact, due to the presence of chemical additives in polymer materials and a tendency to leach out with time. Toxicologists play critical roles in shaping the public awareness, international standards, and regulations to assure safety in compliance with specific regulatory requirements integrated with unique risk assessment contexts. These presentations will cover current multi-industrial and academic perspectives relating to the exposure of chemicals to the public and patient populations, a comprehensive approach to protect consumers and patients from the risks posed by chemicals. Presentations focus on the information used to characterize chemical safety risk specific to each sector in combination with various risk/benefit considerations to strengthen the interpretation of multiple layers of scientific evidence and on recent advanced big data informatics to highlight further opportunities to integrate advanced informatic platform to potential regulatory applications. The first presenter will provide an overview of how the US FDA evaluates the safety of polymers intended for use as indirect food additives (i.e., food contact substances [FCS]) in food packaging materials to ensure public health. This presentation will include a discussion of the tiered exposure-based safety evaluation approach and the type of toxicological

information (e.g., genotoxicity, carcinogenicity, and systemic toxicity) recommended for polymeric FCSs and impurities. The next talk will provide an overview of how the pharmaceutical industry considers, evaluates, and addresses leachable chemicals from drug container systems with unique perspective related to the risk and benefit of pharmaceuticals to patient populations. The third speaker will present chemicals from consumer products, a major concern for consumers and global legislations. Market demands and consumer expectations for safer, toxin-free products are higher than ever, and toxicological risk assessment has become a mandatory part of product safety evaluation in many countries and regions globally. It is critical to understand the current regulation framework and application to real-world questions. The fourth speaker will focus on recent computational power advancement in big data informatics, with an emphasis on the artificial intelligence-assisted analysis and machine learning models to predict human exposure and pharmacokinetic parameters to small molecule organic chemicals and the practical application and a case study of those tools to research polymer leachable chemicals. This session will conclude with an interactive discussion to gain more understanding from toxicologists in academia, government, and industry and how to achieve diverse ranges of scientific expertise to ensure better aligned decision-making framework and to advance further public safety policies and regulations. Overall, this session will enable toxicologists with different background to gain diverse insights and regulations on chemical safety assessment and will provide a practical guide for multidisciplinary concepts and approaches while universally applicable.

Abstract

- #1064 12:10 PM **A Cross-Industry Perspective on Exposure-Driven Human Safety Evaluation on Polymer Chemical Additives.**
- 12:10 PM **Introduction.** *X. Dai.* Abbott, Saint Paul, MN.
- 12:15 PM **An Overview of the US FDA Safety Evaluation of Polymer-Based Food Packaging.** *G. Patton.* US FDA/CFSAN, College Park, MD.
- 12:30 PM **Safety Evaluation of Leachables from Pharmaceutical Container Closure Systems.** *H. Li.* B. Braun Medical Inc., Irvine, CA. Sponsor: *X. Dai*
- 12:45 PM **Updates and Recent Advancement of Consumer Products Safety Regulations.** *R. Roy.* Northland Toxicology Consultants LLC, Chanhassen, MN.
- 1:00 PM **Application of Computational Platforms Integrated with Physiologically Based Pharmacokinetic Modeling to Characterize Exposure of Polymers.** *Q. Chen.* University of Florida School of Public Health and Health Professions, Gainesville, FL.
- 1:15 PM **Panel Discussion/Q&A.** *X. Dai*¹, and *J. Zheng*². ¹Abbott, Saint Paul, MN; and ² US FDA/CDRH, Silver Spring, MD.

Monday, March 17, 12:10 PM to 1:40 PM, Room W206A, Convention Center

IS **Informational Session: Accelerating Acceptance of New Approach Methodologies for Respiratory Toxicology Through Standardization Efforts**

Chair(s): Holger Behrsing, Institute for In Vitro Sciences Inc.; and Monita Sharma, PETA Science Consortium International e.V., Germany.

Primary Endorser: Inhalation and Respiratory Specialty Section

Other Endorser(s): *In Vitro* and Alternative Methods Specialty Section; Risk Assessment Specialty Section

The increasing application of new approach methodologies (NAMs) in numerous research settings creates an unprecedented opportunity to use and generate human-relevant test methods for regulatory toxicology. To assess respiratory toxicity, a number of *in vitro* and *ex vivo* test systems are available that provide a sophisticated means to evaluate complex responses in an acute and chronic setting using single or repeat exposure paradigms. However, to gain regulatory acceptance of NAMs that are fit to protect human health, there is a need for standardization in the application and reporting of these systems and approaches. A number of standardization efforts are ongoing, and this session will

review how aspects of these are applied to NAMs in respiratory toxicology, with a focus on the more complex microphysiological and organotypic test systems representing the human respiratory tract. Following a brief overview introduction to the session topic, the first speaker will summarize the principles and benefits of test system standardization. The second speaker will provide an example of the application of *Good In Vitro Method Practices (GIVIMP)* related to respiratory models. The third speaker will provide an overview of clinical biomarkers and how integration of clinical knowledge with the understanding of biomarkers expressed in the more complex human-derived models may provide the necessary association of exposure and effect when evaluating the potential toxicity in NAMs. The fourth speaker will present on the human precision-cut lung slice model and how recent developments have led to efforts to harmonize their application in toxicology and otherwise. Finally, a panel discussion will review the topics covered and provide regulatory and industry perspective on the standardization of NAMs.

Abstract

- #1065 12:10 PM **Accelerating Acceptance of New Approach Methodologies for Respiratory Toxicology through Standardization Efforts.**
- 12:10 PM **Introduction.** *H. Behrsing*. Institute for In Vitro Sciences Inc., Gaithersburg, MD.
- 12:15 PM **Principles of Test System Standardization.** K. Fant. Key2Compliance AB, Stockholm, Sweden.
Sponsor: *H. Behrsing*
- 12:30 PM **Why a GIVIMP Certification for the Production of 3D *In Vitro* Models of Human Airway Epithelia Is Important.** *S. Constant*. Epithelix, Geneva, Switzerland.
- 12:45 PM **Incorporation of Clinical Markers of Lung Pathology Can Enhance Acceptance of NAMs.**
K. Amin. University of Minnesota Medical School, Minneapolis, MN. Sponsor: *H. Behrsing*
- 1:00 PM **Standardization of Human Precision-Cut Lung Slice Use Methods for Application in Respiratory Research and Testing.** *V. Patel*. Institute for In Vitro Sciences Inc., Gaithersburg, MD.
- 1:15 PM **Panel Discussion/Q&A.** M. Perron¹, and C. Roper². ¹ US EPA, Washington, DC; and ²Roper Toxicology Consulting Limited, Edinburgh, United Kingdom.

Monday, March 17, 12:10 PM to 1:30 PM, Room W203A, Convention Center



Informational Session: Nonessential Heavy Metals in Food: How Low Should We Go?

Chair(s): Brinda Mahadevan, Brincor Associates LLC; and A. Wallace Hayes, Michigan State University.

Primary Endorser: Food Safety Specialty Section

Other Endorser(s): Regulatory and Safety Evaluation Specialty Section; Women in Toxicology Special Interest Group

Humans require varying amounts of essential heavy metals. For other metals, such as arsenic, cadmium, lead, and mercury, the intent is to minimize the levels as much as possible; however, low-level occurrence in foods is unavoidable because of their presence in the environment and being taken up by crops. The presence of heavy metals in many of the foods can be especially harmful to children because they are one of the most vulnerable populations, alongside older consumers and people with chronic health conditions. Even though the levels of a metal in any particular food are low, the overall exposure adds up because many of the foods consumed contain them in small amounts. International organizations have established variable acceptable limits for these chemical components in food as part of food contamination reduction programs. Several risk-based approaches are being considered to prioritize and streamline ways to lower the levels of these contaminants. Speakers in this session will discuss (1) the sources of heavy metals in foods, their accumulation, and impact on nutrition; (2) a US FDA perspective on the need for regulatory limit-setting of heavy metals as potential contaminants in foods; (3) the presence of potential high levels of heavy metals in foods and their bearing on sensitive and vulnerable populations; and (4) derisking approaches and considerations for determining the safety of heavy metals in food.

Abstract

- #1066 12:10 PM **Nonessential Heavy Metals in Food: How Low Should We Go?**
12:10 PM **Introduction and Overview of Nonessential Heavy Metals in Foods.** *B. Mahadevan.* Brincor Associates LLC, Corvallis, OR.
12:20 PM **Derivation of Interim Reference Values to Support US FDA's *Closer to Zero*.** *B. Flannery.* US FDA, College Park, MD.
12:40 PM **Considerations for the Safety Assessment of Nonessential Heavy Metals in Infant Foods.** P. Pressman. University of Maine, Orono, ME. Sponsor: *B. Mahadevan*
1:00 PM **Health Risks from Nonessential Heavy Metals in Foods: Remediation or Derisking Approaches.** *A. Hayes*^{1,2}. ¹University of South Florida, Tampa, FL; and ²Michigan State University, East Lansing, MI.
1:20 PM **Panel Discussion/Q&A.** *B. Mahadevan*¹, *A. Hayes*², *B. Flannery*³, and P. Pressman⁴. ¹Brincor Associates LLC, Corvallis, OR; ²University of South Florida, Tampa, FL; ³ US FDA, College Park, MD; and ⁴University of Maine, Orono, ME.

Monday, March 17, 12:10 PM to 1:30 PM, Room W307A, Convention Center



Informational Session: Recent Advances in Exposure Predictions: Model Refinement and Accessibility

Chair(s): Victoria Hull, Inotiv; and Kristin Isaacs, US EPA.

Primary Endorser: Exposure Specialty Section

Other Endorser(s): Computational Toxicology Specialty Section; *In Vitro* and Alternative Methods Specialty Section

Understanding the interaction between human populations and chemical exposures is essential in prioritizing chemicals for risk assessment, as risk is the intersection of chemical hazard and exposure. However, many chemicals either lack experimental data for human exposure or have exposure estimates that do not properly consider real-world interactions. In these cases, *in silico* methods can be used to generate human-relevant exposure estimates. The principles, methods, and tools for predicting and estimating chemical exposure are often critical to accurately assess chemical risks. Despite the importance of these methods, many toxicologists are either unaware of the many exposure prediction tools available or do not know how to access and apply them. This session will demonstrate not only how exposure predictions are generated but also how users of all skill levels can publicly access and leverage exposure models. The session will start with an introduction by the Chair to provide background on the importance of exposure predictions, their use in supporting regulatory decisions, and opportunities for filling data gaps of data-poor chemicals. Since many of these predictions are computationally intensive, the introductory presentation will highlight the importance of providing exposure prediction algorithms as user-friendly tools accessible to a general toxicology audience. The first speaker will present a tool resulting from an industry-academia partnership that improves on traditional approaches to indoor pesticide exposure estimation by integrating chemical fate and transport dynamics. The second speaker will summarize ongoing efforts within the United States Environmental Protection Agency's ExpoCast group to develop tools for assessing chemical exposure, including web applications, high-throughput computational models, and workflows for integrating exposure, hazard, and toxicokinetics data. The third speaker will discuss a systematic review of open-access methods for predicting human exposure conducted by the European ONTOX initiative, identifying models used globally while highlighting a select subset of models that are commonly used and demonstrating how they can be applied to a PFAS case study. Overall, this session will provide audience members with an understanding of several different publicly available exposure prediction tools and use cases to bolster confidence in which tools to apply.

Abstract

- #1067 12:10 PM **Recent Advances in Exposure Predictions: Model Refinement and Accessibility.**
12:10 PM **Introduction.** *V. Hull.* Inotiv, Morrisville, NC.

- 12:15 PM **The FINE Model: A User-Friendly Prediction Tool for More Realistic Indoor Chemical Exposure Assessment.** R. Avanas. Syngenta Crop Protection LLC, Greensboro, NC. Sponsor: V. Hull
- 12:35 PM **ExpoCast: Accessible Computational Tools for Informing Exposure.** C. Ring. US EPA, Morrisville, NC.
- 12:55 PM **Probabilistic Exposure Assessment of Environmental Chemicals from Different Routes: Open Access Methods from Scoping Review and Custom-Made Methods.** T. Husøy. Norwegian Institute of Public Health, Oslo, Norway.
- 1:15 PM **Panel Discussion/Q&A.** K. Isaacs. US EPA, Research Triangle Park, NC.

Monday, March 17, 12:15 PM to 1:15 PM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Monday, March 17, 12:40 PM to 1:00 PM, W Hall A2, Convention Center

Tiny Tox Talk: Exposure and Food Safety: The Key Parameter

Speaker(s): Craig Llewellyn, Exponent, Atlanta, GA.

Monday, March 17, 1:20 PM to 1:40 PM, W Hall A2, Convention Center

Tiny Tox Talk: The Entrepreneurial Toxicologist

Speaker(s): Ruth Roberts, Apconix, Alderley Edge, United Kingdom.

Monday, March 17, 1:45 PM to 4:30 PM, Room W307A, Convention Center

S Symposium Session: Circadian Rhythms in Environmental Toxicology and Chronic Diseases

Chair(s): Isaac Sundar, University of Kansas Medical Center; and Irfan Rahman, University of Rochester Medical Center.

Primary Endorser: Inhalation and Respiratory Specialty Section

Other Endorser(s): Cardiovascular Toxicology Specialty Section; Mechanisms Specialty Section

The circadian clock is a natural internal timing system found in most living organisms that regulates various physiological processes like metabolism, sleep-wake cycles, hormone release, and immune function. Environmental disruptions to these circadian rhythms can increase disease risk, including chronic inflammatory diseases, metabolic disorders, cardiovascular and pulmonary diseases, and cancers. The circadian clock synchronizes internal biological processes with the external environment through environmental cues. However, emerging research suggests the circadian clock may also regulate environmental health beyond maintaining internal homeostasis. After the Co-Chair introduces the

session and the topic, the first speaker will provide an evolutionary perspective on circadian rhythms in environmental health, including clinical investigations of circadian and seasonal rhythms in the human immune, neuroendocrine, and reproductive systems. They will also present evidence linking biological clocks to human health based on recent findings. The second speaker will focus on the circadian rhythm's role in DNA damage and repair related to UV radiation, ionizing radiation, and chemicals like arsenic. They will emphasize understanding the circadian clock's regulation of genotoxic stress responses affecting the cell cycle, proliferation, and damage repair, along with novel therapeutic strategies. The third speaker will cover how air pollution disrupts circadian rhythms, leading to cardiovascular and cardiometabolic disorders. They will expand on how environmental exposures alter circadian rhythms, heightening inflammation, and oxidative stress and contributing to endothelial dysfunction, atherosclerosis, insulin resistance, and related issues. The fourth speaker will address how environmental exposures disrupt circadian rhythms, affecting the gut and overall health. They will cover key aspects of how circadian disruption has multifaceted effects on environmental exposure, the gut barrier, and the microbiome, contributing to gastrointestinal, metabolic, and inflammatory disorders, along with ways to restore circadian rhythms to mitigate environmental exposure effects on the gut and health. Finally, the fifth speaker will provide an overview of circadian rhythms in chronic lung diseases, referencing clinical and preclinical studies of COPD, asthma, and pulmonary fibrosis. They will also present experimental model data supporting novel cellular functions and molecular mechanisms regulated by the circadian clock with the potential for clock-based therapies to mitigate chronic lung diseases. The audience will discover the importance of circadian clock biology and its role in environmental toxicology, health, and disease, including therapeutic targets and pharmacological agents. The session will cover topics such as the evolutionary perspective on circadian rhythms in medicine; the effects of genotoxic stress, air pollution, and cardiometabolic disorders; environmental exposures affecting the gut barrier and microbiome; and environmental toxicants exposure-related chronic lung diseases. This session is intended for researchers from diverse backgrounds who share an interest in the circadian rhythm and its role in health and disease, including basic science researchers examining the molecular mechanisms of the circadian clock, translational researchers investigating the clock's involvement in environmental health and chronic inflammatory diseases, and scientists from academic institutions, the pharmaceutical industry, government agencies, and all career stages ranging from trainees to senior investigators.

Abstract

- | | | |
|-------|---------|---|
| #1068 | 1:45 PM | Circadian Rhythms in Environmental Toxicology and Chronic Diseases. |
| | 1:45 PM | Introduction. <i>I. Rahman.</i> University of Rochester Medical Center, Rochester, NY. |
| #1069 | 1:50 PM | Biological Clocks in Environmental Health and Evolutionary Medicine. <i>M. Martinez.</i> Columbia University Mailman School of Public Health and WE ACT for Environmental Justice, New York, NY. Sponsor: <i>I. Sundar</i> |
| #1070 | 2:15 PM | Environmental Circadian Disruption and Genotoxic Stress: Impact on Carcinogenesis and Cardiotoxicity. <i>S. Gaddameedhi.</i> North Carolina State University, Raleigh, NC. |
| #1071 | 2:40 PM | Air Pollution and Circadian Rhythm: Impact on Cardiovascular and Metabolic Health. <i>P. Haberzettl.</i> University of Louisville, Louisville, KY. |
| #1072 | 3:05 PM | Circadian Clock in Autoimmunity and Autoimmune Diseases. <i>L. Solt,</i> The Herbert Wertheim UF Scripps Institute for Biomedical Innovation & Technology, Jupiter, FL. Sponsor: <i>I. Sundar</i> |
| #1073 | 3:30 PM | Circadian Clock Influence on the Pathophysiology of Environmental Exposure-Related Chronic Lung Diseases. <i>I. Sundar.</i> University of Kansas Medical Center, Kansas City, KS. |
| #1074 | 3:55 PM | Air Pollution Affects Circadian Clock and Possibly Alters the Function of Adrenergic and Glucocorticoid Receptors. <i>U. Kodavanti.</i> US EPA, Research Triangle Park, NC. |
| | 4:20 PM | Panel Discussion/Q&A. <i>I. Rahman.</i> University of Rochester Medical Center, Rochester, NY. |

Monday, March 17, 1:45 PM to 4:30 PM, Room W202A, Convention Center

S Symposium Session: Diving Deeper into Mechanisms of Neurotoxicity: Integrating Molecular, Behavioral, Pathological, and Imaging Assessments in Zebrafish Neurotoxicology Studies

Chair(s): Jennifer Freeman, Purdue University; and Katharine Horzmann, Auburn University.

Primary Endorser: Neurotoxicology Specialty Section

Other Endorser(s): Comparative Toxicology, Pathology, and Veterinary Specialty Section

Application of the zebrafish in all areas of toxicology continues to grow as the field seeks to better understand health risks associated with environmental exposures to legacy and emerging chemical contaminants. The brain has conserved development, molecular pathways, and function through vertebrate evolution, and while there are some structural differences between the zebrafish and human brain, there is functional conservation for most regions, making the zebrafish a valuable complementary model in neurotoxicological research. In addition, the breadth of tools, techniques, and assays have rapidly expanded in recent years to encompass CRISPR-based genetic models and multiple-omic-based assessments to advance identification of molecular mechanisms of neurotoxicity. Furthermore, advanced imaging assays and growth in zebrafish behavior tests in larvae and adults enable connections between pathological and behavioral alterations and the underlying molecular mechanisms of neurotoxicity. This Symposium Session brings together researchers from academia, government, and a contract research organization that are employing wild type, mutant, and transgenic zebrafish models to identify and integrate alterations in neuronal development and function, neurological disease pathology markers, molecular pathways, biochemical parameters, and multiple behavioral outcomes. This work is defining molecular mechanisms of neurological development and disease associated with exposures to metals, chlorinated solvents, and pharmaceuticals. The first speaker will discuss gene-environment interactions of heavy metal lead neurotoxicity by comparing outcomes in wild type and in a CRISPR mutant zebrafish model for Alzheimer's disease. In the second presentation, the mechanistic pathways responsible for the phenotypes caused by arsenite exposure will be detailed from a study using transgenic zebrafish lines to inform on why arsenic-exposed populations suffer from psychiatric disorders and motor neuron disease. In the third talk, the zebrafish was used to assess the developmental neurotoxicity of the chlorinated solvent trichloroethylene and its metabolite TaClo, where behavioral alterations were aligned to dopaminergic loss. The next speaker will present on a study investigating the developmental neurotoxicity of exposure to an antineoplastic drug that contaminates waters by incorporating gene network perturbations and multiple behavioral outcome assessments. The final talk summarizes advancements in the field of zebrafish new alternative methodology as a tool to predict molecular developmental neurotoxicity based on behavior, histopathology, and molecular studies of the zebrafish in safety and risk assessments. Overall, this session incorporates multiple toxicant studies integrating neurological phenotypic perturbations and molecular assessments to connect mechanisms of neurotoxicity using zebrafish models. Presentations will include details on strengths and limitations of the zebrafish to inform on how these studies optimally complement *in vitro* and mammalian studies to enhance translation for neurotoxicity assessments.

Abstract #

- | | | |
|-------|---------|--|
| #1075 | 1:45 PM | Diving Deeper Into Mechanisms of Neurotoxicity: Integrating Molecular, Behavioral, Pathological, and Imaging Assessments in Zebrafish Neurotoxicology Studies. |
| #1076 | 1:45 PM | Using Zebrafish Models to Dissect Gene-Environment Interaction of an Embryonic Lead Exposure on Alzheimer's Disease-Associated Outcomes. J. Freeman. Purdue University, West Lafayette, IN. |
| #1077 | 2:20 PM | The Effects of Inorganic Arsenic on the Nervous System of Zebrafish Embryos: Mechanistic Studies to Understand the Relevance to Human Health. J. Kanungo. US FDA/NCTR, Jefferson, AR. Sponsor: J. Freeman |
| #1078 | 2:55 PM | Molecular, Behavioral, and Pathologic Insights into Trichloroethylene and Trichloroethylene Metabolite-Associated Developmental Neurotoxicity in Zebrafish. K. Horzmann. Auburn University, Auburn, AL. |

- #1079 3:30 PM **Molecular Profiling Behavioral Effects of the Antineoplastic Chemical Ifosphamide in Zebrafish Larvae.** C. Martyniuk. University of Florida, Gainesville, FL. Sponsor: J. Freeman
- #1080 4:00 PM **Applicability of the Zebrafish New Alternative Methodology as a Powerful Tool for Defining Developmental Neurotoxicity Based on Behavior Studies, Histopathology, and 'Omics.** A. Muriana. Biobide, San Sebastian, Spain.

Monday, March 17, 1:45 PM to 4:30 PM, Room W308A, Convention Center

S Symposium Session: Is the Microenvironment Key to Unraveling Cancer's Origins?

Chair(s): William Bisson, Inotiv/NIEHS/DTT; and Richard Currie, Syngenta, United Kingdom.

Primary Endorser: Carcinogenesis Specialty Section

Other Endorser(s): Molecular and Systems Biology Specialty Section

Why does cancer start? This question seems simple, but our perspective on this has changed dramatically over the last decade. Since the discovery of oncogenes, the prevailing thinking was that when sufficient mutations accumulated within a single cell, then the transformation to cancer would occur. This view changed in 2015 with the discovery of phenotypically normal skin cells that contained large numbers of mutations, including oncogenic mutations. Moreover, Pandiri et al. determined that known carcinogens were causing tumors without increasing mutations. Together, these findings have led to a reconsideration of the idea that factors extrinsic to the mutated cell are responsible for switching it from a normal to a transformed cell state. The microenvironment is the compilation of accessory cells within individual organs that collaborate through cell-cell contacts and molecular crosstalk to provide a functional scaffolding to parenchymal cells. In solid tumors, the microenvironment is instrumental to the survival and propagation of malignant cells. Blood cancers develop in specialized tissue microenvironments, such as bone marrow and secondary lymphoid organs. These microenvironments are characterized by different populations of accessory stromal and T cells that interact with pre-malignant cells to favor transformation and disease progression. Hence, the final question becomes, "Is the microenvironment key to unraveling cancer's origins?" This session, centered on that relevant question, is comprised of a diverse and international group of scientists working in the development and application of novel methods, mechanistic research in chemical carcinogenesis, and translational toxicology. The first presenter will focus on the effects of air pollutants on lung carcinogenesis in never-smokers and the underlying mechanisms that act through the microenvironment on cells with preexisting oncogenic mutations. The next presentation will discuss high-throughput approaches using patient-derived tissues to study the impacts of chemical-exposure disparities on cellular phenotypes and the breast tissue microenvironment as they relate to risk of breast cancer. Then, a presentation will discuss the role of supercompetition, a mechanism involving the microenvironment, in malignant B-cell transformation and its potential link to environmental exposures. The next presentation will discuss using *in vitro* chronic exposure models to study how the microenvironment contributes to chemical-induced cancer, including identifying potential biomarkers acting via effects on stem/progenitor cell transformation. The final presentation will explore the application of the cell transformation assay in capturing key events in the microenvironment that drive the disruption of cancer hallmarks and the promotion of chemical-induced malignancy. To conclude the session, there will be a panel discussion with a question-and-answer period. Overall, this session focuses on a timely, novel, relevant, and high-interest topic for the translational toxicology community. The microenvironment could be key to identifying the earliest influences of known or putative carcinogens in promoting tumorigenesis. Specific changes in the microenvironment could be used as biological markers of chemical exposure and chemical exposure disparity in vulnerable high-risk population. This also could be particularly useful when studying the potential contribution of mixtures and low-dose combinations of chemicals to carcinogenesis.

Abstract #

- #1081 1:45 PM **Is the Microenvironment Key to Unraveling Cancer's Origins?**
1:45 PM **Introduction.** W. Bisson. Inotiv/NIEHS/DTT, Research Triangle Park, NC.

- #1082 1:50 PM **Air Pollutants Promote Non-small Cell Lung Carcinogenesis.** E. Lim. University of British Columbia, Vancouver, BC, Canada. Sponsor: *W. Bisson*
- #1083 2:15 PM **Single Cell and Spatial 'Omics to Understand the Environment and Aggressive Breast Cancers: The Role of the Microenvironment and Cell Plasticity.** J. Colacino. University of Michigan, Ann Arbor, MI.
- #1084 2:40 PM **Supercompetition: A Mechanism of B-Cell Malignant Transformation.** C. Mlynarczyk. Meyer Cancer Center, New York, NY. Sponsor: *W. Bisson*
- #1085 3:05 PM **The Role of Microenvironmental Factors in *In Vitro* Chronic Exposure Models of Chemically Induced Malignancy.** E. Tokar. NIEHS/DTT, Research Triangle Park, NC.
- #1086 3:30 PM **The Cell Transformation Assay: Modeling and Studying Oncotransformation *In Vitro* and Its Application in an Integrated Approach for Testing and Assessment of Non-genotoxic Carcinogens.** A. Colacci. Agenzia Prevenzione Ambiente Energia Emilia-Romagna, Bologna, Italy. Sponsor: *W. Bisson*
- 3:55 PM **Panel Discussion/Q&A.** R. Currie. Syngenta, Bracknell, United Kingdom.

Monday, March 17, 1:45 PM to 4:30 PM, Room W204A, Convention Center

S Symposium Session: Leveraging AI and Genomics in Gene and Cell Therapies for Advancing Personalized Medicine Approaches in Safety Assessments

Chair(s): Gordana Apic, Metisox, United Kingdom; and Tian Yang, Deerfield Discovery and Development LLC.

Primary Endorser: Women in Toxicology Special Interest Group

Other Endorser(s): Computational Toxicology Specialty Section; Drug Discovery Toxicology Specialty Section

The emergence of advanced cell and gene therapies has ushered in a new era of therapeutic innovation, offering tailored treatments that address the unique genetic and molecular characteristics of individual patients. Central to the successful development and implementation of these therapies is the rigorous assessment of safety profiles, which necessitates the integration of genomic profiling and novel approaches to toxicity evaluation. Artificial intelligence (AI) has the potential to enhance the effectiveness of personalized medicine significantly, helping identify biomarkers, genetic mutations, and other factors that contribute to the development and progression of diseases. This information can then be used to create more accurate disease models, test the efficacy of personalized treatments, or identify genetic variations associated with specific diseases. Another way AI can help is by analyzing patient health data, including electronic medical records, imaging data, and patient-reported outcomes. AI algorithms can identify patients most likely to benefit from a specific treatment or predict which patients may experience adverse reactions to a treatment. However, issues related to data privacy, bias, data quality, transparency, and regulatory challenges still must be addressed. This session will explore the evolving landscape of safety assessment in personalized medicine and advanced cell and gene therapies, with a focus on the utilization of genomic profiling, computational toxicology, and cutting-edge methodologies to enhance patient stratification, patient safety, and therapeutic efficacy. The discussion will begin with general considerations regarding the assessment of a drug target safety risk in drug discovery and drug development. Target safety assessment may greatly contribute to reducing and managing on-target adverse drug reactions. The talk will provide important aspects to consider to improve drug development success rates. The second talk will give an overview of personalized medicine approaches, highlighting the pivotal role of genomic profiling in identifying patient-specific biomarkers and therapeutic targets. Insights will be provided into the integration of genomic data and computational toxicology into safety assessment frameworks, potential of using variance of unknown significance in patient stratification, and leveraging computational models to predict toxicity outcomes. The third talk will highlight the power of AI to tailor interventions and mitigate risks on a personal level. By leveraging toxicogenomic insights, a comprehensive understanding of the intricate interplay between genetic factors and toxicant exposure can be gained, paving the way for precision toxicology. Insights will be provided into the integration of cell and gene therapy as innovative avenues for targeted interventions, minimizing

adverse effects and maximizing efficacy. The fourth talk will discuss novel strategies to improve next-generation sequencing-based assays for rapid, broad, sensitive, and specific detection of pathogens and adventitious agents to improve safety of cell and gene therapies. The fifth talk will provide the various potential applications of AI to provide better process control and monitoring of cell and gene therapies. From a regulatory perspective, AI large-language models can be applied to the database of approved therapies to efficiently retrieve information on nonclinical studies as represented in “Summary Basis of Regulatory Action” and “Summary Basis of Approvals.” From a clinical perspective, the application of AI to retrieval of real-world data to support real-world evidence has the potential to radically transform clinical trials. The last talk will give examples from the US Food and Drug Administration (US FDA) projects in both predictive and generative AI application categories, with a specific emphasis on precision medicine and toxicology. In addition, the current thinking and on-going efforts at the US FDA in facilitating the AI application also will be discussed. The session will highlight the importance of interdisciplinary collaboration in navigating the complex landscape of personalized medicine. Overall, this session will provide valuable insights into the transformative potential of genomic profiling, computational toxicology, innovative safety assessment approaches, and regulatory challenges in advancing the safety and efficacy of advanced cell and gene therapies, ultimately improving patient outcomes and quality of care.

Abstract

- #1087 1:45 PM **Leveraging AI and Genomics in Gene and Cell Therapies for Advancing Personalized Medicine Approaches in Safety Assessments.**
1:45 PM **Introduction.** G. Apic. Metisox, Cambridge, United Kingdom.
- #1088 1:50 PM **Assessment of Safety Risk of Drug Target to Improve Drug Development Successful Rate.**
T. Yang. Deerfield Discovery and Development LLC, New York, NY.
- #1089 2:10 PM **Leveraging Genomic Profiling and Innovative Approaches in Personalized Medicine.** G. Apic. Metisox, Cambridge, United Kingdom.
- #1090 2:30 PM **Uniting Cellular Toxicogenomics, Gene Therapy, and AI for Personalized Toxicology in the AI-Tailored Era.** A. Singh. Bundesinstitut für Risikobewertung (BfR), Berlin, Germany.
Sponsor: G. Apic
- #1091a 2:50 PM **Evaluation of RNA Extraction and Illumina Library Prep Methods for Improved Pathogen Detection.** S. De. US FDA/CBER, Silver Spring, MD. Sponsor: G. Apic
- #1091b 3:05 PM **Using Genomics and Bioinformatics in Safety Assessment of Gene Therapy Products.**
K. Singh. US FDA/CBER, Silver Spring, MD. Sponsor: G. Apic
- #1092 3:20 PM **Leveraging AI for Advancing Regulatory Intelligence for the Development of Gene and Cell Therapies.** D. Webster. SSI Strategy, Parsippany, NJ. Sponsor: G. Apic
- #1093 3:40 PM **Artificial Intelligence for Precision Medicine and Toxicology.** W. Tong. US FDA/NCTR, Jefferson, AR.
- 4:00 PM **Panel Discussion/Q&A.** G. Apic. Metisox, Heidelberg, Germany.

Monday, March 17, 1:45 PM to 4:30 PM, Room W203A, Convention Center

S Symposium Session: Living in a Chemical World: Identification and Characterization of Emerging Contaminants of Concern and Need for New Regulatory Approaches

Chair(s): Christopher Kassotis, Wayne State University; and Katherine Pelch, Natural Resources Defense Council.

Primary Endorser: Mixtures Specialty Section

Other Endorser(s): Mechanisms Specialty Section

Humans are exposed to hundreds or thousands of chemicals throughout development, with exposure beginning during gestation, continuing through lactation, and repeating through daily exposures in their indoor and outdoor environments throughout their lives. While some of these chemicals are well-characterized from both hazard and exposure perspectives,

there is an over-investigation on a small subset of chemicals that have received comprehensive assessments over the course of decades (often at the expense of new/emerging contaminants). There are, thus, thousands of chemicals on the market that have insufficient data on human/animal exposure potential, toxicity assessments, and human/animal health risks. As such, research investigating novel environmental and/or human health toxicants is incredibly important to better understand the potential risks associated with these novel chemical classes (as well as their potential mixture interactions with other chemicals already being marketed). In addition, the one-at-a-time risk-based approach to regulating environmental chemicals allows for widespread exposure(s) while a body of evidence is built. We need to consider new regulatory approaches to more efficiently protect human and environmental health. This Symposium Session will highlight a series of novel, emerging contaminants with a spectrum of evidence for both exposure and health effects. We will focus on a range of toxicants from those that are relatively well-characterized to those we still know little about. Many of these emerging contaminants occur as mixtures either directly through mixture applications or co-occurrence across similar consumer products, and discussions of these will focus on both individual and mixture effects, what is known about human and environmental exposures, and what is known about their associated mechanisms of toxicity. This Symposium Session will include primarily early career researchers. The short, opening presentation will serve as an introduction to emerging contaminants and a springboard for the following talks on how we move forward in addressing these and other emerging contaminants. Specifically, cases of “regrettable substitutions” will be examined, as well as the issues of environmental mixtures and the difficulties in navigating research on these (and other) poorly characterized groups of contaminants. The second speaker will talk about emerging groups of per- and polyfluoroalkyl substances (PFAS), specifically short- and ultrashort-chain PFAS that have been, thus far, poorly studied in terms of exposure and potential health effects. The third talk will shift the focus to another emerging contaminant class, quaternary ammonium compounds (QACs), from a government perspective. The use of sanitizing agents, many of which contain QACs, skyrocketed in response to the recent and ongoing COVID-19 pandemic. From here, we will transition to a poorly understood emerging contaminant class: that of liquid crystal monomers (LCMs). LCMs are a diverse group of electronics-associated chemicals used in liquid crystal display (LCD) screens and are housed freely and chemically unbound in the LCD panels. This allows for release into the environment from intact and broken devices and suggests potential widespread environmental and human exposure. The session will end with a discussion of policy frameworks for addressing emerging contaminants from a nonprofit perspective of how an organization has worked to utilize new policy tools to efficiently address emerging contaminants of widespread public health concern. This session is intended to serve as an introduction to several emerging contaminants of concern, highlight research and policy needs in this space, and foster a broader discussion session on how to identify, assess, and regulate these and other novel and/or replacement contaminants to best protect public and environmental health. We welcome discussions about how to better partner with community members and industry groups to better predict emerging contaminants, address community concerns in a timely and responsible manner, and navigate the policy space to provide better incentives for the development of safer alternatives and hazard/exposure monitoring more widely.

Abstract

- | | | |
|-------|---------|---|
| #1094 | 1:45 PM | Living in a Chemical World: Identification and Characterization of Emerging Contaminants of Concern and Need for New Regulatory Approaches. |
| #1095 | 1:45 PM | Overview and Challenges of Emerging Contaminants Research. C. Kassotis. Wayne State University, Detroit, MI. |
| #1096 | 2:10 PM | Elevated Levels of Ultrashort- and Short-Chain PFAS in US Homes and People. A. Salamova. Emory University, Atlanta, GA. Sponsor: C. Kassotis |
| #1097 | 2:40 PM | Quaternary Ammonium Compounds as an Emerging Environmental Concern. S. Datta. California Department of Toxic Substances Control, Davis, CA. Sponsor: C. Kassotis |
| #1098 | 3:10 PM | Liquid Crystal Monomers as Emerging Contaminants. S. Heldman. Wayne State University, Detroit, MI. |
| #1099 | 3:40 PM | Solutions to Match the Magnitude of the PFAS Crisis. K. Pelch. Natural Resources Defense Council, San Francisco, CA. Sponsor: C. Kassotis |
| | 4:10 PM | Panel Discussion/Q&A. C. Kassotis. Wayne State University, Detroit, MI. |

Monday, March 17, 1:45 PM to 4:30 PM, Room W304A, Convention Center

S Symposium Session: Qualifying NAMs for Developmental and Reproductive Toxicity: Advancements and Pitfalls

Chair(s): Helena Hogberg, NIEHS; and Xiaoqing Chang, Inotive.

Primary Endorser: Reproductive and Developmental Toxicology Specialty Section

Other Endorser(s): Regulatory and Safety Evaluation Specialty Section; Women in Toxicology Special Interest Group

Global regulatory agencies mandate the assessment of chemicals for potential developmental and reproductive toxicity (DART) as part of a comprehensive chemical safety assessment. However, conventional *in vivo* DART testing is among the most costly and time-consuming experimental procedures and requires a high number of animals. To address these challenges, researchers are increasingly turning to new approach methodologies (NAMs), which encompass *in vitro*, *ex vivo*, or *in silico* alternatives to animal testing. NAMs not only hold the promise of reducing time, cost, and animal use but also offer valuable mechanistic insights. By adopting tiered approaches, NAMs can elucidate key mechanistic details, shedding light on the intricacies of reproductive and developmental processes. In doing so, they have the potential to provide comparable, if not superior, coverage informing reproductive and developmental processes underlying the traditionally evaluated apical endpoints. When applied to DART risk assessment, many NAMs have shown promise in addressing toxicity screening needs and filling data gaps. The pharmaceutical and chemical industries are increasingly developing and incorporating NAMs into early stages of the product development pipeline and, in some cases, using NAMs to replace *in vivo* DART testing. Join us for an enlightening session as we delve into the latest advancements in NAMs and their pivotal role in revolutionizing chemical safety assessments. With new guidelines being released by regulatory agencies that allow the use of qualified NAMs in place of traditional *in vivo* testing or as part of a weight-of-evidence, this symposium session will showcase the regulatory needs and decision-making framework as well as successful applications of NAMs for DART evaluation. This session will showcase the regulatory needs and decision-making framework as well as successful applications of NAMs for DART evaluation. Case examples will describe a diversity of alternative methods, including human pluripotent stem cell-based assays, *in silico* models capable of predicting developmental toxicity potential, and zebrafish embryo-based models used to assess reproductive toxicity of chemicals. A web-portal accessible, "first-of-its-kind" curated dataset of developmental toxicants will be described in detail, underscoring the importance of reliable and transparent *in vivo* DART databases in validating NAMs and facilitating read-across approaches. Furthermore, the need for pharmacokinetic consideration and application to translate *in vitro* assay data into an *in vivo* context will be presented. The session will conclude with an overview of how the NAM-based toolbox and workflow enable human-relevant DART safety decisions in the context of exposure-driven next-generation risk assessment (NGRA). This session will discuss best practices and confidence building in applying NAMs and provide insight into the strengths, limitations, and future direction of the NAM implementation for DART evaluation for a broad range of chemicals.

Abstract #

- | | | |
|-------|---------|---|
| #1100 | 1:45 PM | Qualifying NAMs for Developmental and Reproductive Toxicity: Advancements and Pitfalls. |
| | 1:45 PM | Introduction. <i>H. Hogberg.</i> NIEHS, Morrisville, NC. |
| #1101 | 1:50 PM | Developmental Toxicity Testing in Risk Assessment: Making a Case for the Development and Integration of New Approach Methods. <i>E. Mendez.</i> US EPA, Washington, DC. |
| #1102 | 2:15 PM | Qualification of the devTOX quickPredict Assay for Regulatory Use. <i>J. Palmer.</i> Stemina Biomarker Discovery Inc., Madison, WI. |
| #1103 | 2:40 PM | DeTox: An <i>In Silico</i> Alternative to Animal Testing for Predicting Developmental Toxicity Potential. <i>R. Tieghi.</i> UNC Eshelman School of Pharmacy, Chapel Hill, NC. Sponsor: <i>H. Hogberg</i> |
| #1104 | 3:05 PM | The Strategic Use of Zebrafish Models as NAMs in Female Reproductive Toxicity. <i>M. Kossack.</i> Brown University, Providence, RI. |
| #1105 | 3:30 PM | <i>In Vitro</i> to <i>In Vivo</i> Extrapolation Application for Assessing Developmental Neurotoxicity. <i>A. Kreutz.</i> Inotiv, Research Triangle Park, NC. |

- #1106 3:55 PM **Practical Application of a Next-Generation Risk Assessment Approach for Developmental and Reproductive Toxicity.** I. Mueller. Unilever, Bedford, United Kingdom. Sponsor: *H. Hogberg*
- 4:20 PM **Panel Discussion/Q&A.** *X. Chang.* Inotiv, Morrisville, NC.

Monday, March 17, 1:45 PM to 4:30 PM, Room W304E, Convention Center

S Symposium Session: Single-Cell RNA Sequencing Unravels Xenobiotic-Induced Alterations in Complex Biological Systems **IAT**

Chair(s): Prakash Nagarkatti, University of South Carolina; and Tim Zacharewski, Michigan State University.

Primary Endorser: Immunotoxicology Specialty Section

Other Endorser(s): Association of Scientists of Indian Origin Special Interest Group

The use of single-cell RNA sequencing (scRNA-seq) technology to study complex biological systems at the single-cell level has become a hot subject. This cutting-edge technology has revolutionized our understanding of how individual cells respond to toxicants within a complex tissue or organ by allowing the study of gene expression dynamics at unparalleled resolution. In this Symposium Session, speakers from academia, industry, and government agencies will highlight the use of this technology in understanding the xenobiotic-induced changes in complex biological systems involving inflammatory or resident immune cells and resident nonimmune cells in different tissues or organs. One of the caveats in assessing cell-specific toxicity induced in drug or xenobiotic-mediated organ toxicity is the cellular heterogeneity within each organ system. Additionally, direct tissue injury caused by toxicants may also attract inflammatory cells to those sites, which may further enhance the injury as well as hamper healing. Thus, such complex alterations occurring within the organ systems are extremely challenging to study. Traditionally, bulk RNA sequencing of the entire tissue provides information on the overall gene expression profile within the entire tissue rather than differences in the response of individual cell types. Such an approach makes it difficult to understand the mechanisms of toxicity and prevents attempts to develop targeted therapeutics. scRNA-seq is a technology that allows transcriptomic analyses of individual cells. By analyzing single cells within a complex population mix, scRNA-seq allows the delineation of how environmental exposure to toxicants alters individual and rare cell types within that organ or tissue. This also helps understand the interactions between resident tissue-specific nonimmune cells and the resident or infiltrating immune cells. Further, scRNA-seq allows the identification of subpopulations within a specialized cell type. For example, numerous subtypes have been discovered within the macrophages, epithelial cells, endothelial cells, and the like, with some subtypes severely affected by the toxicants while others showing modest or no significant change. Thus, the differential susceptibility of cells within a subset can also be studied using scRNA-seq. The focus of this Symposium Session is to emphasize the inherent benefits of implementing a scRNA-seq pipeline in the study of toxicant exposure on various organ systems, especially in the context of phenotypic characterization of dynamic cellular subsets, such as immune cells, and their communication with the surrounding parenchyma. The first talk will briefly introduce the scRNA technology and demonstrate how this technology allows toxicologists to investigate gene expression profiling in individual cells within the complexities of tissue heterogeneity. The second speaker will focus on her laboratory findings on acute respiratory distress syndrome (ARDS) caused by bacterial toxins, highlighting how these toxins have differential effects on myeloid cell types as well as resident cells in the lungs, including endothelial and epithelial cells. She will also present data on how cannabinoids that attenuate ARDS have specific targeted action on such cell types. This will be followed by a talk highlighting hepatotoxicity mediated by 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) exposure in the liver including the effect on immune cells and hepatocytes. The fourth speaker will highlight how neonatal exposure to polybrominated diphenyl ethers (PBDEs) alters individual cell types including the immune cells in the liver and associated gut microbiome dysbiosis. The last talk will highlight studies on how atrazine mediates its toxic effects on human T cells through the identification of multiple novel transcriptional mechanisms. Together, this symposium enhances awareness of the use of scRNA-seq to study complex interactions between the immune cells and resident cell types, leading to organ-specific or systemic pathogenesis.

Abstract #

- #1107 1:45 PM **Single-Cell RNA Sequencing Unravels Xenobiotic-Induced Alterations in Complex Biological Systems.**

- 1:45 PM **Introduction.** *P. Nagarkatti.* University of South Carolina, Columbia, SC.
- #1108 1:50 PM **Assessing Cell Type-Specific Immune and Toxicological Mechanisms with Single-Cell 'Omic Profiling.** *D. Gallegos.* Takeda Development Center Americas Inc., Cambridge, MA.
- #1109 2:20 PM **Single-Cell RNA-Seq Reveals Myeloid Cell Heterogeneity and Activation in the Lungs During Acute Respiratory Distress Syndrome Induced by Staphylococcal Enterotoxin B and Lipopolysaccharide.** *M. Nagarkatti.* University of South Carolina, Columbia, SC.
- #1110 2:50 PM **Investigating Dose-Dependent Hepatic Toxicity Elicited by 2,3,7,8-tetrachlorodibenzo-p-dioxin at Single-Cell and Spatial Resolution.** *R. Nault.* Michigan State University, East Lansing, MI.
- #1111 3:20 PM **Single-Cell Transcriptomics Unveiled That Early Life Exposure to BDE-99 Persistently Down-Regulated Drug-Metabolizing Enzymes but Up-Regulated Pro-inflammatory Pathways in Male Mouse Livers at Late Adulthood.** *J. Cui.* University of Washington, Seattle, WA.
- #1112 3:50 PM **Single-Cell RNA-Seq Reveals Heterogeneous Responses of Naive T Cells to Atrazine After Stimulation.** *P. Karmaus.* NIEHS, Research Triangle Park, NC.
- 4:20 PM **Panel Discussion/Q&A.** *T. Zacharewski.* Michigan State University, East Lansing, MI.

Monday, March 17, 1:45 PM to 4:30 PM, Room W205A, Convention Center



Workshop Session: Into the Fire: Exploring Firefighter Exposures and Health

Chair(s): Sue Fenton, North Carolina State University; and Thomas Sussan, Defense Centers for Public Health–Aberdeen.

Primary Endorser: Occupational and Public Health Specialty Section

Other Endorser(s): Carcinogenesis Specialty Section; Exposure Specialty Section

At the sound of an alarm, firefighters prepare themselves to rush into situations of extreme peril to protect citizens from potentially catastrophic circumstances. While committing these acts of bravery, firefighters encounter significant exposures to several hazards, including known carcinogens. In light of the recent determination by the International Agency for Research on Cancer (IARC) that the firefighter occupation is considered a group 1 carcinogen, this session will explore the unique exposure experiences of firefighters, the associated long-term health implications, and efforts to discover biomarkers useful in indicating exposures and early health effects. The first speaker will give a firsthand hand account of the hazards endured in this occupation and the fight to have policies created to better protect firefighter health. The second speaker will detail federal efforts to better track the exposures and health outcomes of firefighters across the country. There are numerous ongoing efforts to monitor and evaluate civilian and military firefighter health and examine correlations between measured exposures and markers of biological effect. We will hear updates from three distinct cohort studies: Women Firefighters Biomonitoring Collaborative, based in San Francisco; the nationally representative Fire Fighter Cancer Cohort Study; and firefighters within the longitudinal military Millennium Cohort Study. Each of these studies may involve firefighters with varied exposures due to the types of fires to which they respond, and the agents used to extinguish the fires. Finally, the last speaker will give an overview of comparative toxicological assessments of fluorine-containing and fluorine-free aqueous film-forming foams used to extinguish fires in certain situations. These presentations will be followed by a panel discussion of future needs and ways that government and academic toxicologists, advocates, and policymakers can work together to ensure that firefighters are healthier for the long term.

Abstract

- #1113 1:45 PM **Into the Fire: Exploring Firefighter Exposures and Health.**
1:45 PM **Introduction.** *S. Fenton.* North Carolina State University, Raleigh, NC.
- #1114 1:50 PM **Firefighter Health Impacts and Protective Policy Needs.** *E. Kelley.* International Association of Firefighters, Washington, DC. Sponsor: *S. Fenton*

- #1115 2:15 PM **The National Firefighter Registry for Cancer.** A. Mayer, and K. Fent. NIOSH, Cincinnati, OH. Sponsor: *S. Fenton*
- #1116 2:40 PM **Exposures and Breast Cancer in the Fire Service: Discovery and Translation to Reduce Risks.** *R. Rudel*¹, J. Trowbridge², R. Morello-Frosch², and H. Buren³. ¹Silent Spring Institute, Boston, MA; ²University of California Berkeley, Berkeley, CA; and ³United Fire Service Women, San Francisco, CA.
- #1117 3:05 PM **Exposures and Epigenetics in the Fire Fighter Cancer Cohort Study.** *J. Goodrich*. University of Michigan, Ann Arbor, MI.
- #1118 3:30 PM **Examining the Impact of PFAS Exposures in Military Firefighters Enrolled in the Millennium Cohort Study.** *T. Vincent-Hall*¹, A. J. Morris², E. Richard³, A. C. Rivera³, C. A. Kolaja³, C. Hall⁴, L. A. Havens², K. R. Hartley², A. J. Schneiderman¹, and R. P. Rull⁵. ¹US Department of Veterans Affairs Health Outcomes Military Exposures, Washington, DC; ²Central Arkansas Veterans Healthcare System, Little Rock, AR; ³Naval Health Research Center and Leidos, San Diego, CA; ⁴Naval Health Research Center and Leidos, Inc., San Diego, CA; and ⁵Naval Health Research Center, San Diego, CA.
- #1119 3:55 PM **Comparative Product-Level Hazard Assessments of PFAS-Containing and PFAS-Free Firefighting Foams.** *A. East*, A. M. Narizzano, M. J. Quinn, and T. Sussan. Defense Centers for Public Health–Aberdeen, Aberdeen Proving Grounds, MD.
- 4:20 PM **Panel Discussion/Q&A.** T. Sussan. Toxicology, Defense Centers for Public Health–Aberdeen, Aberdeen Proving Ground, MD. Sponsor: *S. Fenton*

Monday, March 17, 1:45 PM to 4:15 PM, W Hall A2, Convention Center

PS Poster Sessions

The presenting authors are available to discuss their research for Poster Sessions. Posters will be displayed from 9:00 am to 4:30 pm, with the author in attendance during the assigned Poster Session. See the *Program: Platform and Poster Session Supplement* PDF, the [SOT Online Planner](#) and [SOT Event App](#) for details.

Monday, March 17, 1:45 PM to 2:45 PM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Monday, March 17, 2:00 PM to 2:20 PM, W Hall A2, Convention Center

Tiny Tox Talk: Hazards and Heroes: The Life of a Medical Device Toxicologist

Speaker(s): Steph Street, Medtronic, St. Paul, MN.

Monday, March 17, 2:40 PM to 3:00 PM, W Hall A2, Convention Center

Tiny Tox Talk: Building Community-Academic Partnerships in Environmental Health

Speaker(s): Judy Zelikoff, NYU School of Medicine, New York, NY.

Monday, March 17, 3:15 PM to 4:15 PM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Monday, March 17, 3:20 PM to 3:40 PM, W Hall A2, Convention Center

Tiny Tox Talk: Meet the Director: US EPA

Speaker(s): Maureen Gwinn, US EPA, Alexandria, VA.

Monday, March 17, 4:30 PM to 5:30 PM, Room TBA, Convention Center

(All Attendees Who Are Interested in Undergraduate Education Are Welcome)

Undergraduate Educator Network Meeting

Chair(s): Robert Roth, Michigan State University (emeritus), Chapel Hill, NC.

Hosted by: Education and Experiential Opportunities Committee

The Undergraduate Educator Network Meeting is for all faculty involved in the teaching of toxicology to undergraduates, trainees considering a career in teaching, and those interested in including toxicology at the undergraduate level. Learn about initiatives for undergraduate faculty, provide your input, network with your colleagues, and discuss shared interests.

Monday, March 17, 4:45 PM to 6:15 PM, Room W307A, Convention Center

FS SOT/EUROTOX Debate: Are Electric Vehicles Actually Bad for the Environment?

Chair(s): James P. Luyendyk, Michigan State University; and Emanuela Corsini, Università degli Studi di Milano, Italy.

SOT Debater: Michael Aschner, Albert Einstein College of Medicine, Bronx, NY.

EUROTOX Debater: Ulf Olofsson, Royal Institute of Technology, Stockholm, Sweden.



The annual SOT/EUROTOX debate features leading toxicologists presenting contrasting perspectives on a controversial or pressing issue in toxicology. The debate began in the early 1990s and has been a highly anticipated event ever since.

This year, the debaters will address the proposition, “Are Electric Vehicles Actually Bad for the Environment?” The debaters will introduce the issues that should be considered in weighing the costs and benefits of electric vehicles to the environment. Critical to this debate are considerations of emissions, natural resources, energy consumption, cost, and lifecycle. Relevant questions include: (1) What are the most important factors for evaluating the environmental impact of gas versus electric vehicles? (2) What is the environmental impact of electric vehicle batteries? (3) What populations are most impacted in the switch to electric vehicles? (4) How can risk be compared across the entire lifecycle of the materials? (5) How do extraction processes for fossil fuels versus electric vehicle battery materials differ?

In addition to inclusion as a Featured Session at this meeting, this debate will take place again (with the debaters taking the reverse positions) in Athens, Greece, during EUROTOX 2025, September 14–17.



Volunteer with SOT

The “Volunteer” section in ToXchange gives SOT members the opportunity to express their interest in a wide variety of service positions within the Society, including leadership positions.

Explore the opportunities today!
www.toxicology.org/volunteer

SOT | Society of Toxicology





Tuesday, March 18, Various Times and Locations

Poster Tours for Trainees

(Students and Postdoctoral Scholars Only. Advance sign-up is required)

Hosted by: Postdoctoral Assembly

Graduate students and postdoctoral scientists participate in one-hour guided poster tours with an expert guide. These small group tours provide the opportunity for trainees to take part in critical evaluation of cutting-edge toxicology methods and research findings and network with a senior toxicologist.

SOT Committee and Component Group Leadership Activities

SOT Committees, including Regional Chapter, Special Interest Group, and Specialty Section leadership, often hold business meetings and discussions as breakfast or lunch events. These meetings are limited to Committee members and Component Group officers. More specific information about these meetings, including the time, date, and location, is available in the [SOT Online Planner](#) and [SOT Event App](#).

SOT Regional Chapter, Special Interest Group, and Specialty Section Events

Many Regional Chapters, Special Interest Groups, and Specialty Sections host breakfasts, luncheons, or receptions and/or facilitate mentoring events during the meeting. These activities act as social events, award ceremonies, and career development sessions all in one. These events are a great way to connect with colleagues and other members of your Component Group. The days, times, and locations of the SOT Component Group activities are available in the "[Program Overview](#)" section of this publication, as well as in the [SOT Online Planner](#) and [SOT Event App](#).

Tuesday, March 18, 7:00 AM to 4:00 PM, Room W109B, Convention Center

Mentorship Lounge

Hosted by: Career Advancement, Mentoring, and Networking Committee

Locating a quiet and available space for mentors and mentees to meet can be a challenge for attendees. This space is intended to provide a meeting destination for attendees to foster new or continuing mentor relationships.

Tuesday, March 18, 7:30 AM to 9:00 AM, Room W311E, Convention Center

(Add-On Event; Limited Seating)

SOT Mentoring Breakfast

Chair(s): Marissa Sobolewski, University of Rochester Medical Center, Rochester, NY.

Hosted by: Career Advancement, Mentoring, and Networking Committee (CAMAN)

SOT recognizes that career advancement, mentoring, and networking are important aspects for all career stages. This event is designed for SOT members from graduate students through established career toxicologists to interact with individuals from various fields to learn about SOT mentoring resources and get foundational tips on career advancement. After a provided breakfast, attendees select and rotate among three tables, each with different mentoring or career topic discussions. Each table is hosted by SOT members with career progression or mentoring expertise and will feature a topic, such as those pertaining to career skills (e.g., building a professional presence, work-life balance, managing burn-out), academic success (e.g., publishing, grant writing), career transitions (e.g., finding the first job, interviewing, changing positions), and different types of career positions. Mentoring resources that will be highlighted include SOT Mentor Match, a year-round program for mentors and mentees to self-match and develop fruitful and long-lasting connections.

Tuesday, March 18, 8:00 AM to 10:45 AM, Room W203A, Convention Center

S Symposium Session: Challenges of NAM-Based Toxicokinetic Assessment in Regulatory Risk Assessment

Chair(s): Sylvia Escher, Fraunhofer Institute for Toxicology and Experimental Medicine, Germany; and John Wambaugh, US EPA.

Primary Endorser: Biological Modeling Specialty Section

Other Endorser(s): Computational Toxicology Specialty Section; Regulatory and Safety Evaluation Specialty Section

New approach methods (NAMs) are under development that aim to reduce or replace traditional toxicity tests. Quantitative *in vitro* to *in vivo* extrapolation (QIVIVE) is a central assessment element in this next-generation risk assessment as it translates *in vitro*-derived benchmark concentrations to their equivalent *in vivo* doses—the point of departure for risk assessment. Physiologically based kinetic (PBK) models form the basis of QIVIVE for human risk assessment, as these compartmental models simulate external exposure from tissue concentrations from a priori determined internal exposure and chemical and physiological parameters. This session outlines different aspects about the integration of kinetic assessment and modeling approaches into regulatory hazard assessment highlighting recent results from the EU projects ONTOX and RISK-HUNT3R, both part of the ASPIS cluster project, as well as a recently started European Chemicals Agency (ECHA) project. The first talk covers an often overlooked aspect of QIVIVE, modeling the *in vitro* distribution kinetics of chemicals. These models translate nominal concentrations to intracellular concentrations and thus allow for a direct comparison of effect concentrations *in vitro* and *in vivo* at the molecular target. The formation of metabolites and their modeling is the focus of the RISK-HUNT3R project. Several case studies were conducted to develop a tiered testing and assessment strategy that was integrated into the ASPIS-initiated Safety Profiling Algorithm (ASPA) framework. With the help of this schema, the potential formation of metabolites is assessed by *in vitro* and *in silico* models and, if necessary, addressed in kinetic modeling. For regulatory implementation a good understanding of the challenges, assumptions, and the applicability domain of PBK modeling approaches is needed. These aspects have been reviewed and modeled in a recently started ECHA project to identify the added values of simplistic versus complex PBK modelling approaches.

Abstract #

- #1120 8:00 AM **Challenges of NAM-Based Toxicokinetic Assessment in Regulatory Risk Assessment.**
8:00 AM **Introduction.** S. Escher. Fraunhofer Institute for Toxicology and Experimental Medicine, Hannover, Germany.

- #1121 8:05 AM **Integrating *In Vitro* Biokinetics Tools into Next-Generation Risk Assessment Using the ASPA Workflow.** *N. Kramer.* Wageningen University, Wageningen, Netherlands.
- #1122 8:40 AM **Are Metabolites of Concern? Suggestion of a Tiered Testing and Assessment Approach.** *B. Islam.* Certara UK Limited, Sheffield, United Kingdom.
- #1123 9:15 AM **Applicability Domain of PBK Models to Chemicals and Regulatory Challenges.** *S. Escher.* Fraunhofer Institute for Toxicology and Experimental Medicine, Hannover, Germany.
- #1124 9:50 AM **Synergies between Approaches for High-Throughput Quantitative *In Vitro* to *In Vivo* Extrapolation.** *J. Wambaugh.* US EPA, Research Triangle Park, NC.
- 10:25 AM **Panel Discussion/Q&A.** *J. Wambaugh.* US EPA, Research Triangle Park, NC.

Tuesday, March 18, 8:00 AM to 10:45 AM, Room W304E, Convention Center

Symposium Session: Environmental Cohort Studies to Promote Children's Health in Japan and the United States

Chair(s): Elaine Faustman, University of Washington; and Emiko Todaka, Chiba University, Japan.

Primary Endorser: Exposure Specialty Section

Other Endorser(s): Risk Assessment Specialty Section

The session will (1) describe ongoing cohort studies in Japan and the US investigating the impact of environmental exposures on children's health, (2) present preliminary findings to date, and (3) discuss how we can protect the health of future generations. The Japan Environment and Children's Study (JECS) was launched in 2011 as a nationwide birth cohort study in Japan, funded by the Ministry of the Environment of Japan. Over 100,000 pregnancies were enrolled at 15 Regional Centers throughout Japan. The follow-up period has been extended to around 40 years to explore the longer-term effects. The Main Study of the JECS involves comprehensive collection of biospecimens, medical records, and questionnaires to collect environmental, genetic, social, and lifestyle information. Face-to-Face medical examination, developmental assessments, and urine/blood collection are conducted at ages 6 and 12. The JECS Sub-Cohort Study, comprising 5% of the Main Study participants, includes environmental sampling at ages 1.5 and 3 and medical check-ups, collection of biospecimens, and neurodevelopmental examination at ages 2, 4, 6, 8, and 10. JECS findings to date on maternal exposure to metallic elements and PFAS, and children's exposure to volatile compounds in relation to their health, growth, and development will be presented during this session. In addition to the nationwide surveys, adjunct studies have been carried out by individual centers with their own research plans and budgets. One of the several adjunct studies of Chiba Regional Center regarding the Paternal Origins of Health and Disease (POHaD) will be presented. The Markers of Autism Risk in Babies: Learning Early Signs (MARBLES) Study was launched in 2006 as the first epidemiologic prospective US cohort of younger siblings of children with autism spectrum disorders (ASD) to enroll during (and before) pregnancy when ASD and other neurodevelopmental conditions are likely to originate. MARBLES has enrolled over 550 pregnancies in sociodemographically diverse families of Northern California; collected over 28,000 biological and environmental specimens periodically throughout pregnancy, at delivery, and during postnatal follow-up; obtained comprehensive data on exposures, medical history, diet, and lifestyle; measured methylation, expression, immune, nutrient, and contaminant markers; and conducted rich characterization of neurodevelopmental outcomes of children at 3 years of age using gold-standard clinical assessments. MARBLES findings to date on several environmental exposures, including PFAS, in relation to ASD and other neurodevelopmental outcomes, will be presented. The Columbia Center for Children's Environmental Health (CCCEH) Study began in 1998 with the recruitment of pregnant individuals from the urban, lower-income neighborhoods of Washington Heights, Harlem, and South Bronx in New York. Mothers and children are followed prospectively and longitudinally. Enrollment is ongoing and follow-up of the CCCEH cohorts currently include over 1,200 offspring up to age 26. Study visits occur annually between the ages of 0 and 3 and biannually thereafter. During pregnancy, a detailed exposure assessment protocol has included home environmental samples (e.g., house dust), personal air monitoring, and biosamples (e.g., maternal blood and urine), along with a detailed questionnaire to assess information about demographics, psychosocial factors, and medical information. At birth and during each visit, biosamples are collected as appropriate (e.g., cord blood, placental tissue, meconium, peripheral blood, urine,

etc.) and have been used to measure a variety of biomarkers (e.g., environmental exposures, epigenetics, and other molecular features). Detailed assessments include anthropometric, neurodevelopmental, and respiratory endpoints. A bilingual (English/Spanish) Community Outreach and Translation team ensures community-based input in the research and communication of research findings to study participants and community members. MARBLES and the CCCEH cohorts are included in the US National Environmental influences on Child Health Outcomes (ECHO) Program. ECHO is a large US cohort study funded by the NIH that plans to enroll over 50,000 children, including new pregnancies, that follow a common research data and biospecimen collection protocol, with a focus on pregnancy and birth, respiratory, obesity, neurodevelopment, and positive health outcomes of children. The findings to date from J ECS, MARBLES, CCCEH, and ECHO will serve as the basis for discussions on how we can prevent possible adverse health outcomes in future generations.

Abstract

- #1125 8:00 AM **Environmental Cohort Studies to Promote Children's Health in Japan and the United States.**
8:00 AM **Introduction.** *E. Faustman*. University of Washington, Seattle, WA.
- #1126 8:05 AM **The Japan Environment and Children's Study: Background, Updates, and Future Perspectives.** *M. Yamamoto*. Chiba University, Chiba City, Japan. Sponsor: *E. Faustman*
- #1127 8:30 AM **The Association between Paternal Origin of Health and Disease and Exposure to Environmental Chemicals.** *K. Sakabe*. Chiba University, Chiba City, Japan. Sponsor: *E. Faustman*
- #1128 8:55 AM **Prenatal Exposure to PFAS and Health Outcomes among Japanese Children.** *Y. Ait Bamai*. Hokkaido University, Sapporo, Japan. Sponsor: *E. Faustman*
- #1129 9:20 AM **US Children's Environmental Health Cohort Studies and Their Contributions.** *R. Schmidt*. University of California Davis, Davis, CA. Sponsor: *E. Faustman*
- #1130 9:45 AM **New York City-Based Children's Environmental Health Cohort Studies and Their Contributions.** *J. Herbstman*. Columbia University Mailman School of Public Health, New York, NY. Sponsor: *E. Faustman*
- 10:10 AM **Panel Discussion/Q&A.** *E. Todaka*¹, and *E. Faustman*². ¹Chiba University, Chiba City, Japan; and ²University of Washington, Seattle WA.

Tuesday, March 18, 8:00 AM to 10:45 AM, Room W202A, Convention Center

S Symposium Session: Individual and Combined Effects of Climate Change–Associated Chemical and Nonchemical Stressors on Immunity

Chair(s): Ley Cody Smith, University of Connecticut; and Hao Chen, Guangxi Medical University, China.

Primary Endorser: Immunotoxicology Specialty Section

Other Endorser(s): American Association of Chinese in Toxicology Special Interest Group; Inhalation and Respiratory Specialty Section

Chemical and nonchemical stressors in the environment influence immunity by targeting key host defense pathways leading to increased susceptibility to infections. Epidemiological studies have demonstrated that exposure to ambient air pollutants, including fine particulate matter (PM_{2.5}), ozone (O₃), and wildfire smoke, can worsen outcomes related to influenza, SARS-COV-2, and respiratory syncytial virus infections due to either immunoenhancing or immunosuppressing effects. These responses are often exacerbated in sensitive subpopulations, including individuals with chronic health conditions. In addition, nonchemical stressors associated with climate change (e.g., heat stress) can also affect respiratory infections by directly targeting the immune system, indirectly favoring the formation of air pollutants, and enhancing the spread of viruses. Thus, these stressors can act individually or can have interactive effects leading to more pronounced responses. The potential for interactions between chemical and nonchemical stressors suggests that the health impacts from climate change-driven increases in air pollution and heat exposure on immunity may be underestimated in studies assessing these risk factors individually. Therefore, expanding our understanding of these interactions and developing risk assessment strategies for both chemical and nonchemical stressors are crucial to mitigate risks for

vulnerable populations. Foundational work from toxicological investigations, cohort, and epidemiological studies analyzing the individual and interactive effects of chemical and nonchemical stressors on immunity will be presented. The first speaker will describe a One Health approach to understanding how inhalation of air pollutants increases susceptibility to respiratory infection by focusing on changes in the pathogenic microenvironment. The second speaker will provide data highlighting interactive effects between air pollutant exposure and a chronically immunosuppressed state on mortality risk among people living with HIV. In the third talk, the effects of heat stress on systemic inflammation in a cohort from a neighborhood in Louisville, Kentucky, will be presented. The fourth presenter will describe results from animal studies investigating synergistic effects of heat stress and wildfire smoke on immunity and cardiopulmonary health, and the final talk will focus on the public health implications of these synergistic interactions and address environmental and health justice issues. The diversity of speaker expertise in mechanistic toxicology, human cohort studies, and epidemiology will enhance comprehension of the complex interplay between chemical and nonchemical stressors and provide guidance on how to apply this information to improve inputs for risk assessments to best protect public health. This will provide valuable insights for research planning, funding allocation, and surveillance practices, as well as policy development.

Abstract

- | | | |
|-------|----------|---|
| #1131 | 8:00 AM | Individual and Combined Effects of Climate Change-Associated Chemical and Nonchemical Stressors on Immunity. |
| | 8:00 AM | Introduction. <i>L. Smith.</i> University of Connecticut, Storrs, CT. |
| #1132 | 8:05 AM | Air Pollution-Induced Susceptibility to Pulmonary Infections: A One Health Problem. |
| | | <i>K. Gowdy.</i> Ohio State University, Columbus, OH. |
| #1133 | 8:35 AM | Adverse Impacts of Ambient Ozone Exposure on People Living with HIV. <i>H. Chen.</i> Guangxi Medical University, Nanning, China. |
| #1134 | 9:05 AM | Associations Between Short-Term Outdoor Heat with Markers of Inflammation and Immune Response. <i>D. Riggs.</i> University of Louisville, Louisville, KY. Sponsor: <i>L. Smith</i> |
| #1135 | 9:35 AM | Subchronic Heat Stress Modifies the Pulmonary and Immunological Response to Wildfire Eucalyptus Smoke. <i>T. Jackson.</i> US EPA, Research Triangle Park, NC. |
| #1136 | 10:05 AM | Interactions Between Air Pollution, Temperature, and Other Environmental Factors on Human Health. <i>K. Fong.</i> George Washington University, Washington, DC. Sponsor: <i>L. Smith</i> |
| | 10:35 AM | Panel Discussion/Q&A. <i>H. Chen.</i> Guangxi Medical University, Nanning, China. |

Tuesday, March 18, 8:00 AM to 10:45 AM, Room W204A, Convention Center

Symposium Session: Toxicological and Regulatory Considerations for Emerging Technologies and Hot Topics in Food

Chair(s): Jay Petrick, ADM; and Alex Eapen, Cargill.

Primary Endorser: Food Safety Specialty Section

Other Endorser(s): Biotechnology Specialty Section; Regulatory and Safety Evaluation Specialty Section

A wide range of consumer trends fuel the need for innovation in the food industry. These trends include the desire for natural food ingredients, nonanimal protein alternatives to meat and dairy products, and the production of meat without the slaughter of animals. Innovation fulfills the need for ingredients that bring new flavor and appearance to foods. As innovative new food products arise, consumer confidence in the safety of existing technologies, processes, and ingredients in the food supply is waning in part due to heightened awareness of food ingredients, food regulation, commercial food production, and food processing, along with widely disseminated misinformation concerning the inherent safety and regulatory scrutiny of our food. Product safety remains the highest priority for food manufacturers and ingredient suppliers. The Food Safety Assessment framework is robust, and regulatory agencies utilize both scientific rigor and policymaking authority to evaluate food ingredient safety and to extend these approaches to innovative new products. Precision fermentation leverages microbes to create novel colors and flavors as well as nutrients ranging from vitamins

and amino acids to human milk oligosaccharides for infant formula. This approach uses microorganisms modified to produce a specific product under fermentation conditions. Safety assessment considers the host organism, introduced genes, fermentation ingredients, and the final product. Fermentation techniques, including precision fermentation, can be leveraged for production of new protein ingredients. Safety assessment of these ingredients extends beyond those for precision fermentation itself and evaluates the potential for toxicity and allergenicity of novel proteins using *in silico* bioinformatics assessment tools and *in vitro* toxicological approaches. Consumer demand for exciting new and innovative products is high in the food and supplement space and appropriate safety, risk assessment, and regulatory considerations are a high priority for product manufacturers in these categories. Biotics are a category of substances that include probiotics, prebiotics, and postbiotics. Probiotics and postbiotics are microbially derived and can include live organisms (probiotics) and organisms killed by heat or other processes (postbiotics). Prebiotics are substrates that are utilized by resident microbes. Biotics must have a documented health benefit, which often focuses on digestive health endpoints although a broad range of other uses have also been investigated. Biotics must be evaluated to ensure safety of the organism and any of its contents from proteins to secondary metabolites or antimicrobial substances. Products for infants (e.g., formula) continue to evolve as science progresses and any innovations, such as products produced using precision fermentation, are scrutinized to ensure both safety and efficacy. Some of these innovations in formula will be discussed along with risk assessment considerations for infants. Cultivated meat represents an exciting and sustainable new approach to production of meat and seafood without the slaughter of animals. This approach relies on culturing cells from animals at scale. Production of cultivated meat considers risk assessment and challenges with scale up and meeting regulatory requirements. Innovation is at the forefront of food production and safety assessment of new products and approaches remains the top priority for regulators, product developers, and manufacturers. At the same time, reassuring consumers and restoring confidence of the safety of existing food products and ingredients and the robustness of the risk assessment paradigm in the wake of increasing public attention is also warranted.

Abstract

- | | | |
|-------|----------|--|
| #1137 | 8:00 AM | Toxicological and Regulatory Considerations for Emerging Technologies and Hot Topics in Food. |
| | 8:00 AM | Introduction. <i>J. Petrick</i> . ADM, Chesterfield, MO. |
| #1138 | 8:05 AM | The Importance of Continued Food Safety Vigilance for Future Foods. K. Muldoon-Jacobs. US FDA/CFSAN, Rockville, MD. Sponsor: <i>J. Petrick</i> |
| #1139 | 8:30 AM | Precision Fermentation for Food Ingredients: Emerging Biotechnology, End Products, and Safety. A. Leman. Good Food Institute, Chapel Hill, NC. Sponsor: <i>A. Eapen</i> |
| #1140 | 8:55 AM | Navigating the United States Regulatory Landscape for Alternative Proteins. <i>S. Tafazoli</i> . Intertek Testing Services, Mississauga, ON, Canada. |
| #1141 | 9:20 AM | Considerations for Determining Safety of Probiotics, Prebiotics, and Postbiotics in Foods. M. Sanders. Mary Ellen Sanders LLC, Centennial, CO. Sponsor: <i>J. Petrick</i> |
| #1142 | 9:45 AM | Risk Assessment for Infant Formula Ingredients: Past Examples and Future Opportunities for Innovation. P. Hanlon. Abbott Nutrition, Columbus, OH. Sponsor: <i>A. Eapen</i> |
| #1143 | 10:10 AM | Food Safety Challenges for Cultivated Meat Production: Current Topics and Future Directions. R. Ovissipour. Texas A&M University, College Station, TX. Sponsor: <i>J. Petrick</i> |
| | 10:35 AM | Panel Discussion/Q&A. <i>A. Eapen</i> . Cargill Inc, Wayzata, MN. |

Tuesday, March 18, 8:00 AM to 10:45 AM, Room W307A, Convention Center

Symposium Session: What's Sex Got to Do with It? Sex-Dependent Cardiopulmonary Effects of Inhaled Environmental Pollutants

Chair(s): Alexandra Noël, Louisiana State University; and Meghan Rebuli, University of North Carolina at Chapel Hill.

Primary Endorser: Inhalation and Respiratory Specialty Section

Other Endorser(s): Cardiovascular Toxicology Specialty Section; Women in Toxicology Special Interest Group

According to the American Lung Association, in 2023, more than 119 million Americans lived in areas where daily spikes or levels of ozone or particulate matter (PM) pollution exceeded national air quality limits. Further, meta-analysis of epidemiological studies suggest that women are twice more likely than men to experience all-cause and cardiopulmonary morbidity/mortality following exposures to ozone and PM10. Also, this past decade, the use of electronic cigarettes has become very popular among adult Americans with a daily prevalence use now reaching over 11 million individuals. Recent findings are emerging and suggesting that women who vape have increased odds of symptoms for COPD and asthma compared to men. Lungs, as the portal of entry for inhaled environmental pollutants, are a physical barrier interfacing with both the host (immune system) and the outdoor environment. Therefore, the lungs play a key role in the initiation of immune responses following exposures to inhalable environmental stressors. Even though it has been known for many decades that the immune system of males and females can respond differently to a same environmental insult, it was only in 2016 that the NIH policy on the incorporation of sex as a biological variable in the design, analysis, and reporting of vertebrate animal and human studies went into effect. Sexual dimorphism is defined as phenotypical differences in physiology, morphology, and behavior between males and females, and sex-specific differences in immune responses manifest in several ways, ranging from differences in the frequency of immune cell populations to variations in the activation of immune pathways. Also, sexual hormones play a complex and multifaceted pivotal role in shaping the immune responses to environmental pollutants. In general, it has been shown that estrogen can enhance immune function while, in contrast, testosterone can suppress immune responses. These distinct immune responses between males and females contribute to differences in frequency, susceptibility, and severity to specific diseases. For instance, allergic asthma is more prevalent in boys while over time, throughout the life course, allergic asthma becomes predominant in adolescent girls and women. This also demonstrates the importance of including the lifespan when considering sex as a biological variable as it is influenced by age and by extension sexual hormones (estrogen, progesterone, and testosterone). As exemplified, disparities in immune function have profound implications in our understanding of disease susceptibility and overall health outcomes, yet the inclusion of sex as a biological variable, with sex-specific data aggregation, is infrequently reported in toxicological research. Sex as a biological variable is at the interplay between gene-hormones-environment interactions, and the divergent immune profiles between males and females have significant health implications. Closing this knowledge gap will help improve health outcomes in both sexes. This Symposium Session will delve into the underlying biological mechanisms of sex-specific effects of inhaled environmental pollutants, including ozone, volatile organic compounds, PM, and e-cigarette aerosols throughout the lifespan from *in utero* to adult outcomes. Understanding these fundamental mechanisms could help pave the way for targeted preventive treatment strategies and improved management of disease on a sex-specific basis and will highlight the importance of considering sex as a crucial variable in human and animal toxicological research.

Abstract #

- | | | |
|-------|---------|---|
| #1144 | 8:00 AM | What's Sex Got to Do with It? Sex-Dependent Cardiopulmonary Effects of Inhaled Environmental Pollutants. |
| | 8:00 AM | Introduction. A. Noël. Louisiana State University, Baton Rouge, LA. |
| #1145 | 8:05 AM | Sex-Specific Effects of Ambient Ozone Exposure. P. Silveyra. Indiana University School of Public Health-Bloomington, Bloomington, IN. |
| #1146 | 8:35 AM | Sex-Dependent Metabolic Effects of Pulmonary Toxicity by Exposure to Electronic Cigarette Aerosols. T. Muthumalage. Purdue University, West Lafayette, IN. |

- #1147 9:05 AM **What's "Sexy" about Endothelial Dysfunction? Sex-Dependent Vascular Dysfunction Induced by Electronic Cigarette-Derived Aldehydes in Mice.** *D. Conklin.* University of Louisville, Louisville, KY.
- #1148 9:35 AM **Interactive Neuroendocrine Mechanisms in Sex-Specific Air Pollution Health Effects.** *D. Alewel.* US EPA, Research Triangle Park, NC.
- #1149 10:05 AM **Sex-Specific Differences in Cardiac Injury Following Inhalation Exposure to Tungsten Metal Particulates.** *A. Bolt.* University of New Mexico, Albuquerque, NM.
- 10:35 AM **Panel Discussion/Q&A.** *M. Rebuli.* University of North Carolina at Chapel Hill, Chapel Hill, NC.

Tuesday, March 18, 8:00 AM to 10:45 AM, Room W304A, Convention Center



Workshop Session: Challenges and Advancements in *In Vivo* Genetic Toxicity Assessment for Regulatory Decision-Making

Chair(s): Matthew LeBaron, Dow Chemical Company; and Daniel Roberts, Toxys B.V.

Primary Endorser: Regulatory and Safety Evaluation Specialty Section

Other Endorser(s): Carcinogenesis Specialty Section

For half a century, genetic toxicity testing has been an essential component of the safety assessment of new and existing chemicals. The scientific discipline of genetic toxicology, along with the specific composition and conduct of assays, has continually evolved in an effort to identify treatment-induced adverse genotoxic events. The ultimate goal has always been to predict the potential for heritable germ cell or carcinogenic effects using a short-term *in vivo* and/or *in vitro* testing paradigm, which can be extrapolated to human hazard and risk. Traditionally, the discipline of genetic toxicology has operated in a qualitative (i.e., binary) fashion, utilizing dedicated studies to assess mutagenicity. However, integrated, animal 3R-aligned, dose-response study designs, with consideration of genotoxicity as a bonafide toxicological endpoint to establish point-of-departure and margin-of-safety metrics, have begun to take hold. Modern study designs allow interpretation of genetic toxicity data alongside other endpoints (e.g., pharmacokinetic and dynamic considerations) and facilitate determination of point-of-departure values for characterization of genotoxic risk. Over the last decade, there have been several modifications to existing Organisation for Economic Co-operation and Development genetic toxicity test guidelines, as well as the advent of multiple assays that allow assessment of gene mutation and chromosome damage in site-of-contact or target tissues and in germ cells. In this session, key issues related to effective genotoxicity testing across different industry sectors will be presented and discussed, including the role of genotoxicity testing in the safety assessment of various xenobiotics, recent developments and implications for regulatory acceptance, nuisance factors and nuances regarding the conduct and interpretation of *in vivo* assays, and ongoing efforts and expert working groups in the field of genotoxicity. The session will culminate with an extended, open discussion on future paths and vision for the assays and genetic toxicity testing more generally. Taken together, these technological and data modeling advancements in the field of genetic toxicology are increasing the utility of these data in chemical safety assessment. This session will provide a timely and valuable forum for presentation and discussion with SOT attendees.

Abstract #

- #1150 8:00 AM **Challenges and Advancements in *In Vivo* Genetic Toxicity Assessment for Regulatory Decision-Making.**
8:00 AM **Introduction.** *M. LeBaron.* Dow Chemical Company, Midland, MI.
- #1151 8:05 AM **Genetic Toxicology: A Frequent Impediment in Early Drug Development.** *D. Jacobson-Kram.* ToxRox Consulting, Bethesda, MD.
- #1152 8:30 AM **Recent Recommendations for Conduct and Use of *In Vivo* Genotoxicity Data.** *C. Beevers.* Corteva Agrisciences, Oxford, United Kingdom. Sponsor: *M. LeBaron*
- #1153 8:55 AM **Evaluating the Quality and Making Appropriate Use of Historical Control Data.** *S. Dertinger.* Litron Laboratories, Rochester, NY.

- #1154 9:20 AM **Avoiding Potentially False-Positive or Unreliable Results in the *In Vivo* Comet Assay.** M. Vasquez. Helix3 Inc., Morrisville, NC. Sponsor: *M. LeBaron*
- #1155 9:45 AM **Quantitative Interpretation of Mutagenicity Dose-Response Data for Risk Assessment and Regulatory Decision-Making.** P. White. Health Canada, Ottawa, ON, Canada. Sponsor: *M. LeBaron*
- 10:10 AM **Panel Discussion/Q&A.** D. Roberts. Toxys B.V., New York, NY. Sponsor: *M. LeBaron*

Tuesday, March 18, 8:00 AM to 10:45 AM, Room W308A, Convention Center

W Workshop Session: Integrating New Approach Methodologies to Inform Sustainable Chemical Decisions

Chair(s): Lauren Brown, ToxStrategies LLC; and Kristie Sullivan, Institute for In Vitro Sciences.

Primary Endorser: Sustainable Chemicals through Contemporary Toxicology Specialty Section

Other Endorser(s): *In Vitro* and Alternative Methods Specialty Section

In recent years, interest in designing products with safe and sustainable chemistries has greatly increased. At the state level, programs such as California's Safer Consumer Products or Washington State's Safer Products for Washington have led to efforts to ban, remove, or innovate away from particular chemicals or chemical classes. There is a need to make informed, transparent decisions about the replacement chemistries and/or process by evaluating and comparing full chemical hazard profiles using chemical alternatives assessment. In Europe, the Safe and Sustainable by Design framework has been proposed by the European Union Commission Joint Research Centre as a mechanism to integrate human health and environmental safety assessment with life-cycle assessment. Work at the Organisation for Economic Co-operation and Development on Safe(r) and Sustainable Innovation Approaches, as well as EU-funded research projects, has explored novel frameworks for integrating the safety and sustainability assessment of advanced and emerging materials, such as nanomaterials. In the United States, government and nongovernmental programs are adapting frameworks to support the identification of safer chemistries with the use of new approach methodologies-based information. One major obstacle to achieving these ambitious goals for new innovations is the availability of data. With novel chemistries, there is often little to no data that can be used directly for decision-making. However, with the explosive growth of new approach methodologies (NAMs), including *in vitro*, *in silico*, and combinatorial approaches, there is an opportunity to begin filling current data gaps with novel data streams. How this can be done, however, has not yet been defined and may differ depending on chemical characteristics, available data, or produce use. The session will offer global perspectives on how new approach methods can be used to inform safe and sustainable chemistry decisions with case studies from regulator, industry, and nongovernmental communities. After the presentations, an active discussion will engage the speakers, session Chairs, and audience to explore (1) best practices for using NAMs data to evaluate existing and novel chemistries, (2) benefits and limitations of NAMs data for evaluating safer choice products, and (3) barriers and needs to implement NAMs more fully into sustainable chemical decisions.

Abstract #

- #1156 8:00 AM **Integrating New Approach Methodologies to Inform Sustainable Chemical Decisions.**
8:00 AM **Introduction.** K. Sullivan. Institute for In Vitro Sciences Inc., Ann Arbor, MI.
- #1157 8:05 AM **Integration of New Approach Methods to Meet the Requirements of Safe and Sustainable by Design Framework.** I. Garmendia Aguirre. European Commission Joint Research Centre, Ispra, Italy. Sponsor: *K. Sullivan*
- #1158 8:30 AM **Regulatory Research for Safety and Sustainability in the EU: Advancements of International Harmonization and Standardization Approaches and NAMs.** S. Friedrichs¹, T. Serchi², D. Greco³, T. Exner⁴, and L. Soetman-Hernandez⁵. ¹AcumenIST SRL, Brussels, Belgium; ²Luxembourg Institute of Science and Technology, Luxembourg, Luxembourg; ³University of Helsinki and Tampere University, Helsinki, Finland; ⁴Seven past Nine GmbH, Freiburg, Germany; and ⁵Rijksinstituut voor Volksgezondheid en Milieu (RIVM), Bilthoven, Netherlands.

- #1159 8:55 AM **US EPA Safer Choice Program: Use of New Approach Methods to Support Chemical Evaluations and Identification of Safer Chemistries.** A. McEwen. US EPA, Washington, DC.
- #1160 9:20 AM **Enabling Safe and Sustainable Innovation Using New Approach Methodologies: A Case Study.** G. Maxwell. Unilever, Bedford, United Kingdom. Sponsor: K. Sullivan
- #1161 9:45 AM **Use of NAMs to Fill Data Gaps in Support of Populating a Centralized Repository of Chemical Hazard Assessments for Alternative Assessments.** C. Bartlett¹, H. McKenney², G. Rigutto³, and L. Heine⁴. ¹ChemForward, Durham, NC; ²ChemForward, Los Angeles, CA; ³ChemForward, San Francisco, CA; and ⁴ChemForward, Spokane, WA. Sponsor: L. Brown
- 10:10 AM **Panel Discussion/Q&A.** L. Brown¹, and K. Sullivan². ¹ToxStrategies LLC, Ann Arbor, MI; and ²Institute for In Vitro Sciences, Ann Arbor, MI.

Tuesday, March 18, 8:00 AM to 10:45 AM, Room W205A, Convention Center



Workshop Session: Micro- and Nanoplastics: Lessons Learned from Nanotoxicology

Chair(s): Phoebe Stapleton, Rutgers, The State University of New Jersey; and Todd Stueckle, NIOSH.

Primary Endorser: Nanoscience and Advanced Materials Specialty Section

Other Endorser(s): Exposure Specialty Section

Micro- and nanoplastics (MNP) continue to be an emerging and hot topic in the fields of environmental, chemical, exposure, toxicological, and public health science. MNP particles have been identified in all environments: urban and rural, indoor and outdoor. They have been identified in the food we eat, the beverages we consume, and the clothes we wear. Overall, human exposure to MNP is inevitable and may begin before birth. MNP behave uniquely in a biological setting, as traditional toxicological principles of adsorption, distribution, metabolism, and excretion are not directly applicable given the challenge of metabolizing a solid particle. Furthermore, MNP may contain chemicals used as additives within the polymeric matrix or have adsorbed chemicals modifying surface chemistry and the formation of a protein or lipid corona. Identification and characterization of MNP in exposure and biological sampling presents a unique set of challenges. It is well-established that nanoscale particles possess distinctive physical and chemical properties compared to the larger bulk material. These physicochemical properties directly relate to the particle interactions within a biological system, including cellular interaction, uptake, translocation, biopersistence, and toxicity. These outcomes and principles have been well-established in the field of nanotoxicology. This session will utilize the lessons learned pertaining to particle physicochemical properties, including material/polymer, size, surface area, surface chemistry, chemical additives/adsorptions, dosimetry, and biodistribution. Expert presenters will apply these principles to the emerging area of micro- and nanoplastic toxicology, highlight the similarities, and identify the growing characterization needs within the realm of micro- and nanoplastic toxicology.

Abstract #

- #1162 8:00 AM **Micro- and Nanoplastics: Lessons Learned from Nanotoxicology.**
8:00 AM **Introduction.** P. Stapleton. Rutgers, The State University of New Jersey, Piscataway, NJ.
- #1163 8:05 AM **NIEHS Plans and Goals to Understand Potential Health Effects of Micro- and Nanoplastics: How Lessons Learned from Nano EHS Can Guide.** L. Ravichandran. NIEHS, Research Triangle Park, NC. Sponsor: P. Stapleton
- #1164 8:30 AM **Considering Polymeric and Additive Diversity in MNP Risk Assessment.** J. Norman. American Chemical Council, Washington, DC.
- #1165 8:55 AM **The Generation and Characterization of Microplastics for Environmental Health and Safety Research.** C. Sayes. Baylor University, Waco, TX.
- #1166 9:20 AM **Particle Dosimetry: What Might We Expect for Micro- and Nanoplastics Based on Lessons from Nanoparticles?** A. Elder. University of Rochester, Rochester, NY.

- #1167 9:45 AM **ADME Modeling and Additive Release of MNP in Biological Tissues: Challenges and Opportunities.** *F. Cassee.* Rijksinstituut voor Volksgezondheid en Milieu (RIVM), Bilthoven, Netherlands.
- 10:10 AM **Panel Discussion/Q&A.** *T. Stueckle.* NIOSH, Morgantown, WV.

Tuesday, March 18, 8:00 AM to 10:45 AM, Room W206A, Convention Center

W Workshop Session: Navigating CNS Toxicity Prediction: Insights from Case Studies on Preclinical and Clinical Correlations

Chair(s): Mamta Behl, Neurocrine Biosciences Inc.; and Simon Authier, Charles River Laboratories, Canada.

Primary Endorser: Neurotoxicology Specialty Section

Other Endorser(s): Biotechnology Specialty Section; Comparative Toxicology, Pathology, and Veterinary Specialty Section

The high failure rate in drugs due to central nervous system (CNS) liability has led many pharmaceutical companies to scale back or halt their programs. Herein, we address the persistent obstacles in CNS drug development amid a rising prevalence of neurological disorders. Our goal is to rethink current methodologies and discover new approaches to improve success rates. This session will take a comprehensive approach, integrating advancements in *in vivo* and *in vitro* methodologies, automated behavioral analysis, pathology, and digital imaging. Its aim is to improve toxicity prediction, thus reducing downstream drug failures. The opening speaker will provide a comprehensive review of the challenges faced in CNS drug development, placing emphasis on historical attrition rates and introduce innovative methodologies currently under evaluation to enhance early toxicity prediction. The second speaker will shed light on the often-overlooked aspect of sensory neuropathy assessment in routine nonclinical safety studies. The third speaker will cover key concepts in planning, executing, and interpreting nonclinical EEG studies for drug development, focusing on study design, species selection, data interpretation, and strategies for investigating CNS adverse events. The fourth speaker will describe how an Integrated Approach to Testing and Assessment case study can build confidence in using new approaches and potentially enhance toxicity prediction. The final speaker will highlight advances in sensor technologies and AI, showcasing their potential to deliver dynamic and clinically relevant insights in animal studies. The presentation will spotlight the Digital In Vivo Alliance (DIVA), an independent consortium of pharmaceutical leaders, innovative biotechs, and public sector collaborators known for pioneering computer vision-derived *in vivo* digital measures to assess early toxicity prediction and drug effects on various organ systems, including the CNS. Through selected case studies spanning the entire drug development spectrum, the session aims to highlight successes, challenges, and crucial translational considerations in neurotoxicology. The speakers represent industry, consortia, the public sector, and government agencies.

Abstract #

- #1168 8:00 AM **Navigating CNS Toxicity Prediction: Insights from Case Studies on Preclinical and Clinical Correlations.**
- #1169 8:00 AM **Challenges and Realities in CNS Drug Development: Overview of Failure Rates and Persistent Obstacles.** *M. Behl.* Neurocrine Biosciences Inc., San Diego, CA.
- #1170 8:10 AM **Drug-Induced Sensory Neuropathy: Getting Aligned to Detect and Translate Neurotoxicity.** *D. Rao.* Greenfield Pathology Services Inc., Greenfield, IN. Sponsor: *M. Behl*
- #1171 8:35 AM **EEG Assessments in Nonclinical Drug Development: 21st-Century Neurotoxicology Tools, Testing Strategies, and Practical Considerations.** *S. Authier.* Charles River Laboratories, Laval, QC, Canada. Sponsor: *M. Behl*
- #1172 9:00 AM **Integrated Approaches to Testing and Assessment Case Study of Mifepristone to Determine Developmental Neurotoxic Potential.** *H. Hogberg-Durdock.* NIEHS, Research Triangle Park, NC.
- #1173 9:25 AM **AI-Enabled Digital Toxicology for Improved Predictions.** *B. Berridge.* Digital In Vivo Alliance (DIVA), Cary, NC.

- #1173a 9:50 AM **Challenges of Addressing Nonclinical Neurotoxicology: Case Studies and Regulatory Perspective.** J. D'Agostino. US FDA/CDER, Bethesda, MD. Sponsor: *M. Behl*
- 10:15 AM **Panel Discussion/Q&A.** *M. Behl*. Neurocrine Biosciences Inc., San Diego, CA.

Tuesday, March 18, 9:00 AM to 4:30 PM, W Hall A2, Convention Center

ToxExpo Exhibits

Incorporating visits to the ToxExpo while at the SOT Annual Meeting connects attendees with 275+ exhibitors who support the toxicology community with cutting-edge solutions and services. Visit the ToxExpo to:

- Connect with exhibitors for product, service, and career insights
- Learn about the latest research from 700+ daily poster presentations
- Network with colleagues in the SOT Pavilion and ask questions about the Society
- Check out the Tiny Tox Theater for brief talks focused on a variety of topics
- Enjoy morning coffee and afternoon refreshments
- Grab lunch and relax with others
- Win big by visiting exhibitors with raffles and by dropping your business card in the SOT Diamond-Level Supporter boxes
- And experience much, much more

Global Gallery of Toxicology

Toxicology societies from around the world participate in the Global Gallery of Toxicology, where they display posters showcasing their upcoming meetings, key accomplishments, strategic initiatives, journals, awards, and more.

SOT Regional Chapter, Special Interest Group, and Specialty Section Posters

Dedicated poster space showcases the activities of the SOT Regional Chapters, Special Interest Groups, and Specialty Sections.

Tuesday, March 18, 9:15 AM to 11:45 AM, W Hall A2, Convention Center

PS Poster Sessions

The presenting authors are available to discuss their research for Poster Sessions. Posters will be displayed from 9:00 am to 4:30 pm, with the author in attendance during the assigned Poster Session. See the *Program: Platform and Poster Session Supplement* PDF, the [SOT Online Planner](#) and [SOT Event App](#) for details.

Tuesday, March 18, 9:15 AM to 10:15 AM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Tuesday, March 18, 9:30 AM to 3:00 PM, Room W209C, Convention Center

(Hours May Vary; Check Posted Information in the Research Funding Insights Room)

Research Funding Insights Room: Network with Grant Program Officers

Representatives from federal agencies will be available in the Research Funding Insights Room to answer general grant-related questions. Check the posted information in the Research Funding Insights Room to make an appointment with a program officer who can discuss aspects of scientific review or specific grant opportunities. New investigators are especially encouraged to meet with program staff.

Tuesday, March 18, 10:00 AM to 10:20 AM, W Hall A2, Convention Center

Tiny Tox Talk: The Importance of Decolonizing Food Safety Standards

Speaker(s): Abdel-Razak Kadry, University of Maryland School of Public Health, Silver Spring, MD.

Tuesday, March 18, 10:40 AM to 11:00 AM, W Hall A2, Convention Center

Tiny Tox Talk: Learn with Worms: Hands-on Laboratory Research Experience with Undergrads

Speaker(s): Joshua Gray, US Coast Guard Academy, Bozrah, CT.

Tuesday, March 18, 10:45 AM to 11:45 AM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Tuesday, March 18, 11:00 AM to 12:00 Noon, Room W304A, Convention Center

FS Leading Edge in Basic Science Award Lecture

This lecture will be delivered by the 2025 SOT Leading Edge in Basic Science Award recipient.

Tuesday, March 18, 11:00 AM to 12:30 PM, Room W304E, Convention Center

S Symposium Session: Assessing the Metabolic Competence of *In Vitro* Models and Their Applicability in Regulatory Toxicology

Chair(s): Hans Raabe, Institute for In Vitro Sciences Inc.; and Nuria Roldan, PETA Science Consortium International e.V., Germany.

Primary Endorser: *In Vitro* and Alternative Methods Specialty Section

Other Endorser(s): Regulatory and Safety Evaluation Specialty Section; Risk Assessment Specialty Section

Because local metabolism may toxify or detoxify xenobiotics—thereby altering local toxicity or systemic availability—understanding local, metabolism-dependent toxicities is important for decision-making in substance development and risk assessment. *In vitro* test systems based on human biology can help improve our mechanistic understanding of these toxicities and, as a result, are increasingly being used in regulatory applications. As their use increases so have the number of studies characterizing the metabolic competency of cell lines, reconstructed tissues, precision-cut organ slices, and other *in vitro* methods. In addition, microphysiological or (multi)organs-on-chip systems allow the interconnection of two or more such cell systems and may provide valuable information on absorption, distribution, metabolism, excretion processes and potential systemic availability and toxicities of test substances. This session will summarize the current state-of-science of these efforts. Case examples for the skin, lung, and liver will be presented and opportunities, and next steps related to human relevance, applicability, and confidence building will be discussed.

Abstract #

- | | | |
|-------|----------|--|
| #1174 | | Assessing the Metabolic Competence of <i>In Vitro</i> Models and Their Applicability in Regulatory Toxicology. |
| | 11:00 AM | Introduction. <i>H. Raabe.</i> Institute for In Vitro Sciences Inc., Gaithersburg, MD. |
| #1175 | 11:05 AM | Regulatory Challenges and Opportunities in Assessing Metabolic Competence of <i>In Vitro</i> Systems. <i>W. Casey.</i> NIEHS/DTT, Research Triangle Park, NC. |
| #1176 | 11:20 AM | Assessing Lung Metabolic Competency for <i>In Vitro</i> Inhalation Toxicology Applications. <i>N. Roldan.</i> PETA Science Consortium International e.V., Stuttgart, Germany. Sponsor: <i>H. Raabe</i> |
| #1177 | 11:40 AM | State-of-the-Science on the Metabolic Competency of <i>In Vitro</i> Human Skin Models for Use in Regulatory Toxicology Applications. <i>P. Hayden.</i> BioSurfaces LLC, Ashland, MA. |
| #1178 | 12:05 PM | Characterization and Validation of Single- and Multi-organ Liver Microphysiological Systems for Regulatory Toxicology Applications. <i>E. Richardson.</i> CN Bio, Cambridge, United Kingdom. Sponsor: <i>H. Raabe</i> |

Tuesday, March 18, 11:00 AM to 12:30 PM, Room W203A, Convention Center

S Symposium Session: Emerging Approaches in Chemical Analysis and Toxicological Risk Assessments of Extractables Data for Medical Device Evaluations

Chair(s): Berk Oktem, US FDA/CDRH; and Trevor Fish, Edwards Lifesciences.

Primary Endorser: Medical Device and Combination Product Specialty Section

Other Endorser(s): Hispanic Organization of Toxicologists Special Interest Group; Regulatory and Safety Evaluation Specialty Section

Establishing a common chemical characterization and toxicological risk assessment approach of the final finished medical device is challenging because the design, materials, and intended uses are widely diverse. Understanding the body's exposure to the entire device is particularly challenging for long-term contacting devices because it is often not practical to conduct simulated use extraction studies. Accelerating the release of device extractables and chemical analysis of the mixture by nontargeted approaches are necessary and essential for chemical toxicological risk assessments of long-term contacting devices. To address these challenges, medical device standards continuously evolve and advance the evaluation of medical device extractables testing. For example, the ISO 10993-18:2020/Amd1:2022 "Chemical characterization of medical device materials within a risk management process" includes the analytical evaluation threshold for when identification and quantification of extractables is necessary. The recently published ISO 10993-17:2023 "Biological evaluation of medical devices Part 17: Toxicological risk assessment of medical device constituents" includes new approaches for estimating whether the risk of harm from exposure to the mixture of constituents from a medical device will be without appreciable harm to health. However, these standards contain gaps that cause inconsistent application and outcomes among stakeholders. In this session, selected critical gaps in ISO 10993-18:2020/Amd1:2022 and ISO 10993-17:2023 that address these issues, based on current state-of-the-art approaches, will be presented. This Symposium Session will bring forward the most difficult subjects encountered in medical device evaluations that call for the most innovative and emerging approaches available in the toolbox of chemists and toxicologists. The first speaker will present on confident identification approaches of extractables that includes advanced approaches available in state-of-the-art chemical instrumentation. The second speaker will present an overview of a toxicological risk-based approach for extractables with an identity that is consistent with a chemical class of molecule only. The third presentation will have two speakers who will discuss the cumulative exposure dose in toxicological risk assessment and what to consider in the toxicological risk assessment of tentatively identified chemicals as well as selected chemical categories and associated chemical boundaries, including some case studies on the medical device field. The last speaker will present the EU medical device regulatory framework and alignment of ISO 10993-17:2023 with this directive. Each topic will be presented by subject-matter experts in the medical device chemical characterization and toxicological risk assessment community, and a Q&A session will promote further discussion. This session will bring awareness, and encourage discussion, of emerging approaches in chemical analysis and toxicological risk assessment of medical device extractables that address critical gaps and possible consideration in a future revision of ISO 10993-18:2020/Amd1:2022 and ISO 10993-17:2023.

Abstract #

- | | | |
|-------|----------|---|
| #1179 | 11:00 AM | Emerging Approaches in Chemical Analysis and Toxicological Risk Assessments of Extractables Data for Medical Device Evaluations. |
| | 11:00 AM | Introduction. <i>B. Oktem.</i> US FDA/CDRH, Silver Spring, MD. |
| #1180 | 11:05 AM | Identification of Chemical Species for Toxicological Risk Assessment. <i>G. Vas.</i> Intertek Clinical Research Services, Flemington, NJ. Sponsor: <i>B. Oktem</i> |
| #1181 | 11:20 AM | Defining Tolerable Intakes for Chemical Classes: A Tool to Improve Medical Device Chemical Characterization and Toxicological Risk Assessment. <i>W. Christian.</i> Medtronic, Jacksonville, FL. |
| #1182 | 11:35 AM | Application of Cumulative Exposure Dose and Chemical Categories in the Estimation of Tolerable Exposure to Medical Device Extractables. <i>T. Palacios Hernandez, and A. Hood.</i> US FDA/CDRH, Silver Spring, MD. |

- #1183 11:50 AM **European Framework in the Regulation of Medical Devices-Perspective from the European Medicines Agency.** *M. Rubio Armendariz.* Universidad de La Laguna, San Cristobal de la Laguna, Spain.
- 12:05 PM **Panel Discussion/Q&A.** *T. Fish.* Edwards Life Sciences, Irvine, CA.

Tuesday, March 18, 11:00 AM to 12:20 PM, Room W307A, Convention Center



Education-Career Development Session: Bridging the Gap and Paving the Way for Future Leaders in Toxicology

Chair(s): Mohamed Ghorab, US EPA; and Jessica LaRocca, Corteva Agriscience.

Primary Endorser: Career Advancement, Mentoring, and Networking Committee

Other Endorser(s): Postdoctoral Assembly; Toxicologists of African Origin Special Interest Group

In the rapidly evolving field of toxicology, effective leadership is paramount to navigating the complexities of contemporary research environments. This session is designed to address the critical gap between traditional toxicological training and the emergent leadership skills necessary for guiding cutting-edge research, influencing policy, and advancing public health and safety. The session will open with an introduction that will underscore the imperative of scientific leadership. The speaker will explore the profound impact of leadership on career progression and scientific advancement, setting the stage for enhanced interdisciplinary collaboration and innovation. They will highlight the characteristics of effective scientific leaders, such as communication and negotiation skills, and discuss how these traits can be nurtured through targeted training and mentorship programs. The next speaker will then provide insights from the academic perspective, addressing the specific demands and challenges of leadership within academic settings. They will delve into the dual responsibilities of academic leaders in managing educational excellence and innovative research. Their presentation will emphasize effective mentorship strategies and analyze successful leadership models from top research institutions, offering practical insights into building and leading productive academic teams. Following this, the third speaker will discuss leadership within governmental scientific organizations, focusing on the unique challenges and opportunities in this sector. The presentation will examine the role of scientific leaders in ensuring that science remains a cornerstone of decision-making and in guiding research to support these decisions. They will discuss the critical importance of scientific integrity, engaging with stakeholders, and promoting innovation within government settings. The next speaker will present the industrial perspective, emphasizing the pivotal role of leadership in driving industrial innovation. They will cover how effective leaders manage large-scale projects and spearhead technological advancements. They will discuss strategic decision-making, agile leadership, and the challenges of leading multidisciplinary teams in high-stakes environments, as well as the importance of promoting sustainability and ethical practices within industry settings. Lastly, the final speaker will provide a comprehensive analysis of leadership's pivotal role in guiding scientific organizations through the complexities of today's dynamic landscape. They will examine the ways in which effective leaders can sustain organizational relevance by nurturing a culture of innovation and upholding rigorous ethical standards. Additionally, the presentation will shed light on the importance of fostering international collaborations, emphasizing how these partnerships can amplify the global influence of scientific endeavors. Moreover, the presentation will explore the strategic approaches leaders utilize to manage organizational growth and sustainability. This includes overcoming funding hurdles, boosting member engagement, and harnessing technology to serve an increasingly diverse and global membership. The session will conclude with a panel discussion allowing attendees to engage directly with the speakers and further explore the themes presented. This comprehensive overview aims to equip toxicologists with the leadership tools necessary to lead ambitiously and ethically in their future careers.

Abstract #

- #1184 11:00 AM **Bridging the Gap and Paving the Way for Future Leaders in Toxicology.**
- 11:00 AM **The Imperative of Scientific Leadership.** *J. LaRocca.* Corteva Agriscience, Indianapolis, IN.
- 11:15 AM **Leadership Dynamics in the Academic Sphere.** *P. Silveyra.* Indiana University Bloomington, Bloomington, IN.

- 11:25 AM **Leadership at the Confluence of Science and Government.** *A. Lowit.* US EPA, Washington, DC.
- 11:35 AM **Strategic Leadership in the Industrial Sector.** *T. Parman.* Sangamo Therapeutics, Richmond, CA.
- 11:45 AM **Steering Scientific Organizations in a Dynamic Era.** *A. Kadry.* University of Maryland, College Park, MD.
- 11:55 AM **Panel Discussion/Q&A.** *M. Ghorab.* US EPA, Washington, DC.

Tuesday, March 18, 11:00 AM to 12:20 PM, Room W202A, Convention Center

EC Education-Career Development Session: Teaching in the Age of AI: Benefits, Challenges, and Ethical Considerations

Chair(s): Jaime Mirowsky, SUNY College of Environmental Science and Forestry; and Hollie Swanson, University of Kentucky.

Primary Endorser: Education and Experiential Opportunities Committee

Other Endorser(s): Ethical, Legal, Forensics, and Societal Issues Specialty Section

Chat Generative Pre-trained Transformer (ChatGPT) is an artificial intelligence (AI) chatbot that uses machine learning algorithms to process and analyze large amounts of data to answer questions submitted by a user in real-time. Since its inception in November 2022, many other AI platforms have become available, such as Google Gemini and Microsoft Copilot, each with their strengths and weaknesses. With the rise in AI platforms accessible for public use, many educators have become concerned about the impact of this technology on academic dishonesty and its ability to reduce students' critical thinking and problem-solving skills. However, others have embraced AI as a tool for helping design lessons, creating assessment questions, and developing grading rubrics. From a student perspective, AI can be used for personalized tutoring and learning and additional writing support and as a study aid. In this session, we will provide some basic terminology related to AI, provide a brief introduction to the most common AI platforms available, and describe some of their pros and cons. We will then share some ideas of how to successfully use AI in your classroom to create course content, design students' assessments, and provide suggestions for achieving course learning objectives while circumventing AI's widespread presence and potential abuse. For those wondering if this technology can be used to support student learning as a homework resource, we will discuss how one undergraduate educator ran their major course assignments through ChatGPT, assessed whether the platform was a reliable tool for students looking for outside help, and determined how the output given has changed over time; this and other approaches can be used to reveal the strengths and limitations of the technology. Further, we will present one academic graduate program's approach for discouraging generative AI use in their courses, including the collaborative evaluation of current course assessments and the identification of acceptable and unacceptable use of the technology by students. Lastly, we will discuss the ethical implications of using AI in research and how to facilitate an open dialogue with students about using these platforms to promote responsible and ethical research; issues such as bias in AI models, privacy concerns, hallucinations, incorrect citations, and plagiarism will be highlighted. The session will conclude with a Q&A segment to allow audience members to engage with the speakers, exchange ideas about their experiences using AI in educational settings, and address how they have handled some of the concerns that this technology has brought into the classroom.

Abstract #

- #1185 11:00 AM **Teaching in the Age of AI: Benefits, Challenges, and Ethical Considerations.**
- 11:00 AM **Introduction.** *J. Mirowsky.* SUNY College of Environmental Science and Forestry, Syracuse, NY.
- 11:05 AM **Strategies for the Integration and Ethical Use of AI in the Classroom.** *H. Swanson.* University of Kentucky, Lexington, KY.
- 11:20 AM **From Hype to Help? Evaluating ChatGPT's Performance in an Upper-Division Chemistry Course over Time.** *J. Mirowsky.* SUNY College of Environmental Science and Forestry, Syracuse, NY.

- 11:35 AM **Implementation of a Policy on Generative AI Use in an Online Graduate Program.** I. Brown. Michigan State University, East Lansing, MI. Sponsor: *J. Mirowsky*
- 11:50 AM **Teaching the Ethics of Using AI for Education and Research.** D. Resnik. NIEHS, Research Triangle Park, NC. Sponsor: *J. Mirowsky*
- 12:05 PM **Panel Discussion/Q&A.** *H. Swanson.* University of Kentucky, Lexington, KY.

Tuesday, March 18, 11:20 AM to 11:40 AM, W Hall A2, Convention Center

Tiny Tox Talk: Drug Development for Academics

Speaker(s): Jay Stallons, Tiresias Consulting LLC, Mobile, AL.

Tuesday, March 18, 12:00 Noon to 1:15 PM, Room W311E, Convention Center

(Add-On Event; Postdoctoral Scholars Only)

Postdoctoral Assembly Luncheon

Hosted by: Postdoctoral Assembly (PDA)

This ticketed event encourages networking and engagement among postdoctoral scholars. Stop in when you can to enjoy a buffet lunch with your fellow postdocs. There is a short program at 12:15 pm to recognize the Best Postdoctoral Publication Award recipients, share updates from the PDA, and announce the raffle winners.

Tuesday, March 18, 12:00 Noon to 12:20 PM, W Hall A2, Convention Center

Tiny Tox Talk: Alternative Careers in Toxicology: Expanding Your Professional Horizons

Speaker(s): Jesus Illan, Cerulean, Milton Keynes, United Kingdom.

Tuesday, March 18, 12:15 PM to 1:15 PM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Tuesday, March 18, 12:30 PM to 1:45 PM, Room TBA, Convention Center

(Undergraduates Only)

Undergrad Gab with a Grad over Grub

Chair(s): Tynisha D. Glover, Johnson & Johnson Innovative Medicines; and Checo J. Rorie, North Carolina Agricultural & Technical State University.

Hosted by: Inclusion, Diversity, and Engagement Committee (IDEC)

This informal session for all undergraduate students attending the SOT Annual Meeting is hosted by the Inclusion, Diversity, and Engagement Committee. SOT undergraduate travel awardees participate in this event. Students will connect with peers and learn first-hand from graduate students about the graduate school experience, as well as gain a better understanding of the opportunities offered by SOT. This session includes free lunch.

Tuesday, March 18, 12:40 PM to 1:00 PM, W Hall A2, Convention Center

Tiny Tox Talk: Demystifying a Career in Risk Assessment: Insights from a Recent Grad in Industry

Speaker(s): Alicia Healey, SRC Inc., Rochester, NY.

Awards & Fellowships

Call for 2025 Nominations

More than 200 distinguished toxicologists across the career span are honored each year.

***Nominations and applications
due October 9, 2024.***

www.toxicology.org/awards

SOT | Society of
Toxicology



Tuesday, March 18, 1:00 PM to 2:30 PM, Room W206A, Convention Center

FS Engagement Session: Successful Mentorship: Aligning Expectations Through Effective Communication

Chair(s): Ashley L. Woolard, Amway/Nutriline; and Toufan Parman, Sangamo Therapeutics Inc.

Primary Endorser: Career Advancement, Mentoring, and Networking Committee

Other Endorser(s): Women in Toxicology Special Interest Group; Postdoctoral Assembly

Facilitators: Ashley L. Woolard, Amway/Nutriline, Irvine, CA; Toufan Parman, Sangamo Therapeutics Inc., Brisbane, CA; and Lauren M. Aleksunes, Rutgers, the State University of New Jersey, Piscataway, NJ.



Regardless of where you are in your career, you can always benefit from strong mentor-mentee relationships. At the heart of any successful mentorship is clear, effective communication. Often, mentors are unsure of what the mentee truly wants from the relationship, while mentees struggle to clearly express their needs and expectations. If you've encountered these challenges in your experiences, then this session is for you!

This session will offer an intellectual framework, practical methods, and a platform to address common mentor-mentee barriers. Through three interactive activities, participants will learn from the experiences of their peers, reflect on their own approaches, and be able to work collaboratively with individuals from diverse backgrounds. The session will begin with a short skit illustrating poor communication and ineffective behaviors, followed by a group discussion on these missteps. Then, participants will answer Kahoot questions to poll their reactions and brainstorm more appropriate practices. A follow-up skit will demonstrate effective communication and positive behaviors. Next, participants will work in small groups to discuss a case study on mentor-mentee interactions, guided by moderators. Key questions will help facilitate discussions, with each group sharing their insights during a debrief period. During the final portion, we will consider poorly phrased statements that can derail mentor-mentee relationships. Roundtable groups, led by volunteers from various sectors (industry, government, academia, and nonprofits), will reframe these statements into

clearer, more productive language that better aligns expectations between mentor and mentee.

While no one can offer a one-size-fits-all formula for mentorship, this session will provide foundational principles on learning and the environmental factors that foster growth, productivity, and creativity.

Tuesday, March 18, 1:00 PM to 2:00 PM, Room W304A, Convention Center

FS Merit Award Lecture

This lecture will be delivered by the 2025 SOT Merit Award recipient.

Tuesday, March 18, 1:00 PM to 2:30 PM, Room W308A, Convention Center

S Symposium Session: Behavioral Testing: Novel Strategies and Approaches to Maximize Translational Value, Reproducibility, and Rigor

Chair(s): Megan Mahoney, University of Illinois at Urbana-Champaign; and Heather Patisaul, NIEHS.

Primary Endorser: Neurotoxicology Specialty Section

Other Endorser(s): Reproductive and Developmental Toxicology Specialty Section; Women in Toxicology Special Interest Group

Most psychosocial and neurodevelopmental disorders (NDDs), including autism spectrum disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD) are defined clinically by their behavioral traits and lack a defining pathology. Thus, linking chemical exposures to NDD risk poses a challenge for traditional toxicology testing which is almost entirely reliant on physical biomarkers of disease. Here, we show how NDD-related toxicological research can be accomplished using robust approaches firmly established around clinically relevant behavioral traits and the use of the most appropriate and translational animal models, systems, and testing strategies that are reproducible, rigorous, and have high construct validity. Moreover, nearly all NDDs have pronounced heterogeneity in phenotypic presentation, including prevalence and severity of co-morbidities, and most NDDs also have sex differences in expression. For example, some autistic individuals have epilepsy or gastrointestinal issues while others have extreme allergies; some are nonverbal while others are not, and female patients tend to have higher levels of anxiety but less stereotypic behaviors than male patients. Accounting for this biological variability while minimizing experimental variability is a significant challenge for toxicological testing. Drawing together experts from neurotoxicology and behavioral neuroscience, this session will present and discuss best practices in behavioral testing, including accounting for age and sex differences, strategic use of nontraditional species to assess rare but human-relevant traits such as monogamy and paternal care, and emerging technologies, including approaches that measure neurophysiology in real time. These approaches include imaging of circuits in live-behaving animals, continuous home cage monitoring, and *in vivo* electrophysiology. Strategies to assess and analyze behavioral traits more aligned with human impairments in neurobehaviors, such as memory, learning, attention, and socioemotional behaviors, will also be presented. Also discussed will be computational approaches and tools, including machine learning and AI, for analyzing multi-platform test data and assessing different aspects of construct validity, including convergent validity. Accounting for sex differences and powering studies to account for biological variability are essential to maximize translational value. Best practices to minimize risk of bias and maximize consistency in data reporting, such as use of the ARRIVE Guidelines Essential 10 Checklist, will be demonstrated along with some discussion as to how to incorporate non-guideline behavioral data in risk assessment. The speakers will also highlight how frameworks developed for mental health research, most notably the NIMH Research Domain Criteria (RDoC), can be used to establish causality and interrogate how prenatal chemical exposures impact sexually dimorphic behavioral and neural traits of direct relevance to human psychosocial and neurodevelopmental disorders. How behavioral testing, particularly in non-rodent species, could complement and be integrated with new approach methodologies (NAMs) for developmental neurotoxicity (DNT) testing, and its relevance to clinical outcomes will also be discussed. This session aims to educate anyone interested in generating, evaluating, or using behavioral data for decision-making in the most rigorous and up-to-date approaches for behavioral assessment and analysis.

Abstract #

- | | | |
|-------|---------|---|
| #1186 | 1:00 PM | Behavioral Testing: Novel Strategies and Approaches to Maximize Translational Value, Reproducibility, and Rigor. |
| | 1:00 PM | Introduction. <i>M. Mahoney.</i> University of Illinois at Urbana-Champaign, Urbana, IL. |
| #1187 | 1:05 PM | Overcoming Issues in the Design, Analysis, and Application of Behavioral Testing in Rodent Developmental Neurotoxicology Studies. <i>C. Vorhees.</i> University of Cincinnati, Cincinnati, OH. |
| #1188 | 1:20 PM | Strategies for Aligning Behavioral Testing with Behavioral Traits Relevant to Human Neurodevelopmental Disorders. <i>H. Patisaul.</i> NIEHS, Research Triangle Park, NC. |

- #1189 1:35 PM **New Tools for Behavioral Testing: From Machine Learning to Assessing Behavior and Physiology Simultaneously in Spontaneously Behaving Animals.** J. Cushman. NIEHS, Research Triangle Park, NC. Sponsor: *H. Patisaul*
- #1190 1:50 PM **Using Behavioral Flow to Quantify Behavior and Well-Being.** O. Sturman. Eidgenössische Technische Hochschule Zürich, Zürich, Switzerland. Sponsor: *H. Patisaul*
- #1191 2:05 PM **Advancing Developmental Neurotoxicity Testing Beyond Rodents: An Integrated Approach and International Collaboration.** M. Behl. Neurocrine Biosciences, San Diego, CA.
- 2:20 PM **Panel Discussion/Q&A.** *H. Patisaul*. NIEHS, Research Triangle Park, NC.

Tuesday, March 18, 1:00 PM to 2:30 PM, Room W304E, Convention Center



Symposium Session: Interplay of Toxicant Exposure and the Immune System: Impact on Pregnancy Outcomes

Chair(s): Elana Elkin, San Diego State University; and Colette Miller, US EPA.

Primary Endorser: Reproductive and Developmental Toxicology Specialty Section

Other Endorser(s): Immunotoxicology Specialty Section; Women in Toxicology Special Interest Group

During pregnancy, the maternal immune system faces a unique challenge of protecting both mother and fetus from pathogens while maintaining tolerance to the growing fetus and placenta. However, environmental exposures can disrupt this delicate balance, potentially leading to adverse outcomes such as preterm birth or increased susceptibility to infections. This session aims to delve into the impact of environmental toxicants on maternal immune responses during pregnancy and its consequences for maternal and fetal health outcomes. Through exploring the effects of various environmental exposures on immune function, elucidating underlying mechanisms, and considering the role of the microbiome in mediating these interactions, this session seeks to identify research gaps and pave the way for future studies and interventions aimed at safeguarding maternal and fetal health.

Abstract #

- #1192 1:00 PM **Interplay of Toxicant Exposure and the Immune System: Impact on Pregnancy Outcomes.**
1:00 PM **Introduction.** *E. Elkin*. San Diego State University, San Diego, CA.
- #1193 1:05 PM **Introduction to Pregnancy, Immune System, and Toxicant Exposure.** *S. Harris*. University of Michigan, Ann Arbor, MI.
- #1194 1:25 PM **Endocrine-Immune Interactions in Group B Streptococcal Infection of the Female Reproductive Tract.** M. Petroff. Michigan State University, East Lansing, MI. Sponsor: *E. Elkin*
- #1195 1:45 PM **Environmental Modulator of Tryptophan Catabolism in Pregnancy.** *M. Susiarjo*. University of Rochester, Rochester, NY.
- #1196 2:05 PM **The Trichloroethylene Metabolite S-(1,2-dichlorovinyl)-l-cysteine Inhibits Innate Immune Responses to GBS in Human Fetal Membranes and Macrophage Cell Line THP-1 *In Vitro*.**
E. Boldenow. Calvin University, Grand Rapids, MI. Sponsor: *E. Elkin*
- 2:25 PM **Q&A.** *C. Miller*. US EPA, Research Triangle Park, NC.

Tuesday, March 18, 1:00 PM to 2:30 PM, Room W204A, Convention Center

S Symposium Session: N-Nitrosamines in Water and in Drugs: Occurrence, Detection, Biological Effects, and Regulation

Chair(s): Bevin Engelward, Massachusetts Institute of Technology; and Nan Mei, US FDA/NCTR.

Primary Endorser: American Association of Chinese in Toxicology Special Interest Group

Other Endorser(s): Women in Toxicology Special Interest Group

N-nitrosamines have been demonstrated to be potent carcinogens in animal models. Several nitrosamines, including N-nitrosodimethylamine (NDMA) and N-nitrosodiethylamine (NDEA) are Group 2A probable human carcinogens according to the International Agency for Research on Cancer (IARC). Although understood as environmental contaminants in food and water for many years, NDMA and other nitrosamines have emerged as a critical concern after recent discovery as reaction products of active pharmaceutical ingredients and contaminants of commonly used medications. Over a dozen drugs have been recalled as a consequence of NDMA contamination. This Symposium Session will address the occurrence of NDMA and other nitrosamines, as well as current efforts to detect and evaluate the human risk of this class of carcinogens by relevant stakeholders in academia, industry, and the US Food and Drug Administration (US FDA). The MIT Superfund Program is focused on NDMA contamination in water due to legacy contaminants present at a Superfund Site in Wilmington, Massachusetts. A recent study by the Massachusetts Department of Public Health showed an association between exposure to NDMA *in utero* and subsequent childhood cancer in Wilmington. The pharmaceutical industry and the FDA are addressing the detection, remediation, and human carcinogenic risk of nitrosamines found associated with drugs, as well as *in vivo* formation of nitrosamines from nitrite and secondary or tertiary amino drug structures. The US FDA National Center for Toxicological Research has undertaken investigations to evaluate the risk of nitrosamine drug impurities and to identify optimized testing conditions. The chemical and biological consequences of nitrosamines, including genotoxic interactions and DNA repair activity relevant to human carcinogenic risk, will be addressed in the session.

Abstract #

- | | | |
|-------|---------|--|
| #1197 | 1:00 PM | N-Nitrosamines in Water and in Drugs: Occurrence, Detection, Biological Effects, and Regulation. |
| #1198 | 1:00 PM | Window on Environmental Exposure and Cancer Susceptibility and Modulation by DNA Repair Systems. <i>B. Engelward.</i> Massachusetts Institute of Technology, Cambridge, MA. |
| #1199 | 1:30 PM | N-Nitrosamines as Carcinogens and Regulatory Perspective on Human Carcinogenic Risk Assessment. <i>R. Elespuru.</i> Retired, Columbia, MD. |
| #1200 | 2:00 PM | <i>In Vitro</i> Genotoxicity Evaluation of Nitrosamine Drug Impurities. <i>N. Mei.</i> US FDA/NCTR, Jefferson, AR. |

Tuesday, March 18, 1:00 PM to 2:30 PM, Room W203A, Convention Center

S Symposium Session: Reproductive and Endocrine-Disrupting Effects of Legacy and Emerging PFAS and Their Mixtures

Chair(s): Barbara Wetmore, US EPA; and Shuo Xiao, Rutgers, The State University of New Jersey.

Primary Endorser: Reproductive and Developmental Toxicology Specialty Section

Other Endorser(s): Mixtures Specialty Section

Per- and polyfluoroalkyl substances (PFAS, also termed “forever chemicals”) are a rising public health concern as they have been linked to adverse health effects in humans, including female reproductive and endocrine disorders, such as premature ovarian failure, irregular menstrual cycles, infertility, and preterm birth. However, the underlying mechanism remains elusive. Moreover, nearly all studies focus on PFOA and PFOS, the two long-chain legacy PFAS that have been phased out. However, many other long-chain PFAS, such as PFNA, are rarely studied even though they may have similar or even higher contamination levels. Further, short-chain PFAS, such as GenX, are now increasingly used, but their reproductive impacts are poorly understood. Humans are also exposed to mixtures of PFAS, but studying PFAS mixtures is challenging, and traditional approaches are often low throughput. To bridge these technical and knowledge gaps, this session will include three cross-disciplinary presentations that have evaluated reproductive and endocrine-disrupting effects of legacy and emerging PFAS and their mixtures. The session will start with a short introduction that will describe existing challenges in the field. The first main presentation will discuss the effects of PFAS on various molecular targets using the Tox21 *in vitro* assay datasets. The second presentation will focus on the use of traditional *in vivo* animal models and emerging organoid and organ-on-chip methodologies to investigate the effects of long- and short-chain PFAS and their mixtures on the ovary and uterus. The final presentation will introduce a population- and exposomics-based study to examine associations of PFAS with human placental epigenomic and transcriptomic activity and birth and postnatal outcomes. During the panel discussion, the speakers and attendees can further discuss research presented and ongoing gaps and needs, particularly the application of new alternative assays to the study of PFAS and mixtures. This session will benefit both the PFAS and mixtures toxicology fields by highlighting current knowledge gained using these cutting-edge tools and identifying critical next steps.

Abstract #

- | | | |
|-------|---------|---|
| #1201 | 1:00 PM | Reproductive and Endocrine-Disrupting Effects of Legacy and Emerging PFAS and Their Mixtures. |
| | 1:00 PM | Introduction. <i>B. Wetmore.</i> US EPA, Research Triangle Park, NC. |
| #1202 | 1:05 PM | Evaluation of PFAS Effects on Nuclear Receptors, Pathways, and Cytochrome p450 Enzymes Using Tox21 Screening Data. <i>M. Xia.</i> NIH/NCATS, Rockville, MD. |
| #1203 | 1:30 PM | Ovarian-Disrupting Effects of Long- and Short-Chain PFAS and Their Mixtures. <i>S. Xiao.</i> Rutgers, The State University of New Jersey, Piscataway, NJ. |
| #1204 | 1:55 PM | Prenatal PFAS Exposure, Newborn Growth Characteristics, and the Role of Placental Molecular 'Omics. <i>T. Everson.</i> Emory University, Atlanta, GA. Sponsor: <i>B. Wetmore</i> |
| | 2:20 PM | Panel Discussion/Q&A. <i>B. Wetmore.</i> US EPA, Research Triangle Park, NC. |

Tuesday, March 18, 1:00 PM to 2:30 PM, Room W307A, Convention Center

W Workshop Session: Applying Fit-for-Purpose Study Design to Build Confidence in NAM Use

Chair(s): Agnes Karmaus, Syngenta Crop Protection LLC; and Shaun McCullough, RTI International.

Primary Endorser: *In Vitro* and Alternative Methods Specialty Section

Other Endorser(s): Molecular and Systems Biology Specialty Section

Adapting new approach methodologies (NAMs) for use as early stage screening or for mechanistic evaluation in late stage decision making requires different study design considerations. The evolution of approaches applied to analyze, verify, and interpret assays specific to the context of use in which they are being applied means there are opportunities to leverage NAMs. Establishing what adjustments and stringency should be applied for study conduct, analysis approach, and documentation requires comprehensive consideration of how fit-for-purpose study design is defined. The abundance of NAMs currently being used can be applied for academic evaluation, screening and prioritization, and even as lines of evidence in decision-making context. The context in which data are intended to be used requires serious consideration regarding what adjustments must be made to substantiate interpretations and conclusions made. In this session, speakers will demonstrate how NAMs can be leveraged as early-stage approaches or for late-stage insight and address study design considerations based on ensuring fit-for-purpose application. After a brief introduction, the first speaker will present a novel 3D *in vitro* co-culture model and how it is being leveraged for both discovery screening and *in vivo* regulatory requirement refinements and replacements by approximating long-term *in vivo* hazard profiles and points of departure. The second speaker will present how the OECD-endorsed developmental neurotoxicity *in vitro* battery (DNT-IVB) screening assays can be used for biological interpretation of chemical effects or for derivation of a conservative point of departure for DNT, emphasizing differences in the analysis approaches applied for data aggregation and confidence criteria. Finally, the last speaker will present how an *in silico* pharmacodynamic modeling approach developed as part of the R&D pipeline is being adapted for evaluation of potential risks in human populations to be applied in late-stage decision making for agrochemical projects. Combined, these presentations touch on novel model systems, data aggregation, and *in silico* applications that are leveraged for both screening and decision-making contexts and how those applications differ in study design. Attendees will gain insight into how NAMs are developed, analyzed, and optimized for specific contexts of use to confidently assure appropriate use and interpretation of results.

Abstract #

- | | | |
|-------|---------|--|
| #1205 | 1:00 PM | Applying Fit-For-Purpose Study Design to Build Confidence in NAM Use. |
| | 1:00 PM | Introduction. <i>A. Karmaus.</i> Syngenta Crop Protection LLC, Greensboro, NC. |
| #1206 | 1:05 PM | Incorporation of <i>In Vitro</i> New Approach Methodologies and Co-culture Models in Agrochemical Discovery and Regulatory Applications. <i>J. LaRocca.</i> Corteva Agriscience, Zionsville, IN. |
| #1207 | 1:30 PM | New Approach Methods for Evaluation of Developmental Neurotoxicity: Fit-for-Purpose Analysis Approaches in a Multidimensional Data Landscape. <i>K. Carstens.</i> US EPA, Research Triangle Park, NC. |
| #1208 | 1:55 PM | Mechanistic Systems Pharmacodynamic Modeling to Support Decision-Making. <i>J. Leedale.</i> Syngenta Crop Protection Research, Bracknell, United Kingdom. Sponsor: <i>A. Karmaus</i> |
| | 2:20 PM | Panel Discussion/Q&A. <i>S. McCullough.</i> RTI International, Durham, NC. |

Tuesday, March 18, 1:00 PM to 2:30 PM, Room W202A, Convention Center

W Workshop Session: Exposure Assessment Strategies for Susceptible and Vulnerable Communities

Chair(s): Eva Vitucci, Texas A&M University; and Samantha Snow, ICF International Inc.

Primary Endorser: Exposure Specialty Section

Other Endorser(s): Inhalation and Respiratory Specialty Section; Mixtures Specialty Section

Human exposure to the myriad chemicals in indoor and outdoor environments can pose significant risks to human health. This chemical exposure burden is not evenly distributed among people, with children and low-income communities facing elevated exposure burdens. Consequently, these vulnerable groups are subject to more adverse health effects than those with lesser exposure burdens. To improve our understanding of the relationship between elevated chemical exposures and adverse health effects in these susceptible and vulnerable populations, and to help inform equitable remediation strategies, accurate characterization of the exposure burdens within vulnerable populations are needed. In this session, we highlight the disproportionately higher exposure levels in specific vulnerable groups and highlight current strategies to characterize this elevated burden on a more localized and individual scale. The first presentation will discuss the novel application of mobile air monitoring coupled with nontargeted analysis to identify the local volatile organic compound (VOC) emission burden in environmental justice communities and in communities following environmental disasters. This presentation will also discuss how these data can be combined with available US EPA tools to generate a hazard assessment for community residents. The second presentation will discuss unique strategies to investigate individual exposure to criteria air pollutants and VOCs, link this exposure to specific cardiovascular disease risk endpoints in residents of low-income communities, and discuss how increasing residential greenness could be a mitigation strategy to lessen exposure burdens. The third presentation will discuss how silicone wristbands can act as passive samplers to help investigate the relationship between increased chemical exposure burden in perinatal women and children and economic stress. This presentation will also touch on new strategies to identify sources of differential chemical exposure between groups and discuss ongoing efforts to link chemical exposures to neurodevelopmental outcomes. The final presentation will discuss nontraditional community science strategies to support chemical exposure assessment in disadvantaged communities. This presentation will also present strategies on how to lead all-inclusive discussions on solutions to lessen exposure burdens and improve health outcomes in disadvantaged communities. Overall, this session highlights how exposure assessment strategies can investigate the disproportionate chemical exposure burden faced by susceptible and vulnerable populations. In addition, it highlights how these exposure assessments can be linked to biological outcomes, improve our understanding of exposure consequences, and encourage important discussion on equitable mitigation strategies to improve human health amongst vulnerable groups.

Abstract #

- #1209 1:00 PM **Exposure Assessment Strategies for Susceptible and Vulnerable Communities.**
1:00 PM **Introduction.** *E. Vitucci.* Texas A&M University, College Station, TX.
- #1210 1:05 PM **Application of Mobile Air Monitoring Using High-Resolution Mass Spectrometry and Nontargeted Analysis to Characterize Volatile Organic Compounds Mixtures in Vulnerable Communities.** *N. Johnson.* Texas A&M University, College Station, TX.
- #1211 1:20 PM **Local Association of Pollutant Exposures with Cardiovascular Toxicity in a Low-Income and Underserved Neighborhood.** *A. Bhatnagar.* University of Louisville, Louisville, KY.
Sponsor: *E. Vitucci*
- #1212 1:35 PM **Exposure Assessment via Silicone Wristbands: Overview and Practical Applications in a Perinatal Cohort of Women and Children.** *E. Hickman.* University of North Carolina at Chapel Hill, Chapel Hill, NC.
- #1213 1:50 PM **Leveraging Nontraditional Community Science to Support Exposure and Risk Assessment for CalEPA's Environmental Justice Efforts..** *V. Galaviz.* California Environmental Protection Agency, Sacramento, CA. Sponsor: *E. Vitucci*
- 2:05 PM **Panel Discussion/Q&A.** *S. Snow.* ICF International Inc., Durham, NC.

Tuesday, March 18, 1:20 PM to 1:40 PM, W Hall A2, Convention Center

Tiny Tox Talk: Enhancing Laboratory Animal Welfare: Career Paths and Personal Branding

Speaker(s): Meaghan Loy, Scientist.com, Solana Beach, CA.

Tuesday, March 18, 1:45 PM to 4:15 PM, W Hall A2, Convention Center

PS Poster Sessions

The presenting authors are available to discuss their research for Poster Sessions. Posters will be displayed from 9:00 am to 4:30 pm, with the author in attendance during the assigned Poster Session. See the *Program: Platform and Poster Session Supplement* PDF, the [SOT Online Planner](#) and [SOT Event App](#) for details.

Tuesday, March 18, 1:45 PM to 3:00 PM, Room W311E, Convention Center

(Complimentary Add-On Event; Students and Postdoctoral Scholars Only)

Career Exploration through Speed Informational Interviews

Hosted by: Postdoctoral Assembly (PDA)

Are you interested in learning more about toxicology careers in academia, government, and industry? This complimentary ticketed event is designed for graduate students and postdocs who want to gain insight into different career sectors in toxicology. Trainees will rotate through a series of short, informal conversations to learn about various career pathways.

Tuesday, March 18, 1:45 PM to 2:45 PM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Tuesday, March 18, 2:00 PM to 2:20 PM, W Hall A2, Convention Center

Tiny Tox Talk: A Consultant’s Struggle to Keep Track of Important Documents

Speaker(s): Anne Chappelle, SafeBridge Consultants Inc., Chadds Ford, PA.

Tuesday, March 18, 2:40 PM to 3:00 PM, W Hall A2, Convention Center

Tiny Tox Talk: Leaping into Personal Branding and the Art of Communication

Speaker(s): Colleen McLoughlin, Enhesa, Arlington, VA.

Tuesday, March 18, 3:00 PM to 4:15 PM, W Hall A2, Convention Center

FS Smoothie Schmooze

Enjoy an extended break featuring smoothies and schmoozing in the ToxExpo Exhibit Hall with exhibitors and poster presenters, courtesy of the ToxExpo exhibitors. With no Scientific Sessions on the schedule, it is the perfect time to connect with the ToxExpo exhibitors and engage with poster presenters.

Tuesday, March 18, 3:20 PM to 3:40 PM, W Hall A2, Convention Center

Tiny Tox Talk: Meet the Director: NIEHS

Speaker(s): Rick Woychik, NIEHS, Chapel Hill, NC.

Tuesday, March 18, 4:30 PM to 6:00 PM, Room W304E, Convention Center

FS American Academy of Clinical Toxicology Symposium: Natural Doesn't Mean Safe: When Dietary Supplements Become Deadly

Panelists: Jeanna M. Marraffa, SUNY Upstate Medical University, Syracuse, NY; and Justin N. Corcoran, Medical College of Wisconsin, Milwaukee, WI.



As part of the SOT Strategic Plan to maximize the Society's prominence within the scientific community and foster new relationships with other societies, SOT is continuing its collaboration with the American Academy of Clinical Toxicology (AACT). In addition, SOT will select two speakers from the 2025 SOT Annual Meeting and ToxExpo to present their work at the AACT Annual Meeting. Please join us in welcoming AACT speakers to Orlando.

Tuesday, March 18, 4:30 PM to 6:00 PM, Room W202A, Convention Center

FS SOT/EUROTOX Roundtable: Dazed and Confused: Cannabis, Magic Mushrooms, and Special K—EU Versus US on Recreational Drugs

Chair(s): James P. Luyendyk, Michigan State University; and Martin F. Wilks, University of Basel, Switzerland.

Panelists: Max Leung, Arizona State University, Glendale, AZ; David Wood, St. Thomas' Hospital, London, United Kingdom; William Slikker, Retired, Little Rock, AR; and Félix Carvalho, Universidade do Porto, Porto, Portugal.



Cannabis, psilocybin, and ketamine occupy a unique intersection between recreational use, pharmaceutical applications, and potential for abuse. Regulatory frameworks for these substances are often complex and inconsistent, particularly when comparing federal and state laws in the US. This regulatory uncertainty can deter responsible manufacturers while encouraging less scrupulous producers and distributors to flood the market with products of inconsistent quality. Generating reliable safety data presents unique challenges for each category of recreational drug.

In the US, cannabis research is particularly hindered by its classification as a Schedule I substance, limited legal sources for research, and funding constraints. In Europe, the regulatory landscape varies significantly between countries, with a patchwork of national policies influencing the approval, use, and monitoring of these substances. While some European countries have embraced medical applications, others maintain restrictive policies, complicating both cross-border research and unified policy approaches.

The disparities between US and EU regulations highlight the need for harmonization efforts to ensure consistent safety standards and facilitate collaborative research. This Roundtable will explore current challenges and opportunities in regulating recreational drugs, with a focus on the role of toxicologists in enriching the regulatory knowledge base. Additionally, the panelists will address potential pathways for transatlantic collaboration, aiming to align regulatory practices between the US and the EU and promote evidence-based policymaking in this evolving field.

Tuesday, March 18, 4:30 PM to 6:00 PM, Room W307A, Convention Center

S Symposium Session: Time After Time: Evaluating Chronic Toxicity Using NAMs to Inform Longer-Term Chemical Hazard on a Quick Timeline

Chair(s): Brian Chorley, US EPA; and Julia Rager, University of North Carolina at Chapel Hill.

Primary Endorser: *In Vitro* and Alternative Methods Specialty Section

Other Endorser(s): Mechanisms Specialty Section; Molecular and Systems Biology Specialty Section

The evaluation of human health or toxicity hazard of chemicals is an overwhelming, multi-sector challenge, driven by the lack of available data on the thousands of chemicals present in the environment or newly synthesized compounds as part of commercial development. New approach methodologies (NAMs) offer alternative, higher-throughput, lower-cost and more human-relevant data compared to traditional *in vivo* models. Importantly, cell culture and alternative model-based NAMs can generate data that can indicate putative mechanism of action for hazardous chemical exposures. However, most assays have logistic or financial resourcing constraints that force researchers to focus on singular, usually short-term, time points of exposure that complicate interpretation of cellular response indicative of long-term toxicity. Therefore, temporal measures of adverse cellular state bioindicators are a methodological need to increase the profundity of NAMs-based evaluation of chemical hazard. In this session, we examine the developing methods, tools, and applications of experimental model NAMs that evaluate the chronology of cellular responses to better interpret the putative hazard of environmental or commercial chemical exposures. Presentations will focus on the utilization of extracellular vesicle contents measured in *in vitro* and *in vivo* models of different species to predict chronic effects of environmental contaminant exposures, novel hepatocyte culture systems predictive of sub-chronic effects in test model species in agrochemical testing paradigms, and longer-term cell culture and 3D microtissue cardiotoxicity testing systems to predict the cumulative chronic heart health hazards of pharmaceutical exposures. This session, therefore, highlights the novel development and applications of short-term NAMs to address multi-sector needs focused on predicting longer-term (e.g., subchronic, chronic) health effects *in vivo*. *This abstract does not necessarily reflect US EPA or FDA policy. Mention of trade names is not an endorsement or recommendation for use.*

Abstract #

- #1214 4:30 PM **Time After Time: Evaluating Chronic Toxicity Using NAMs to Inform Longer-Term Chemical Hazard on a Quick Timeline.**
- 4:30 PM **Introduction.** B. Chorley. US EPA, Research Triangle Park, NC.
- #1215 4:35 PM **Extracellular Vesicles as Novel Informants of Chronic Toxicity for NAMs Assessments.**
- J. Rager. University of North Carolina at Chapel Hill, Chapel Hill, NC.
- #1216 5:00 PM **Utilization of the *In Vitro* HepatoPac System in Toxicology Testing of Rat and Dog Hepatocytes.** P. Deford. Corteva Agriscience, Indianapolis, IN.
- #1217 5:25 PM **Chronic Cardiotoxicity Assessments Based on Prolonged Drug Exposures of Human iPSC-Cardiomyocytes and Human Heart Slices.** K. Blinova. US FDA, Silver Spring, MD. Sponsor: B. Chorley
- 5:50 PM **Panel Discussion/Q&A.** J. Rager. University of North Carolina at Chapel Hill, Chapel Hill, NC.

Tuesday, March 18, 4:30 PM to 6:00 PM, Room W205A, Convention Center

W Workshop Session: Advancements in Microphysiological Systems for Toxicity Assessment: Bridging the Gap Between *In Vitro* and *In Vivo* Models

Chair(s): Lauren Aleksunes, Rutgers, The State University of New Jersey; and Pouria Fattahi, University of Pennsylvania.

Primary Endorser: *In Vitro* and Alternative Methods Specialty Section

Other Endorser(s): Drug Discovery Toxicology Specialty Section

In today's world, we face a constantly changing array of toxic substances, from pollutants in our environment to chemicals used across industries. This ever-increasing number of chemicals for safety assessment demands thorough methods for predicting human toxicity in translational models. Microphysiological systems (MPS) have emerged as a leading solution in research. They provide a way to mimic physiological conditions and study how various substances affect biological pathways. By bridging the gap between lab tests and real-life conditions, MPS not only help us understand environmental risks better but also aid in screening drugs more efficiently. This comprehensive approach to toxicity assessment addresses both environmental and biomedical concerns. These innovative platforms offer a bridge between traditional *in vitro* models and complex *in vivo* systems. By harnessing the power of MPS, researchers can unravel the mechanisms underlying toxicological phenomena, predict the effects of exposure with greater accuracy, and devise targeted interventions to safeguard public health and environmental sustainability. This session aims to explore the latest advancements in MPS and their application in toxicity assessment across various domains. From evaluating the impact of environmental toxicants on the human placenta during pregnancy to assessing the preclinical safety of pharmaceutical compounds, these systems offer unique insights into the dynamic interactions between biological systems and toxic agents. This session will focus on recent advancements in MPS for contemporary toxicity assessment using case examples. Presentations will provide cross-disciplinary perspectives across multiple fields, including bioengineering, biochemical toxicology, environmental health sciences, and target organ responses to xenobiotics, including particularly sensitive tissues such as the human placenta and bone marrow. The session will commence with a brief introduction of existing challenges in the field. The first presentation will discuss the OrganoPlate, with 64 chip units, enabling high-throughput toxicity testing of vasculature, neurons, and liver models, improving data interpretation and translatability. The second talk will focus on introducing a high-throughput platform with robotic automation for analyzing thousands of 3D human tissue models, exemplified by a vascularized bone marrow model. It enables comprehensive screening of US Food and Drug Administration-approved chemotherapeutic compounds, offering insights into their effects on hematopoietic tissue and vasculature, with potential applications in preclinical drug testing. The third presentation will focus on the development of novel human vascularized placenta-on-a-chip platforms. The model demonstrates efficacy in studying the adverse effects of heavy metals like cadmium on fetoplacental health, highlighting the role of immune cells and transport proteins. Through various analytical techniques, including immunofluorescence and 'omics, the model offers valuable insights into placental function dynamics and fetal health monitoring. The session will conclude with more in-depth discussions among speakers and attendees, facilitating an exploration of the research presented and identification of knowledge gaps that require attention. This collaborative effort will be invaluable for researchers in the fields of environmental toxicology, pharmacology, and high-throughput screening, shedding light on current findings and prioritizing crucial next steps. As the field increasingly relies on MPS for precise assessment of toxicants, including automation and high-throughput screening, these discussions will aid in the development of intervention and mitigation strategies vital for safeguarding human health and environmental stability.

Abstract #

- | | | |
|-------|---------|--|
| #1218 | 4:30 PM | Advancements in Microphysiological Systems for Toxicity Assessment: Bridging the Gap Between <i>In Vitro</i> and <i>In Vivo</i> Models. |
| | 4:30 PM | Introduction. L. Aleksunes. Rutgers, The State University of New Jersey, Piscataway, NJ. |
| #1219 | 4:35 PM | High-Throughput Microphysiological Systems for Scalable Toxicity Testing. K. Bircsak. MIMETAS, Gaithersburg, MD. |

- #1220 5:00 PM **Leveraging High-Throughput Automation, Artificial Intelligence, and Microphysiological Systems for Advanced Nonclinical Safety Evaluation.** A. Bahinski. Vivodyne, Philadelphia, PA.
- #1221 5:25 PM **A Microengineered Biomimetic Model of the Placental Barrier to Study Environmental Exposures During Pregnancy.** P. Fattahi. University of Pennsylvania, Philadelphia, PA. Sponsor: L. Aleksunes
- 5:50 PM **Panel Discussion/Q&A.** L. Aleksunes. Rutgers, The State University of New Jersey, Piscataway, NJ.

Tuesday, March 18, 4:30 PM to 5:50 PM, Room W206A, Convention Center

R Roundtable Session: Is It Time to Right-Size Systematic Review?

Chair(s): Heather Lynch, Integral Consulting Inc.; and Anna Lowit, US EPA.

Primary Endorser: Risk Assessment Specialty Section

Other Endorser(s): Occupational and Public Health Specialty Section; Regulatory and Safety Evaluation Specialty Section

Systematic review has become a common approach in chemical risk assessment in the United States including at the US Environmental Protection Agency (US EPA), the US National Toxicology Program, the US Food and Drug Administration, the US Agency for Toxic Substances and Disease Registry, and other agencies. Systematic review methods can support transparency through articulated research questions, documented literature search and selection processes, and standardized data evaluation and extraction methods. Although AI and computational tools are rapidly improving, systematic reviews continue to require substantial resources and time, which is often not compatible with available staffing or statutory deadlines. Moreover, best practices for systematic review in chemical risk assessment remain an area of scientific debate. For example, there is a lack of consensus regarding whether systematic review methods only apply to initial stages of the review (literature search and extraction) or whether the standardized methods should carry through to evidence integration and toxicity value derivation. There remain significant challenges with consistently evaluating data across studies, chemicals, and chemical reviewers. Additional challenges exist for certain study designs (e.g., some human studies) and study types without standard protocols such as *in vivo*, *in vitro* mechanistic and pharmacokinetic studies, and occupational exposure studies. Some in the chemical risk assessment field recently proposed implementing systematic review approaches for risk evaluations without the full systematic review process, although the exact methods for such an application have yet to be described. For example, in the amended risk evaluation rule "Procedures for Chemical Risk Evaluation under the Toxic Substances Control Act" by the US EPA Office of Pollution Prevention and Toxics, the US EPA proposes to "streamline chemical-specific protocols and approaches while remaining consistent with systematic review principles" using "systematic approaches [that] will be transparent, fit-for-purpose, and specific to the needs of each chemical/category." The goals of this Roundtable Session will be to (1) provide a comprehensive overview of prevailing approaches to systematic review from experts from US and international agencies and (2) engage the audience and identify a path(s) forward to developing a workable and sustainable systematic review approach that maintains systematic review tenants and meets the specific needs of agencies and organizations. Additionally, owing to the need to evaluate methodological robustness of the available evidence efficiently and objectively, this session will touch specifically upon evolving approaches to evaluating data quality and integrity for regulatory assessments.

Abstract #

- #1222 4:30 PM **Is It Time to Right-Size Systematic Review?**
- 4:30 PM **Introduction.** H. Lynch. Integral Consulting Inc., Boston, MA.
- 4:40 PM **Application of Systematic Review Approaches to Chemical Hazard and Risk Assessment: Key Principles and Lessons Learned.** S. Hartigan. American Chemistry Council, Washington, DC. Sponsor: H. Lynch
- 4:50 PM **Are Systematic Review Methods a Barrier to Public Health Decision-Making?** A. Rooney. NIEHS/DTT, Research Triangle Park, NC.

- 5:00 PM **Moving Toward Fit-for-Purpose Systematic Review Approaches.** M. Perron. US EPA, Washington, DC. Sponsor: *H. Lynch*
- 5:10 PM **Improving the Utility and Uptake of Research Data in Regulatory Assessments.** C. Wittwehr. European Commission Joint Research Centre, Ispra, Italy. Sponsor: *H. Lynch*
- 5:20 PM **Panel Discussion/Q&A.** A. Lowit. US EPA, Washington, DC.

Tuesday, March 18, 4:30 PM to 5:30 PM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Tuesday, March 18, 7:30 PM to 9:00 PM, Windermere Ballroom Y, Hyatt Regency

Tox ShowDown

Captain: Cynthia Rider, NIEHS/DTT.

This is the lucky thirteenth year of the Tox ShowDown, the toxicological quiz game par excellence. Three teams of three contestants each—the Endocrine Disruptors, the Free Radicals, and the Toxic Metabolites—battle each other to answer questions wholly, partially, or remotely related to toxicology. Topics cover the gamut, including the role of toxicology in history, current events, arts, culture, and society, not to mention science. The event features a cash bar and is a great opportunity to see how many questions you can answer correctly, while enjoying a good laugh.

ToxSci

Submit High-Quality, Original Research

Publishing a broad spectrum of impactful research with rapid online publication and no page or submission fees

academic.oup.com/toxsci



Wednesday, March 19, Various Times and Locations

Poster Tours for Trainees

(Students and Postdoctoral Scholars Only. Advance sign-up is required)

Hosted by: Postdoctoral Assembly

Graduate students and postdoctoral scientists participate in one-hour guided poster tours with an expert guide. These small group tours provide the opportunity for trainees to take part in critical evaluation of cutting-edge toxicology methods and research findings and network with a senior toxicologist.

SOT Committee and Component Group Leadership Activities

SOT Committees, including Regional Chapter, Special Interest Group, and Specialty Section leadership, often hold business meetings and discussions as breakfast or lunch events. These meetings are limited to Committee members and Component Group officers. More specific information about these meetings, including the time, date, and location, is available in the [SOT Online Planner](#) and [SOT Event App](#).

SOT Regional Chapter, Special Interest Group, and Specialty Section Events

Many Regional Chapters, Special Interest Groups, and Specialty Sections host breakfasts, luncheons, or receptions and/or facilitate mentoring events during the meeting. These activities act as social events, award ceremonies, and career development sessions all in one. These events are a great way to connect with colleagues and other members of your Component Group. The days, times, and locations of the SOT Component Group activities are available in the "[Program Overview](#)" section of this publication, as well as in the [SOT Online Planner](#) and [SOT Event App](#).

Wednesday, March 19, 7:00 AM to 4:00 PM, Room W109B, Convention Center

Mentorship Lounge

Hosted by: Career Advancement, Mentoring, and Networking Committee

Locating a quiet and available space for mentors and mentees to meet can be a challenge for attendees. This space is intended to provide a meeting destination for attendees to foster new or continuing mentor relationships.

Wednesday, March 19, 8:00 AM to 10:45 AM, Room W304E, Convention Center



Society of Toxicology and Japanese Society of Toxicology Symposium: Emerging Frontiers in PFAS Research

Chair(s): Cynthia V. Rider, NIEHS/DTT; and Ryuichi Ono, National Institute of Health Science, Japan.

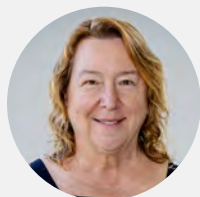
Per- and polyfluorinated alkyl substances (PFAS) are ubiquitous contaminants that are frequently detected as mixtures in human and environmental biomonitoring efforts around the world. Toxicological research on PFAS has revealed that the PFAS class targets multiple systems (e.g., liver, immune, brain) through complex mechanisms of action. While chemical analysis has identified thousands of PFAS, the number of class members that pose significant exposure and toxicity concerns may be more tractable. Individual PFAS display highly variable potencies and toxicokinetic properties. High content data on a diversity of PFAS structures are required to uncover patterns of activity and build predictive read-across models of toxicity. Speakers in this session will discuss ongoing efforts to characterize the hazard associated with exposure to PFAS across a range of model systems.



Speaker(s):

PFOA Transcriptome Analysis and Introduction to the PFAS Percellome Project.

Jun Kanno, National Institute of Health Sciences, Kawasaki, Japan.



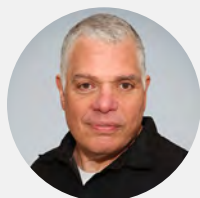
PFAS and Metabolic Disease: How Genotypes Can Inform Phenotypes.

Suzanne E. Fenton, North Carolina State University, Raleigh, NC.



Morphological, Physiological, and Transcriptomic Changes in Developing Zebrafish Exposed to Diverse PFAS.

Akira Kubota, Obihiro University of Agriculture and Veterinary Medicine, Obihiro, Japan.



The Development and Use of the US EPA Transcriptomic Assessment Product for PFAS.

Michael J. DeVito, US EPA, Research Triangle Park, NC.

Wednesday, March 19, 8:00 AM to 10:45 AM, Room W205A, Convention Center

S Symposium Session: Exploring the Toxicological Impact of Micro- and Nanoplastics: Early-Stage Scientists' Perspective

Chair(s): Milica Pavlovic, University of Iowa; and Sumira Phatak, University of New Mexico.

Primary Endorser: Women in Toxicology Special Interest Group

Other Endorser(s): Nanoscience and Advanced Materials Specialty Section; Postdoctoral Assembly

In 2019, the World Health Organization's Director of Public Health, Dr. Maria Neira, stated that "we urgently need to know more about the health impact of microplastics because they are everywhere, including in our drinking water." Bottled water was recently revealed to contain up to 100 times more plastic particles than previously thought, causing widespread concern. Field studies around the globe also confirmed the presence of plastic particles in both indoor and outdoor air, suggesting that this emerging and persistent pollutant is ubiquitously present in our environment. However, the exact health effects of such exposures remain elusive to the scientific community and regulators who have accepted the challenge of tackling the global plastic pollution predicament. In this session, the organizers bring together a diverse and dynamic group of women toxicologists who are pioneering research in the critical field of micro- and nanoplastics. They are at the forefront of understanding the intricate interactions between these pervasive pollutants and biological systems, shedding light on their potential impacts on human health and the environment. The main objective of this session is to engage attendees with talks presented by a diverse speaker panel of early stage career scientists presenting their work in micro- and nano-sized plastics to the wider toxicology community. Secondly, this session intends to showcase various new approach methodologies, employing *in vitro* models and *in silico* tools. Cutting-edge research presented by future toxicology leaders delves into various aspects of plastic particles, contributing to a comprehensive understanding of complex issues surrounding this topic. The cytotoxicity and genotoxicity of the plastic particles released from cutlery on various cell lines will be described. Next, gastrointestinal and metabolic endpoints from mice fed different diets supplemented with polystyrene microspheres to mimic human plastic intake will be reported. A focus on neurotoxic effects, including translocation through the blood-brain barrier of different plastic polymers, will be discussed. Assessment of the inflammatory and cytotoxic potential of several plastic polymers using the *in vitro* air-liquid interface system is going to be presented. Finally, development of the aerosol generation system for assessing *in vivo* inhalation toxicity and *in silico* deposition modeling will be shared. Through their innovative methodologies and rigorous scientific inquiry, the session's presenters are uncovering invaluable insights into the toxicity pathways, bioaccumulation dynamics, and ecological ramifications of these microscopic menaces. Collectively, these presentations showcase the multifaceted nature of plastics research encompassing pristine and non-pristine, secondary generated microplastic effects on genotoxicity, metabolism, neurotoxicity, and pulmonary toxicity. This session aims to foster discussions among early career trainees, encouraging collaboration and further exploration into the complex world of plastics during a concluding Q&A panel discussion.

Abstract #

- #1223 8:00 AM **Exploring the Toxicological Impact of Micro- and Nanoplastics: Early-Stage Scientists' Perspective.**
- #1224 8:00 AM **The Tale of the Plastics: An Emerging and Persistent Environmental Contaminant.**
M. Pavlovic. University of Iowa, Iowa City, IA.
- #1225 8:15 AM **Comparative Toxicity of Different Micro- and Nanoplastics Obtained from Human Consumer Products on Human Cell-Based Models.** A. Janiga-MacNelly. Baylor University, Waco, TX. Sponsor: *M. Pavlovic*
- #1226 8:40 AM **Assessing Toxicity of Amorphous Nanoplastics on Bronchial Epithelial Cells Using Air-Liquid Interface Models.** I. Gosselink. Maastricht University, Maastricht, Netherlands.
Sponsor: *M. Pavlovic*
- #1227 9:05 AM **Characterization of Aerosolized Micro-/Nanoplastic Aerodynamic Diameter and Multiple-Path Particle Dosimetry Modeling to Determine Inhalation Dispersion in Sprague-Dawley Rat Model.** G. Moreno. Rutgers, The State University of New Jersey, Piscataway, NJ.

- #1228 9:30 AM **Assessing Neurotoxicity of Micro- and Nanoplastics: Translocation over the Blood-Brain Barrier and *In Vitro* Neurotoxic Effects.** *E. Kasteel.* Universiteit Utrecht, Utrecht, Netherlands.
- #1229 9:55 AM **Assessing Dietary Impact on Microplastic Absorption, Health Outcomes, and Beyond.** *S. Phatak.* University of New Mexico, Albuquerque, NM.
- 10:20 AM **Panel Discussion/Q&A.** *S. Phatak.* University of New Mexico, Albuquerque, NM.

Wednesday, March 19, 8:00 AM to 10:45 AM, Room W204A, Convention Center

S Symposium Session: Launching Space Toxicology as a New Frontier Research Discipline: Academic, Industrial, and Intergovernmental Agency Perspectives

Chair(s): Mathieu Vinken, Vrije Universiteit Brussel, Belgium; and Deidre Dalmas Wilk, Center for the Advancement of Science in Space User Advisory Committee.

Primary Endorser: Clinical and Translational Toxicology Specialty Section

Other Endorser(s): Mechanisms Specialty Section; Molecular and Systems Biology Specialty Section

"Space: the final frontier ..." These epic words used in the prologue of the *Star Trek* television series and movies illustrate the eagerness of mankind to explore space. In 1961, Yuri Gagarin pioneered spaceflight during a mission that lasted 108 minutes. The building of space stations, including Salyut, Skylab, Mir, and the International Space Station, offered new opportunities for stays in space up to six months at a low Earth orbit. More than 600 astronauts have been sent into space to conduct exploration missions thus far. Despite intensive research, however, insight into the mechanisms underlying the adverse effects of the space environment on human physiology is still largely in its infancy. Nevertheless, this knowledge is urgently needed, especially in view of the ambition of space agencies to establish a human settlement on the Moon and to travel to Mars, as well as given the space tourism initiated by a number of private companies. Extended stays in deep space necessitate the establishment of countermeasures to protect astronauts, including those relying on the use of pharmaceutical drugs. While space pharmacology is an emerging discipline, space toxicology, focusing not only on side effects of pharmaceutical drugs in astronauts but in fact on any adverse outcome of the harsh space environment on human health, is as yet in an incipient stage. This session will launch space toxicology as an international, interdisciplinary, and intersectoral frontier research field in a series of state-of-the-art presentations. The session will end with an interactive discussion with the speakers and audience focusing on the potential utility and application of space-based toxicological research.

Abstract #

- #1230 8:00 AM **Launching Space Toxicology as a New Frontier Research Discipline: Academic, Industrial, and Intergovernmental Agency Perspectives.**
- 8:00 AM **Introduction.** *D. Dalmas Wilk.* Center for the Advancement of Science in Space User Advisory Committee, Collegeville, PA.
- #1231 8:15 AM **Twins and Telomeres in Space.** *S. Bailey.* Colorado State University, Fort Collins, CO. Sponsor: *M. Vinken*
- #1232 8:40 AM **Space Oddity: Abnormalities of Membrane Barriers in Space.** *S. Eyal.* Hebrew University of Jerusalem, Jerusalem, Israel. Sponsor: *M. Vinken*
- #1233 9:05 AM **Effects of Altered Microgravity and Cosmic Radiation on the Liver.** *M. Vinken.* Vrije Universiteit Brussel, Brussels, Belgium.
- #1234 9:30 AM **Mitochondrial Driver of Hepatic Lipotoxicity in Space.** *A. Beheshti.* University of Pittsburgh School of Medicine, Pittsburgh, PA. Sponsor: *M. Vinken*
- #1235 9:55 AM **NCATS Tissue Chips in Space Program.** *D. Tagle.* NIH/NCATS, Bethesda, MD. Sponsor: *M. Vinken*

Wednesday, March 19, 8:00 AM to 10:45 AM, Room W202A, Convention Center

S Symposium Session: Next-Generation *In Vitro* Neurotoxicology: Modeling Cognition-in-a-Dish

Chair(s): Lena Smirnova, Johns Hopkins University; and Timothy J. Shafer, US EPA.

Primary Endorser: Mechanisms Specialty Section

Other Endorser(s): *In Vitro* and Alternative Methods Specialty Section; Women in Toxicology Special Interest Group

Over the last 15 years, tremendous progress has been made toward the development of alternative, phenotypic screening approaches to identify compounds with potential neurotoxicity, especially developmental neurotoxicity (DNT) hazard. For DNT, a battery of screening assays, along with a guidance document, has been developed, and data from these assays are increasingly being used for screening and weight of evidence decisions. However, these successes should be viewed as the beginning of a journey, not the destination. The assays in the DNT *in vitro* battery provide information on the ability of compounds to disrupt basic neurodevelopmental processes (e.g., proliferation, synaptogenesis, network function) but are recognized not to completely cover all aspects of neurodevelopment. Learning, memory, and intelligence are higher-level functions in the nervous system and are often the most sensitive adverse impacts associated with developmental exposure to environmental chemicals. Ultimately, these processes are also among the most sensitive and impactful outcomes of neurodevelopmental and neurodegenerative diseases. The *in vivo* DNT guideline incorporates metrics for learning and memory, but these are often variable and difficult to interpret. *In vitro*, processes such as long-term potentiation (LTP) and long-term depression (LTD), as well as other measures, allow the ability to evaluate chemical effects on plasticity. However, these approaches are not high throughput and depend on animals. To date, there is no *in vitro* new approach methodologies (NAMs) assay that addresses higher-level function of the nervous system, especially in human neurons. However, this is beginning to change with the development of novel and powerful approaches that allow us to evaluate synaptic plasticity, molecular and cellular mechanisms of learning and memory, long-term potentiation, and as a result “cognition” or “intelligence” *in vitro*. Plasticity has been demonstrated in human neuronal cell networks and organoids grown on microelectrode array plates. Human neurons “embodied” in virtual worlds are capable of learning to play video games. Organoid intelligence—a fast-developing field of brain microphysiological systems—seeks to develop more advanced models of learning and memory. Thus, human-relevant alternatives of animal learning and memory studies become feasible with advances in the biomedical, bioengineering, and computational sciences. Developing *in vitro* approaches to studying plasticity, cognition, and intelligence will need to bring together neuroscientists, bioengineers, and artificial intelligence specialists to make this goal a reality. The field of potential applications is large—from basic science of molecular and cellular mechanisms of learning to drug development against Alzheimer’s disease and neurodevelopmental disorder and toxicity testing of environmental chemicals perturbing cognition. The *in vitro* (developmental) neurotoxicity field has not been addressed at SOT from the angle of cognition models *in vitro*. This session will offer an in-depth examination of the state-of-the-art approaches to NAMs for plasticity, cognition, and intelligence and will explore how they can be applied to current challenges in neurotoxicity.

Abstract #

- #1236 8:00 AM **Next-Generation *In Vitro* Neurotoxicology: Modeling Cognition-in-a-Dish.**
8:00 AM **Introduction.** *L. Smirnova.* Johns Hopkins University, Baltimore, MD.
- #1237 8:05 AM **Impacts of Chemicals on Plasticity in Human Neurons Grown on Microelectrode Arrays.**
A. Bang. Sanford Burnham, La Jolla, CA. Sponsor: *L. Smirnova*
- #1238 8:35 AM **Not Just Gaming: How Neurons Embodied in a Game World Can Provide Previously Unattainable Insights into the Impact of Drugs and Disease on Neural Function.** *B. Kagan.*
Corticals Labs, Melbourne, Australia. Sponsor: *L. Smirnova*

- #1239 9:05 AM **Using Electrophysiological Responses in Brain Organoids to Evaluate the Impact of PFAS Exposure on Human Neurodevelopment.** A. Moutri. UC San Diego School of Medicine, San Diego, CA. Sponsor: *L. Smirnova*
- #1240 9:35 AM **Advanced Electrophysiology and AI Supporting Brain Microphysiological System Functionality and Understanding of DNT.** *L. Smirnova*. Johns Hopkins University, Baltimore, MD.
- #1241 10:05 AM **Designing Intelligent Brain Systems through Sociotechnical Lens.** K. Rommelfanger. Institute of Neuroethics Think and Do Tank, Atlanta, GA. Sponsor: *L. Smirnova*
- 10:35 AM **Panel Discussion/Q&A.** *T. Shafer*. US EPA, Research Triangle Park, NC.

Wednesday, March 19, 8:00 AM to 10:45 AM, Room W203A, Convention Center

Symposium Session: Progress of *In Silico* Methodologies for Chemical Safety Assessment

Chair(s): Chandrika Moudgal, Genentech Inc.; and Alejandra Trejo-Martin, Gilead Sciences Inc.

Other Endorser(s): Computational Toxicology Specialty Section; Risk Assessment Specialty Section

In silico methodologies vary in their approaches, and over the past decade, work has been done to derive general principles governing their use. It has now been over 10 years since the Organisation for Economic Co-operation and Development (OECD) published guidance on validating quantitative structure-activity relationship (QSAR) models assessing the reliability of (QSAR) predictions and handling out of domain results. This session will present an introductory overview of *in silico* approaches in various applications, including within industry, academia, nonprofit organizations, and contract research organizations, along with a deeper dive into the progress of *in silico* approaches for predicting various endpoints that demonstrates how limitations could be addressed. The first presentation offers a historical perspective while also displaying recent work at US FDA/CDER. It outlines how QSAR modeling evolved at CDER from an early investigational tool into a routinely used approach for decision-making under regulatory guidance. Additionally, it provides an overview of current use cases for drug impurities and extractable/leachable compounds. The second speaker will discuss the evolution of the skin-sensitization model (CADRE platform) developed using electronic-structure descriptors based on the recognized key events in the endpoint's adverse outcome pathway (AOP) to develop a respiratory sensitization model by mimicking key attributes of the dermal sensitization model. Given that *in silico* models are often developed and trained utilizing data for publicly available chemicals, there have been concerns regarding their performance on nonpublic compounds, such as pharmaceuticals. The third presentation provides an overview of how *in silico* models can be improved. This talk describes the assessment and initiatives toward the development of fit-for-purpose skin sensitization *in silico* models for the prediction of potency categories for pharmaceuticals and their related compounds. The fourth speaker will discuss expanding the predictivity and performance of QSAR models for acute oral toxicity using predictions from commercial and open-source models and presenting a consensus approach. Additionally, the talk will showcase how a deeper dive into models demonstrated that utilizing a consensus of models from both commercial and public domains allows for broader coverage of chemical space. Finally, the integration of *in silico* methods with *in vitro* data to derive fit-for-purpose new approach methodologies will be discussed by the fifth speaker. The approach is demonstrated in the context of the evaluation of respiratory tract effects in the absence of *in vivo* test data where an assessment of uncertainty is presented and used in the derivation of an occupational exposure limit. Overall, the goal of this Symposium Session is to highlight the ongoing progress in the development and evaluation of *in silico* approaches and to showcase their application to assess several critical endpoints that frequently lack experimental data.

Abstract #

- #1242 8:00 AM **Progress of *In Silico* Methodologies for Chemical Safety Assessment.**
8:00 AM **Introduction.** *C. Moudgal*. Genentech Inc., South San Francisco, CA.
- #1243 8:05 AM **The Evolution of QSAR Modeling for Pharmaceutical Regulatory Safety Assessment.**
N. Kruhlak. US FDA, Silver Spring, MD.

- #1244 8:35 AM **Computer-Aided Discovery and Redesign: An Evolution of a Dermal-Sensitization Model to Accurately Capture Initiating Events in the Respiratory-Sensitization Pathway.** J. Kostal. ToxFix, Alexandria, VA. Sponsor: *C. Moudgal*
- #1245 9:05 AM **Extraction of Knowledge from Proprietary Datasets for the Advancement of QSAR Models.** C. Johnson. Instem, Conshohocken, PA. Sponsor: *C. Moudgal*
- #1246 9:35 AM **Strengthening the Application of *In Silico* Models to Predict Acute Oral Toxicity of Pharmaceutically Relevant Compounds.** V. Siramshetty. Genentech Inc., South San Francisco, CA. Sponsor: *C. Moudgal*
- #1247 10:05 AM **Applications of *In Silico* Bioavailability Estimation and Hazard Tools for Inhalation Route Limiting Setting: Current Approaches and Ongoing Challenges.** A. Maier. Occupational Alliance for Risk Science, Cincinnati, OH.
- 10:35 AM **Panel Discussion/Q&A.** A. Trejo-Martin. Gilead Sciences Inc., South San Francisco, CA. Sponsor: *C. Moudgal*

Wednesday, March 19, 8:00 AM to 10:45 AM, Room W308A, Convention Center

W Workshop Session: Active Ingredient Degradation: Process and Challenges in Identification, Toxicological Limit Determination, and Regulatory Submission

Chair(s): Demetria Fischesser, Procter & Gamble; and Scott Furness, US FDA.

Primary Endorser: Regulatory and Safety Evaluation Specialty Section

Degradation of drug active ingredients is a key consideration in assessing the safety of over-the-counter (OTC) medicines. While some OTC drugs have well-recognized and established degradants and corresponding analytical detection methods in public standards, there are many that do not. To improve upon this, test method monograph modernization led by US Pharmacopeia (USP) in partnership with industry was initiated in 2010, which included updates to listed degradants as well as updated analytical methods for several common personal healthcare drug actives. The three aspects of drug degradant determination that need to be considered are analytical method development, toxicological safety profile determination, and regulatory processes. Creating analytical methods for OTCs in a public standard, such as a USP monograph, can be complicated since active ingredients in consumer products exist within formulas in a range of product forms and dose levels and alongside a range of excipients and sometimes other actives. Identification of common degradants for such product was the first step in the process. Determining the toxicological safety profile of degradants in legacy OTCs can also present a unique challenge, as many of them are marketed under the US Food and Drug Administration (US FDA) OTC monograph system, and registrations are not required. Therefore, many degradants have not been tested extensively to new drug standards. To this end, it becomes incumbent to resort to alternate methodologies, including read-across and other new approach methodologies (NAMs), to evaluate general safety of degradants as well as to use weight of evidence approaches to establish limits for exposure to those degradants. Finally, the regulatory aspects of degradant determination must be considered. ICH Q3B (R2) outlines the guidance for industry submission of impurities in new drug products from new drug substances within a new drug application. It is also applied to abbreviated new drug applications. Such registrations specify which degradants are present and their qualification limits. The qualification process involves demonstration of suitability of analytical procedures consistent with safety considerations and current applicable regulatory guidelines. In addition, rationales for inclusion or exclusion of impurities must be documented. Many OTCs do not undergo this registration process due to their status as generally recognized as safe and effective under the US FDA monograph system. This session will highlight all three components of degradant discovery and notification by including speakers who will discuss methodology challenges, use of NAMs to establish safe limits, and perspectives on how these approaches fit within the regulatory framework of ICH Q3B.

Abstract

- #1248 8:00 AM **Active Ingredient Degradation: Process and Challenges in Identification, Toxicological Limit Determination, and Regulatory Submission.**
8:00 AM **Introduction.** *D. Fischesser.* Procter & Gamble Company, Mason, OH.
- #1249 8:05 AM **Modernizing the Over-the-Counter Monograph Construct: Tracing the Evolution of Quality Regulatory Modernization.** *S. Furness.* US FDA, Bethesda, MD. Sponsor: *D. Fischesser*
- #1250 8:20 AM **Understanding the USP Compendial Process: Monograph Development for Prescription and Over-the-Counter Drug Products.** *A. Carney, and D. Vicchio.* US Pharmacopeia, North Bethesda, MD. Sponsor: *D. Fischesser*
- #1251 9:00 AM **Analytical Chemistry and Method Development Challenges for Common Over-the-Counter Degradation Products.** *K. Whitaker.* Procter & Gamble, Mason, OH. Sponsor: *D. Fischesser*
- #1252 9:40 AM **Strategies to Evaluate Over-the-Counter Drug Degradants.** *A. Mihalchik.* ToxStrategies LLC, Research Triangle Park, NC.
- 10:20 AM **Panel Discussion/Q&A.** *D. Fischesser.* Procter & Gamble Company, Mason, OH.

Wednesday, March 19, 8:00 AM to 10:45 AM, Room W206A, Convention Center



Workshop Session: Global Implications of the Changing EU Expectations on Dose-Level Setting in Reproductive and Developmental Studies

Chair(s): Katy Goyak, Celanese Corporation; and Emily Richmond, Exponent, United Kingdom.

Primary Endorser: Reproductive and Developmental Toxicology Specialty Section

Other Endorser(s): Regulatory and Safety Evaluation Specialty Section; Risk Assessment Specialty Section

Since 2022, reproductive toxicity studies that are done for the purposes of regulatory submission in the European Union (EU) must consider the advice on dose-level selection provided by the European Chemicals Agency (ECHA). This advice states, “Where a test method offers flexibility in the study design, for example in relation to the choice of dose levels, the chosen study design shall ensure that the data generated are adequate for hazard identification and risk assessment. To this end, testing shall be performed at appropriately high dose levels. For the highest dose level, it should be demonstrated that the aim is that it is the highest possible dose level without severe suffering or death, or the limit dose concept shall be used.” Following this advice, sponsors of reproductive toxicity studies must now consider protocol considerations to ensure that the dose is sufficiently high to be considered acceptable by the regulatory authority in EU. The likelihood that ECHA may reject a study due to perceived underdosing was made clear in ECHA’s 2023 review of 55 Extended One-Generation Reproductive Toxicity Studies (EOGRTS), in which 20% of studies (11 of 55) were considered inconclusive due to insufficient dosing at the top dose. In order to increase confidence that the top dose will be sufficiently high, other study design principles, such as reduction in overall animal usage or permitting data interpretation in the context of risk assessment, may now be deprioritized. The need to balance dose-level selection and animal usage considerations places the dose selection advice at odds with other regulatory requirements, such as REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) Article 25 which states, “In order to avoid animal testing, testing on vertebrate animals for the purposes of this Regulation shall be undertaken only as a last resort.” This Workshop Session will provide insights into the ways in which this dose-level selection advice has been implemented in practice to highlight the intended and unintended global consequences of this shift in regional regulatory expectations. The first two speakers in this session will provide an overview of the EU’s dose-selection guidance, including an update from a recent EUROTOX session in which ECHA provided additional insight into the rationale and expectations for acceptable data to meet information requirements under REACH. The following two speakers will provide details on the impact on animal usage and welfare considerations. The discussion will conclude by highlighting perspectives from US regulatory authority on animal study design, emphasizing the use of a weight of evidence approach to inform decisions regarding dose setting.

Abstract

- #1253 8:00 AM **Global Implications of the Changing EU Expectations on Dose-Level Setting in Reproductive and Developmental Studies.**
8:00 AM **Introduction.** *K. Goyak.* Celanese Corporation, Irving, TX.
- #1254 8:05 AM **Update from the EUROTOX/ECHA Workshop on Expectations for Dose-Setting in Reproductive/Developmental Toxicity Studies.** *M. Beekhuijzen.* Charles River Laboratories, Den Bosch, Netherlands. Sponsor: *K. Goyak*
- #1255 8:30 AM **Global Consequences of Changing EU Regulatory Expectations for Dose-Setting on Existing Data Acceptability.** *E. Richmond.* Exponent, Harrogate, United Kingdom.
- #1256 8:55 AM **Considerations for Dose-Level Selection for Developmental and Reproductive Toxicity Studies: 3Rs and Scientific Perspectives.** *F. Sewell.* NC3Rs, London, United Kingdom.
- #1257 9:20 AM **Consequences of Conducting Reproductive Toxicity Studies for Chemical Registration at Doses That Exceed the Maximally Tolerated Dose.** *M. Stavanja.* Celanese Corporation, Irving, TX.
- #1258 9:45 AM **A Weight of Evidence Approach to Inform Dose Setting.** *C. Tan.* US EPA, Research Triangle Park, NC.
- 10:10 AM **Panel Discussion/Q&A.** *K. Goyak.* Celanese Corporation, Irving, TX.

Wednesday, March 19, 8:00 AM to 10:45 AM, Room W307A, Convention Center



Workshop Session: Incorporating Stress as a Variable into Toxicological Testing: Advancing Our Understanding of Cumulative Impacts

Chair(s): William Klaren, ToxStrategies LLC; and Kimberly Kelly, NIOSH.

Primary Endorser: Occupational and Public Health Specialty Section

Other Endorser(s): Ethical, Legal, Forensics, and Societal Issues Specialty Section

With greater understanding of the complex interactions between different biological systems and the social, occupational, and chemical environment, there is increasing interest in understanding the potential differences in the adverse effects of chemicals. Consideration of differences in susceptibility to adverse effects from various exposures extends beyond that of genetic differences actively being investigated in various animal or *in vitro* models. One such environmental factor that comes into play is the influence of non-chemical stress on chemical-biological interactions. While considerations for stress to impact toxicity testing are well-recognized (e.g., animal handling), studies are largely not designed to examine the explicit role of additional stress to potentially impact susceptibility to adverse effects. As such, there is a need to understand how stress whether occupational, personal, or societal may impact the ultimate susceptibility of individuals in advanced risk assessments. This session will focus on several experimental approaches designed to explicitly incorporate stress as an experimental variable. Such approaches offer understanding into the interaction between the biology of stress and the impact on chemical toxicity (e.g., stress potentiating or mitigating toxic effects). First, results from a targeted scoping review will characterize the breadth of available experimental models that consider stress, as well as illustrate why stress is an important consideration in toxicological testing. The second talk will expand on the US Environmental Protection Agency's actions toward investigating stress and the prioritization of chemicals being considered in their assays. The remaining talks will each present unique experimental models designed to consider the impact that stress has on chemical response. In all, this session will highlight the importance of considering stress within some experimental models and present several approaches that attempt to address this research need.

Abstract

- #1259 8:00 AM **Incorporating Stress as a Variable Into Toxicological Testing: Advancing Our Understanding of Cumulative Impacts.**

- #1260 8:00 AM **Targeted State of the Science Scoping Review for Incorporating Stress Within Experimental Models of Chemical Toxicity.** *W. Klaren.* ToxStrategies LLC, Asheville, NC.
- #1261 8:40 AM **Equity in Toxicity: Unmasking the Hidden Impact of Stress on Chemical Toxicity in Environmental Justice Communities.** *L. Word.* US EPA, Research Triangle Park, NC.
- #1262 9:15 AM **Validating a Model of Gulf War Illness: Chronic Exposure to Glucocorticoids Primes the Neuroinflammatory Response to Diisopropyl Fluorophosphate Resulting in Long-Lasting Sensitivity to Subsequent Challenges.** *K. Kelly.* NIOSH, Morgantown, WV.
- #1263 9:50 AM **Non-chemical Stressors Affect Behavioral Function and Alter the Cardiopulmonary Response to Acute Extreme Heat and Wildfire Smoke Exposures.** *M. Fiamingo.* US EPA, Research Triangle Park, NC.
- 10:25 AM **Panel Discussion/Q&A.** *W. Klaren.* ToxStrategies LLC, Asheville, NC.

Wednesday, March 19, 9:00 AM to 4:30 PM, W Hall A2, Convention Center

ToxExpo Exhibits

Incorporating visits to the ToxExpo while at the SOT Annual Meeting connects attendees with 275+ exhibitors who support the toxicology community with cutting-edge solutions and services. Visit the ToxExpo to:

- Connect with exhibitors for product, service, and career insights
- Learn about the latest research from 700+ daily poster presentations
- Network with colleagues in the SOT Pavilion and ask questions about the Society
- Check out the Tiny Tox Theater for brief talks focused on a variety of topics
- Enjoy morning coffee and afternoon refreshments
- Grab lunch and relax with others
- Win big by visiting exhibitors with raffles and by dropping your business card in the SOT Diamond-Level Supporter boxes
- And experience much, much more

Global Gallery of Toxicology

Toxicology societies from around the world participate in the Global Gallery of Toxicology, where they display posters showcasing their upcoming meetings, key accomplishments, strategic initiatives, journals, awards, and more.

SOT Regional Chapter, Special Interest Group, and Specialty Section Posters

Dedicated poster space showcases the activities of the SOT Regional Chapters, Special Interest Groups, and Specialty Sections.

Wednesday, March 19, 9:15 AM to 11:45 AM, W Hall A2, Convention Center

PS Poster Sessions

The presenting authors are available to discuss their research for Poster Sessions. Posters will be displayed from 9:00 am to 4:30 pm, with the author in attendance during the assigned Poster Session. See the *Program: Platform and Poster Session Supplement* PDF, the [SOT Online Planner](#) and [SOT Event App](#) for details.

Wednesday, March 19, 9:15 AM to 10:15 AM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Wednesday, March 15, 9:30 AM to 3:00 PM, Room W209C, Convention Center

(Hours May Vary; Check Posted Information in the Research Funding Insights Room)

Research Funding Insights Room: Network with Grant Program Officers

Representatives from federal agencies will be available in the Research Funding Insights Room to answer general grant-related questions. Check the posted information in the Research Funding Insights Room to make an appointment with a program officer who can discuss aspects of scientific review or specific grant opportunities. New investigators are especially encouraged to meet with program staff.

Wednesday, March 19, 9:45 AM to 10:45 AM, Room W304A, Convention Center

FS Translational Impact Award Lecture

This lecture will be delivered by the 2025 SOT Translational Impact Award recipient.

Wednesday, March 19, 10:00 AM to 10:20 AM, W Hall A2, Convention Center

Tiny Tox Talk: The Active Practice of Work-Life-Self Balance

Speaker(s): Kim Zaccaria and Kelly Salinas, SRC Inc., Syracuse, NY.

Wednesday, March 19, 10:40 AM to 11:00 AM, W Hall A2, Convention Center

Tiny Tox Talk: Wait! Facts Matter? Evidence-Based Approaches for the Toxicological Assessment of Medical Devices

Speaker(s): Ron Brown, Risk Science Consortium, Arnold, MD.

Wednesday, March 19, 10:45 AM to 11:45 AM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Wednesday, March 19, 11:00 AM to 12:00 Noon, Room W304A, Convention Center

FS EUROTOX Award Lecture: Endocrine Disruptors and Microplastics: Facing Complexity with Connection

Chair(s): Laurie C. Haws, ToxStrategies LLC; and Thomas Weiser, F. Hoffmann-La Roche AG, Switzerland.

Lecturer: Juliette Legler, Universiteit Utrecht, Utrecht, Netherlands.



In this presentation, Juliette Legler, PhD, will reflect on her experience in research in the field of endocrine disruption (ED) and how lessons learned in the ED field apply to the emerging field of micro- and nanoplastic (MNP) toxicology. Dr. Legler will highlight the challenges of studying endocrine-disrupting chemicals and MNPs and describe how developing innovative solutions to these challenges involves embracing complexity and forging connections between disciplines and stakeholders.

Wednesday, March 19, 11:00 AM to 12:20 PM, Room W203A, Convention Center

IS Informational Session: Skin Deep: Navigating the Evolution and Application of Dermal Absorption Modeling in Modern Risk Assessment of Cosmetics and Personal Care Products

Chair(s): Sara Farahmand, The Honest Company; and A. Cuevas, Combe Inc.

Primary Endorser: Dermal Toxicology Specialty Section

Other Endorser(s): Hispanic Organization of Toxicologists Special Interest Group; Risk Assessment Specialty Section

Dermal absorption assessment serves as a critical pillar in ensuring the safety of consumer products and environmental contaminants. As methodologies evolve and regulatory frameworks adapt, continued collaboration between stakeholders and advancements in predictive modeling techniques will further enhance our ability to assess dermal

absorption accurately, thereby safeguarding public health and environmental integrity. Skin absorption testing methods, primarily *in vitro*, have replaced *in vivo* tests like the Organisation for Economic Co-operation and Development (OECD) 428, reflecting regulatory preference for human-derived data. These methods, guided by OECD standards, are accepted globally, with agencies like the US FDA, the European Food Safety Authority, and the Scientific Committee on Consumer Safety (SCCS) endorsing them for various assessments. Meanwhile, dermal absorption tools, including new approach methods (NAMs), play a crucial role in risk assessment across industries and continue to allow for the departure from animal testing. Predictive models, such as quantitative structure activity relationships (QSAR) and physiologically based pharmacokinetic (PBPK), aid in evaluating chemical hazards by considering various factors influencing skin penetration. Despite advancements, challenges remain when it comes to model accuracy due to interindividual variability and data uncertainties. Recent efforts focus on enhancing model performance through advanced techniques and data integration. Safety evaluation of cosmetics and personal care products involves assessing dermal absorption, crucial for determining systemic toxicity. This requires selecting appropriate absorption factors, often based on experimental data or alternative sources like physicochemical properties and expert judgment. This session will provide an overview of skin absorption modeling and its application in cosmetic and personal care product risk assessment. The session will (1) provide an overview of principles for building suitable *in vitro* skin absorption study designs and running high-quality testing programs with historical examples; (2) discuss the regulatory acceptance of NAMs like *ex vivo* and *in vitro* models and the need for up-to-date guidance along with modeling approaches in assessing dermal absorption; (3) illustrate the application of a PBPK model of dermal absorption developed to include formulation-, chemical-, and skin-specific descriptions for the prediction of plasma analyte concentration-time profiles for recreational or facial product exposures, focusing on the implications for safety assessment; and (4) discuss practical case studies related to dermal absorption in the context of cosmetic safety evaluation and incorporate an overview of agency recommendations (e.g., OECD, SCCS), common pitfalls, and industry best practices. Overall, attendees will gain insights into designing and interpreting effective *in vitro* skin absorption studies; gaining confidence in NAMs for dermal absorption assessment; applying PBPK modeling for safety evaluation of cosmetic products; and understanding practical case studies related to dermal absorption in cosmetic safety and risk assessments.

Abstract

- #1264 11:00 AM **Skin Deep: Navigating the Evolution and Application of Dermal Absorption Modeling in Modern Risk Assessment of Cosmetics and Personal Care Products.**
- 11:00 AM **Introduction.** *S. Farahmand.* The Honest Company, Pleasanton, CA.
- 11:05 AM **Applications and Best Practices for Skin Absorption Testing.** *C. Roper.* Roper Toxicology Consulting Limited, Loanhead, United Kingdom.
- 11:20 AM **Roadmap to Regulatory Acceptance: Challenges and Solutions Facilitating the Use of Nonanimal Approaches for Dermal Absorption Assessment.** *K. Sullivan.* Institute for In Vitro Sciences Inc., Ann Arbor, MI.
- 11:35 AM **Integrative Dermal Absorption and Disposition Modeling in Chemical Risk Assessment.** *J. Troutman.* Procter & Gamble, Cincinnati, OH. Sponsor: *S. Farahmand*
- 11:50 AM **Dermal Absorption of Ingredients in Cosmetics and Personal Care Products: Understanding and Addressing Real-World Complexities.** *A. Lewis, and C. Marsh.* Gradient, Cambridge, MA.
- 12:10 PM **Panel Discussion/Q&A.** *A. Cuevas.* Combe Inc., Stamford, CT.

Wednesday, March 19, 11:00 AM to 12:20 PM, Room W307A, Convention Center

Education-Career Development Session: Building and Improving Undergraduate Programs at Your Regional Chapter

Chair(s): Joshua Gray, US Coast Guard Academy; and Larissa Williams, Bates College.

Primary Endorser: Education and Experiential Opportunities Committee

Other Endorser(s): Inclusion, Diversity, and Engagement Committee

Undergraduate engagement with the Society of Toxicology occurs at organizational and regional levels with a diverse array of programs. While engagement of students through in-person attendance at the SOT Annual Meeting and ToxExpo is ideal, the number of students who participate is limited by the high costs to transport students to the meeting and a limited number of travel awards. Most of the 18 Regional Chapters of SOT, covering North America, host undergraduate posters during their Regional Chapter meetings and have some engagement with undergraduates, but few provide more extensive programming and most focus on undergraduates working in the laboratories of toxicologists, limiting recruitment from many institutions. The goal of this session is to enable more Regional Chapters to create, adapt, and improve undergraduate programs to be effective for the regions in which they are located, each of which face unique challenges to undergraduate recruitment and participation. Several Regional Chapters have engaged undergraduates with more extensive programming and outreach, either designing novel programming or adopting similar programming to that developed by the SOT Inclusion, Diversity and Engagement Committee (IDEC, formerly CDI) and the *In Vitro* Toxicology Lecture and Luncheon to provide outreach to undergraduates. Some also intentionally recruit and engage undergraduates who are not associated with toxicologists, who are at institutions that do not have toxicologists, or who are from historically disadvantaged backgrounds or institutions. This session will first highlight the undergraduate programs hosted by IDEC that occur during the SOT Annual Meeting that are most adaptable for use by the Regional Chapters. Next, representatives from three Regional Chapters will highlight undergraduate programming that has been successful in their chapters. Each will include data on their program's efficacy. After these presentations, a panel discussion will field questions from the audience. Each participant will produce digital materials describing their program that will be hosted on ToXchange, the SOT online membership community, to be used in the future. The overall goal of this session will be to grow the number of Regional Chapters hosting undergraduate-specific programming and to develop a network of Regional Chapter members committed to adopting an undergraduate program at their institution. Participants will leave the session with materials and knowledge that will help them adopt or improve undergraduate programs at their Regional Chapter. After the session, Regional Chapter members can engage on the SOT Undergraduate Educator Network listserv to share their ideas and ask others for guidance or help.

Abstract #

- | | | |
|-------|----------|---|
| #1265 | 11:00 AM | Building and Improving Undergraduate Programs at Your Regional Chapter. |
| | 11:00 AM | Introduction to Regional Chapter Undergraduate Programming. <i>J. Gray.</i> US Coast Guard Academy, New London, CT. |
| | 11:05 AM | The SOT Undergraduate Diversity Program: Providing Educational Opportunities in Toxicology at the Annual Meeting. <i>K. Sant.</i> Michigan State University, East Lansing, MI. |
| | 11:25 AM | Northeast Society of Toxicology Undergraduate Program, 2018–Present. <i>L. Williams.</i> Bates College, Lewiston, ME. |
| | 11:40 AM | A Two-Way Street: Undergraduate Engagement within the NCSOT Regional Chapter. <i>A. Watson.</i> Inotiv, West Lafayette, IN. |
| | 11:55 AM | Ohio Valley Chapter of the Society of Toxicology Undergraduate Programs. <i>A. Keebaugh.</i> BlueHalo, Dayton, OH. |
| | 12:10 PM | Panel Discussion/Q&A. <i>J. Gray.</i> US Coast Guard Academy, New London, CT. |

Wednesday, March 19, 11:20 AM to 11:40 AM, W Hall A2, Convention Center

Tiny Tox Talk: How to Make the Most of Your Postdoc

Speaker(s): Gagandeep Kaur, University of Rochester Medical Center, Rochester, NY.

Wednesday, March 19, 12:00 Noon to 12:20 PM, W Hall A2, Convention Center

Tiny Tox Talk: What I Learned from Cake Baking for Teaching and Protocol Writing

Speaker(s): Amy Wang, NIEHS, Research Triangle Park, NC.

Wednesday, March 19, 12:15 PM to 1:15 PM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Wednesday, March 19, 12:40 PM to 1:00 PM, W Hall A2, Convention Center

Tiny Tox Talk: Toxicology Tango: Dance Your Way to Networking Success

Speaker(s): Ishita Virmani, Medizinische Universität Innsbruck, Tirol, Austria.

Wednesday, March 19, 1:20 PM to 1:40 PM, W Hall A2, Convention Center

Tiny Tox Talk: How Your Lab Notes Can Make You More Marketable

Speaker(s): Emily Resseguie, Labcorp Drug Development, Franklin Park, NJ.

Wednesday, March 19, 1:30 PM to 4:15 PM, Room W206A, Convention Center

FS Engagement Session: Facing Inconvenient Truths: How the Current Toxicology Research Ecosystem Limits Public and Environmental Health Protection

Chair(s): Robyn Tanguay, Oregon State University; and Sandrine Deglin, HESI.

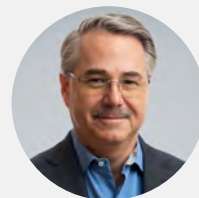
Facilitators: Kevin Crofton, R3Fellows LLC, Durham, NC; David Balshaw, NIEHS, Research Triangle Park, NC; Corie Ellison, Procter & Gamble, Cincinnati, OH; Fenna Sillé, Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD; Justin Teeguarden, Pacific Northwest National Laboratory, Richland, WA; Richard Currie, Syngenta Crop Protection, Bracknell, United Kingdom; and Jamie DeWitt, Oregon State University, Corvallis, OR.



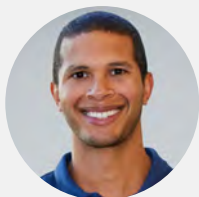
Toxicology stands at a critical crossroads, with growing demands to address complex public and environmental health challenges. Yet, the current research ecosystem may unintentionally hinder our ability to fulfill this mandate. Are we asking the right questions? Are funding priorities, publication practices, and institutional structures aligning with the goal of protecting human and environmental health?



This session provides a unique, inclusive platform to explore these pressing questions. Bringing together scientists from diverse disciplines, career stages, and sectors, this experimental session will offer a fresh approach to reimagining toxicology's role in advancing health protection. A panel of thought-provoking speakers will share their perspectives on systemic limitations within the toxicology ecosystem—from research funding and regulatory science to interdisciplinary collaboration and public engagement. Following these short presentations, the audience will have the opportunity to weigh in by responding to curated questions and contributing their insights, advice, and strategies for change. This is your chance to influence the future of toxicology as we tackle the inconvenient truths that shape our field.



The objectives of this session are to (1) critically assess the limitations within the current toxicology research ecosystem; (2) facilitate open dialogue between diverse scientists, including academia, government, industry, and early career scientists; and (3) brainstorm actionable ideas to better align toxicology research with public and environmental health goals. Join us to help build a more inclusive, forward-thinking vision for toxicology's future!



Wednesday, March 19, 1:30 PM to 4:15 PM, Room W202A, Convention Center

S Symposium Session: Clearing the Air: Health Effects of Secondhand and Thirdhand Vaping Exposure

Chair(s): Christa Wright, Chemical Insights Research Institute; and Xiaojia He, Chemical Insights Research Institute.

Primary Endorser: Exposure Specialty Section

Other Endorser(s): Inhalation and Respiratory Specialty Section

Due to the misconception that electronic nicotine delivery systems (ENDS), or e-cigarettes, are safer alternatives to traditional tobacco products, the popularity of vaping has grown across the US and globally. Increasing concerns have emerged regarding the potential health risks associated with secondhand and thirdhand exposure to ENDS aerosols in indoor spaces. Characterizing and evaluating inhalation risks and human health effects of secondhand and thirdhand emissions becomes challenging when considering the various formulations of nicotine and e-liquids and the diverse array of ENDS devices and brands available in the market. Recent evidence indicates variations in vaping behavior such as puff volume, flow rate, duration, and frequency can also impact ENDS aerosol emission profiles, dispersion, and deposition in indoor environments and potentially lead to differential exposures and adverse health outcomes in vulnerable populations, including pregnant individuals, children, elderly, and those with pre-existing conditions. This Symposium Session aims to be a crucial platform for convening experts from not-for-profit research organizations and universities to present the latest findings on secondhand and thirdhand vaping and regulatory implications. We will highlight potential adverse respiratory, cardiovascular, neurodevelopmental, and immune health outcomes associated with secondhand and thirdhand vaping exposures, as well as novel methodology advances including but not limited to exposure science, molecular epidemiology, and multi-omics approaches. Through presentations and discussions, attendees will gain insights into the most recent research advances employed to uncover the health impacts of secondhand and thirdhand vaping exposure. We believe these presentations and discussions will advance our understanding of secondhand and thirdhand exposure to vaping and facilitate efforts to create a safer, healthier indoor environment.

Abstract #

- | | | |
|-------|---------|--|
| #1266 | 1:30 PM | Clearing the Air: Health Effects of Secondhand and Thirdhand Vaping Exposure. |
| | 1:30 PM | Introduction. C. Wright. Chemical Insights Research Institute, Marietta, GA. |
| #1267 | 1:35 PM | Secondhand Vaping Exposures and Assessment of Associated Human Health Impacts. |
| | | J. Shannahan. Purdue University, West Lafayette, IN. |
| #1268 | 2:05 PM | Maternal Electronic Cigarette Use During Pregnancy Affects Long-Term Arterial/ |
| | | Cardiopulmonary Function in Offspring. M. Olfert. West Virginia University, Morgantown, WV. |
| #1269 | 2:35 PM | The Developmental Origins of Respiratory Sequelae in Mouse Offspring Exposed <i>In Utero</i> to |
| | | Electronic Cigarette Aerosols. A. Noël. Louisiana State University, Baton Rouge, LA. |
| #1270 | 3:05 PM | Effects of Exposure to Third-Hand E-cigarette Residues in Three Mouse Models: <i>In Utero</i> |
| | | Exposure, Acute, and Chronic Exposure in Juvenile Mice. B. Oliver. University of Technology |
| | | Sydney and the Woolcock Institute of Medical Research, Sydney, Australia. Sponsor: X. He |
| #1271 | 3:35 PM | Mice Exposed to Thirdhand E-cigarettes Exhibit a Prothrombotic Phenotype Independent of |
| | | Sex. F. Alshbool. Texas A&M University, College Station, TX. Sponsor: X. He |
| | 4:05 PM | Panel Discussion/Q&A. X. He. Chemical Insights Research Institute, Marietta, GA. |

Wednesday, March 19, 1:30 PM to 4:15 PM, Room W304E, Convention Center

S Symposium Session: Coming into Focus: The Role of DNA Repair Inhibition in Carcinogenesis Through the Lens of Metal-Induced DNA Damage and Repair Inhibition

Chair(s): John Wise Sr., University of Louisville; and Koren Mann, McGill University, Canada.

Primary Endorser: Carcinogenesis Specialty Section

Other Endorser(s): Mechanisms Specialty Section; Metals Specialty Section

Cancers are commonly characterized by genomic instability manifesting as microsatellite instability, chromosome instability, or for some cancers like lung cancer, both outcomes. The underlying cause of these types of genomic instability are thought to result from errors in mismatch repair and/or DNA double-strand break repair; however, how repair becomes disrupted is poorly understood for chemical carcinogenesis. Recent data indicate that beyond cancer, these outcomes and the mechanisms that underlie genomic instability are critically involved in the development and progression of many human diseases, including neurodegenerative disease, cardiovascular disease, and liver disease, among others. Recent studies have focused on how inhibition of mismatch repair and DNA double-strand break repair act as critical driving factors in the mechanisms for carcinogenic metals. These metals are common environmental and occupational pollutants and important etiologic factors for cancer and many other diseases, though their underlying mechanisms are uncertain. The effects of toxic metals and other environmental pollutants on DNA repair function is an exciting and crucial research field in toxicology. The goals of this Symposium Session are to introduce current DNA repair inhibition research in the field of toxicology and to discuss the role and mechanism of repair dysregulation in metal toxicity and carcinogenesis. To achieve these goals, this Symposium Session convenes a panel of outstanding carcinogenesis researchers. The first speaker, an expert in DNA damage and repair in metal carcinogenesis, will present a brief introductory overview on mismatch repair and DNA double-strand break repair, followed by four experts in metal carcinogenesis who will present their cutting-edge studies to show how three known metal carcinogens (cadmium, chromium and nickel) and one emerging metal co-carcinogen (tungsten) impact DNA repair and how the dysregulated repair is critically involved in metal-induced cancer of the colon, lung, and blood. Outstanding diverse speakers from both inside and outside the US are engaged in this Symposium Session. These topics are of interest not just to carcinogenesis researchers but also to those studying metals, as well as the mechanisms of DNA repair in other diseases such as neurotoxicity, cardiovascular toxicity, hepatotoxicity, and reproductive and developmental toxicity, among others. This Symposium Session will introduce the concept of DNA repair inhibition to those not familiar with the subject and those more focused on epigenetic mechanisms and will attract an expanded SOT audience of metals and other toxicology researchers.

Abstract #

- #1272 1:30 PM **Coming into Focus: The Role of DNA Repair Inhibition in Carcinogenesis through the Lens of Metal-Induced DNA Damage and Repair Inhibition.**
1:30 PM **Introduction.** J. Wise Sr¹, and K. Mann². ¹University of Louisville, Louisville, KY; and ²McGill University, Montréal, QC, Canada.
- #1273 1:35 PM **Introduction to DNA Damage and DNA Repair Inhibition in Metal-Induced Carcinogenesis.** H. Xie. US FDA, College Park, MD. Sponsor: J. Wise Sr
- #1274 1:45 PM **Inhibition of DNA Mismatch Repair by Toxic Environmental Metals.** A. Prakash¹, M. Eggers¹, M. Patterson¹, S. Chokshi¹, and J. Scalici². ¹University of South Alabama, Mobile, AL; and ²Emory University, Atlanta, GA. Sponsor: J. Wise Sr
- #1275 2:20 PM **The Role of DNA Double-Strand Break Repair Inhibition in Hexavalent Chromium-Induced Carcinogenesis.** J. Wise Sr, H. Lu, S. Wise, I. Meaza, A. Williams, R. Wise, and C. Browning. University of Louisville, Louisville, KY.
- #1276 2:55 PM **Tungsten-Induced Carcinogenesis: A Role for Inhibition of DNA Repair.** K. Mann. McGill University, Montréal, QC, Canada.

- #1277 3:30 PM **Nickel Nanoparticle-Induced Cell Transformation: Involvement of DNA Damage and DNA Repair Defect.** Y. Mo, and Q. Zhang. University of Louisville, Louisville, KY.
- 4:05 PM **Panel Discussion/Q&A.** J. Wise Sr¹, and K. Mann². ¹University of Louisville, Louisville, KY; and ²McGill University, Montréal, QC, Canada.

Wednesday, March 19, 1:30 PM to 4:15 PM, Room W203A, Convention Center

S Symposium Session: Harnessing Generative AI: Revolutionizing Toxicology Research

Chair(s): Miao Li, US FDA/CFSAN; and Elizabeth Martin, ICF International Inc.

Primary Endorser: Computational Toxicology Specialty Section

Other Endorser(s): Biological Modeling Specialty Section; Risk Assessment Specialty Section

Traditional methods in toxicology often involve time-consuming experimental studies, manual literature screening and review, and limited predictive modeling capabilities to assess the safety and potential hazards of chemicals. With the application of emerging technologies in toxicology, nowadays, risk assessment heavily relies on analysis of data from high-throughput or high-content studies. Artificial intelligence (AI), with its ability to process vast amounts of data, detect patterns, and generate novel insights, offers transformative potential in toxicology. Generative AI (genAI), an emerging class of AI models developed in recent years, has garnered significant attention with the well-known example of ChatGPT. GenAI's remarkable ability to create new data and content based on patterns learned from vast amounts of existing data offers unprecedented opportunities to transform various aspects of toxicology. This session will discuss the use of genAI to revolutionize toxicology through innovative approaches to a variety of processes, including safety assessment, enhancement of pharmacovigilance, prediction of toxicity, utilization in large systemic literature review, and extraction of high-content toxicity data. The first presentation will talk about the enhancing genAI method to improve the multi-objective molecular design. The second presentation will discuss the usage of locally hosted large language models for pharmacovigilance. The third speaker will present how to summarize large amounts of literature in a short time frame with the assistance of genAI. The fourth presentation will cover the topic of the extraction of high-content toxicity biomarkers data using large language models. The last presentation will demonstrate the model based on Generative Adversarial Networks (GANs) as alternatives to toxicology studies with animals. The topics discussed here will include large language models, such as GPT-4, Claude and Llama, GANs, and the generative molecular design. The presentations of this session showcase how toxicologists can harness the capabilities of genAI to enhance risk assessment strategies, extract information for biological modeling, and contribute to the advancement of public health.

Abstract #

- #1278 1:30 PM **Harnessing Generative AI: Revolutionizing Toxicology Research.**
1:30 PM **Introduction.** M. Li. US FDA/CFSAN, College Park, MD.
- #1279 1:35 PM **Data-Efficient Strategies for Enhancing Generative AI Models in Multi-objective Molecular Design.** B. Yoon. Texas A&M University, College Station, TX. Sponsor: M. Li
- #1280 2:05 PM **Adaptation of Locally Hosted Large Language Models to Enhance Pharmacovigilance.** J. Xu. US FDA/NCTR, Jefferson, AR.
- #1281 2:35 PM **A Modular Generative Artificial Intelligence Workflow to Summarize Large Amounts of Literature for Urgent Needs.** E. Martin. ICF International Inc., Durham, NC.
- #1282 3:05 PM **Extraction of High-Content Toxicity Biomarkers Data from Scientific Literature and Structured Sources Using Large Language Models.** O. Stroganov. Rancho BioSciences LLC, Rancho Santa Fe, CA. Sponsor: M. Li
- #1283 3:35 PM **Generative Adversarial Networks as Alternatives to Animal Studies in Toxicology.** X. Chen. US FDA/NCTR, Jefferson, AR. Sponsor: J. Xu
- 4:05 PM **Panel Discussion/Q&A.** E. Martin. ICF International Inc., Durham, NC.

Wednesday, March 19, 1:30 PM to 4:15 PM, Room W205A, Convention Center

S Symposium Session: Science and Practice of Characterizing Population Variability for Regulatory Decision-Making

Chair(s): Ivan Rusyn, Texas A&M University; and Christopher Vulpe, University of Florida.

Primary Endorser: Risk Assessment Specialty Section

Other Endorser(s): *In Vitro* and Alternative Methods Specialty Section; Sustainable Chemicals through Contemporary Toxicology Specialty Section

Individuals can vary substantially in their susceptibility to adverse outcomes associated with toxicant exposure based on multiple factors, including genetic variation, age, sex, pre-existing conditions, concurrent stressors, and exposure history. Incorporating population variability into risk assessment is essential for effective regulatory decisions, but the lack of relevant data often necessitates the use of uncertainty factors to account for individual differences in toxicant response. Emerging *in vivo*, *in vitro*, and computational modeling approaches are enabling the further characterization of human variability in susceptibility which may help inform chemical-specific decisions using scientific data rather than default assumptions. In this session, a series of presentations will discuss the needs, challenges, and opportunities for the quantitative characterization of population variability and the potential use of these novel data streams in regulatory decision-making. Collectively, this Symposium Session will showcase contemporary research efforts for characterizing population variability and the potential for developing data-driven risk assessments by incorporating data on susceptible populations.

Abstract #

- | | | |
|-------|---------|--|
| #1284 | 1:30 PM | Science and Practice of Characterizing Population Variability for Regulatory Decision-Making. |
| | 1:30 PM | Introduction. <i>I. Rusyn.</i> Texas A&M University, College Station, TX. |
| #1285 | 1:35 PM | Regulatory Needs in Characterization of Population Variability: The Status Quo and Data Gaps. <i>L. Zeise.</i> California Environmental Protection Agency, Sacramento, CA. Sponsor: <i>I. Rusyn</i> |
| #1286 | 2:00 PM | "Synthetic Populations" as a Novel NAMs Approach in Toxicology: Using Human Cells with Representative Genetic Variants for High-Throughput Phenotypic Profiling of Population Variability. <i>C. Vulpe.</i> University of Florida, Gainesville, FL. |
| #1287 | 2:25 PM | Studies of <i>In Utero</i> Exposures with Tissue Chip Approaches: Modeling Early Life Susceptibility <i>In Vitro</i>. <i>L. Richardson.</i> University of Texas Medical Branch at Galveston, Galveston, TX. |
| #1288 | 2:50 PM | Is it Possible to Model Lifestyle Factors? Examples of Modeling Psychological Stress <i>In Vitro</i>. <i>J. Harrill.</i> US EPA/CCTE, Research Triangle Park, NC. |
| #1289 | 3:15 PM | Mammalian <i>In Vitro</i> and <i>In Vivo</i> Models for Characterizing Population Variability: Case Examples of Utility for Decision-Making. <i>W. Chiu.</i> Texas A&M University, College Station, TX. |
| | 3:40 PM | Panel Discussion/Q&A. <i>I. Rusyn.</i> Texas A&M University, College Station, TX. |

Wednesday, March 19, 1:30 PM to 4:15 PM, Room W304A, Convention Center

W Workshop Session: Battle of the Sexes: Sexually Dimorphic Responses to *In Utero* Toxicant Exposures

Chair(s): Lizzie Bowdridge, West Virginia University; and Phoebe Stapleton, Rutgers, The State University of New Jersey.

Primary Endorser: Reproductive and Developmental Toxicology Specialty Section

Other Endorser(s): Inhalation and Respiratory Specialty Section; Women in Toxicology Special Interest Group

The developmental origins of health and disease, historically known as the Barker hypothesis, underscores the importance of perturbations during early life development. Environmental exposure during these critical windows of pre- and perinatal development often result in sexually dimorphic health outcomes in male and females. It is becoming clear that the messages between the mother and developing fetus leave an imprint that lasts a lifetime. Currently, there is an open call by the National Institutes of Health to understand the influence of sex on health and disease and how responses to toxicant exposures differ based on sex. Yet, our understanding of how environmental toxicants drive the mechanisms behind these sexually dimorphic responses in neural development, placental support, immune function, metabolic disease, and reproductive capacity are vastly understudied. The goal of this session is to discuss how toxicant exposures during critical windows of pregnancy result in sexually dimorphic placental and fetal responses and how these changes impact the health of the offspring into adulthood. This session will feature research projects that focus on environmental exposures during distinct, crucial points of development and that use state-of-the-art techniques to define how neural, metabolic, epigenetic, immune, and reproductive outcomes differ between males and females. This research is used to gain a better mechanistic understanding of the developmental effects of *in utero* environmental exposures and lifelong health consequences presented in adulthood. Ultimately, this session will highlight the need to include sex as a biological variable to navigate for future mitigation and elimination strategies aimed toward the developmental origins of disease.

Abstract #

- | | | |
|-------|---------|--|
| #1290 | 1:30 PM | Battle of the Sexes: Sexually Dimorphic Responses to <i>In Utero</i> Toxicant Exposures. |
| | 1:30 PM | Introduction. <i>L. Bowdridge.</i> West Virginia University, Morgantown, WV. |
| #1291 | 1:35 PM | Sex Matters: Sexually Dimorphic Responses to Prenatal Exposures on Neuroendocrine Systems and Behaviors. <i>H. Patisaul.</i> NIEHS, Research Triangle Park, NC. |
| #1292 | 1:55 PM | Exposure to Particulate Matter Causes Sex-Specific Effects on Placental Metabolism. <i>T. Seymore.</i> Rutgers, The State University of New Jersey, New Brunswick, NJ. |
| #1293 | 2:15 PM | Placental Sex-Specific Epigenetic Responses to Toxicant Exposure: A Driver of Later-Life Sexually Dimorphic Outcomes. <i>L. Eaves.</i> University of North Carolina at Chapel Hill, Chapel Hill, NC. |
| #1294 | 2:35 PM | Maternal Ozone Exposure Alters Hepatic Susceptibility to Postnatal Stressors Differentially by Sex. <i>C. Miller.</i> US EPA, Research Triangle Park, NC. |
| #1295 | 2:55 PM | Sex-Specific Responses to Inhaled Environmental Exposures Prior to Viral Infection in Adults. <i>M. Rebulli.</i> University of North Carolina at Chapel Hill, Chapel Hill, NC. |
| #1296 | 3:15 PM | Sexually Dimorphic Metabolic Responses to <i>In Utero</i> Nano-Titanium Dioxide Exposure and High Fat Diet into Adulthood. <i>L. Bowdridge.</i> West Virginia University, Morgantown, WV. |
| | 3:35 PM | Panel Discussion/Q&A. <i>L. Bowdridge</i> ¹ , and <i>P. Stapleton</i> ² . ¹ West Virginia University, Morgantown, WV; and ² Rutgers, The State University of New Jersey, New Brunswick, NJ. |

Wednesday, March 19, 1:30 PM to 4:15 PM, Room W204A, Convention Center

W Workshop Session: How Can We Use Alternative Approaches to Move Safety Evaluation of Medical Devices Forward?

Chair(s): Betina Lew, Johnson & Johnson; and Echoleah Rufer, US FDA/CDRH.

Primary Endorser: Medical Device and Combination Product Specialty Section

Other Endorser(s): Hispanic Organization of Toxicologists Special Interest Group; Risk Assessment Specialty Section

Safety evaluation of medical devices relies heavily on decades-old animal tests to demonstrate medical device biological safety. It is now becoming clear that these traditional animal tests may have limited relevance to human health. Regulators and stakeholders are exploring ways to move beyond conventional animal studies. Evidence now suggests that a single toxicological endpoint may not be effectively replaced by a single *in vitro* test. Many new approach methodologies (NAMs) are based on *in vitro* assays. However, there has been less focus on how strategies beyond *in vitro* and computational methods can meet the same goals and be accessible in the near term. In addition, these *in vitro* methods are not broadly accepted by regulatory agencies. For the safety evaluation of medical devices, the ISO 10993 matrix of studies is usually followed for new product development and for less significant device changes in the manufacturing process (e.g., sterilization, supplier, packaging). While the biological evaluation of devices has been evolving for specific endpoints, there are still methodologies that may be “borrowed” from other sectors that should be considered for evaluating medical devices because they may have a significant benefit. For example, the threshold of toxicological concern (TTC) approach is effective for streamlining the safety assessment; there are modifications to the application of TTC that would make the entire biological safety evaluation less burdensome while protecting patient safety and reducing the use of animals. This session aims to discuss approaches currently being used in other sectors (e.g., food, consumer goods, cosmetics, pharma) that have not yet been broadly adopted or accepted in the medical device industry. The discussion will cover strategies that are mature and currently used in other sectors (e.g., the weight of evidence, TTC), as well as forward-thinking alternatives, such as using artificial intelligence in the safety assessment of devices. Following the session presentations, the chairs will invite the audience to participate in the discussion. The presentations are expected to foster thought-provoking discussions among industry, government, and academia stakeholders. Bringing these groups together is the only path to modernize the medical device safety evaluation process to both protect patients and reduce the unnecessary use of animals.

Abstract #

- | | | |
|-------|---------|--|
| #1297 | 1:30 PM | How Can We Use Alternative Approaches to Move Safety Evaluation of Medical Devices Forward? |
| | 1:30 PM | Introduction. <i>B. Lew.</i> Johnson & Johnson, Yardley, PA. |
| #1298 | 1:35 PM | Advancing Regulatory Science at US FDA to Streamline Medical Device Safety Evaluation Using Nonanimal Methods. <i>E. Rufer.</i> US FDA/CDRH, Silver Spring, MD. |
| #1299 | 2:00 PM | Building and Applying High-Confidence Computational Models in Med Tech. <i>N. Kleinstreuer.</i> NIEHS/NICEATM, Morrisville, NC. |
| #1300 | 2:25 PM | Advancing TTC for Toxicological Risk Assessment of Medical Devices. <i>N. Soucy.</i> Boston Scientific Corporation, Monticello, MN. |
| #1301 | 2:50 PM | The Use of AI in Safety Assessment of Medical Devices. <i>T. Hartung.</i> Johns Hopkins University Center for Alternatives to Animal Testing (CAAT), Baltimore, MD. |
| #1302 | 3:15 PM | The Weigh-In: Modernizing Biocompatibility Evaluations with a Weight of Evidence Framework. <i>S. Street.</i> Medtronic, Saint Paul, MN. |
| | 3:40 PM | Panel Discussion/Q&A. <i>B. Lew.</i> Johnson & Johnson, Raritan, NJ. |

Wednesday, March 19, 1:30 PM to 4:15 PM, Room W307A, Convention Center

W Workshop Session: Vaccine Toxicology in the Post-COVID Era

Chair(s): Lawrence Segal, CEPI, United Kingdom; and Sarah Gould, Charles River Laboratories, France.

Primary Endorser: Regulatory and Safety Evaluation Specialty Section

Other Endorser(s): Drug Discovery Toxicology Specialty Section; Immunotoxicology Specialty Section

Nonclinical safety studies to support clinical development and registration of vaccines is a niche area within pharmaceutical regulatory toxicology. Toxicology testing for vaccines has been required since the mid-1990s, starting with the publication of the EMEA “Note for Guidance on Preclinical Pharmacological and Toxicological Testing of Vaccines” (CPMP/SWP/465/95). Toxicological assessment of vaccines is based on their mechanism of action via the immune system and in many respects is quite distinct from that required for small molecules or other categories of biological drugs. The key regulatory guidelines for nonclinical safety assessment of vaccines are those published by the World Health Organization (WHO). The 2005 WHO guidelines were focused on the effects of the adaptive immune response, while the 2013 WHO adjuvants and adjuvanted vaccines guidance confirmed that investigations of potential autoimmunity is not possible. In 2021, WHO and the US Food and Drug Administration (US FDA) COVID guidance shifted emphasis toward the innate immune system and effects unrelated to the antigen. The COVID-19 pandemic brought with it rapid advances in vaccine technology, such as the widespread introduction of mRNA vaccines, as well as changes in regulatory agency review procedures to accelerate clinical development. This session will examine several aspects of toxicology studies for vaccines in the post-COVID era, including: mRNA vaccines, lipid nanoparticles, novel adjuvants, and US FDA perspectives on vaccine testing.

Abstract #

- | | | |
|-------|---------|---|
| #1303 | 1:30 PM | Vaccine Toxicology in the Post-COVID Era. |
| | 1:30 PM | Introduction. <i>L. Segal.</i> CEPI, London, United Kingdom. |
| #1304 | 1:35 PM | Nonclinical Safety Assessment Strategy of modRNA-Based Vaccines to Prevent Infectious Diseases. <i>C. Rohde.</i> Pfizer Inc., Pearl River, NY. |
| #1305 | 2:05 PM | Lipid Nanoparticle Toxicology. <i>S. Gould.</i> Charles River Laboratories, Lyon, France.
Sponsor: <i>L. Segal</i> |
| #1306 | 2:35 PM | Nonclinical Assessment of Adjuvants: Boosters of Immunity. <i>E. Destexhe.</i> GSK, Rixensart, Belgium. |
| #1307 | 3:05 PM | US FDA Perspectives on Nonclinical Vaccine Safety Testing in the Post-COVID Era.
<i>C. Wrzesinski.</i> US FDA/CBER, Silver Spring, MD. Sponsor: <i>L. Segal</i> |
| | 3:35 PM | Panel Discussion/Q&A. <i>L. Segal.</i> CEPI, London, United Kingdom. |

Wednesday, March 19, 1:45 PM to 4:15 PM, W Hall A2, Convention Center

PS Poster Sessions

The presenting authors are available to discuss their research for Poster Sessions. Posters will be displayed from 9:00 am to 4:30 pm, with the author in attendance during the assigned Poster Session. See the *Program: Platform and Poster Session Supplement* PDF, the [SOT Online Planner](#) and [SOT Event App](#) for details.

Wednesday, March 19, 1:45 PM to 2:45 PM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Wednesday, March 19, 2:00 PM to 2:20 PM, W Hall A2, Convention Center

Tiny Tox Talk: Beyond the Informational Interview: Building Professional Relationships Throughout Your Career

Speaker(s): Lauren Walker, Pliant Therapeutics, South San Francisco, CA.

Wednesday, March 19, 2:40 PM to 3:00 PM, W Hall A2, Convention Center

Tiny Tox Talk: Your Partner in Preclinical Toxicology Studies: What Can Your Pathologist Do for You?

Speaker(s): Mark Hoenerhoff, Inotiv, Saline, MI.

Wednesday, March 19, 3:15 PM to 4:15 PM, Rooms Vary, Convention Center

E Exhibitor-Hosted Sessions

Information on the Exhibitor-Hosted Sessions scheduled for this time period is available in the “Program Overview” section of this publication, and full details, including hosts, topics, and descriptions, are available in the [SOT Online Planner](#) and [SOT Event App](#).

Wednesday, March 19, 3:20 PM to 3:40 PM, W Hall A2, Convention Center

Tiny Tox Talk: US FDA/NCTR

Speaker(s): Tucker Patterson, US FDA/NCTR, Jefferson, AR.

Wednesday, March 19, 7:00 PM to 8:30 PM, Regency Ballroom R, Hyatt Regency

(By Invitation Only)

President’s Reception



Thursday, March 20, 8:30 AM to 11:15 AM, Room W307A, Convention Center

S Symposium Session: Endocrine Disruption and Non-EATS Modalities: State of the Science for Metabolic Disorders and Next Steps ITS

Chair(s): Leah Zorrilla, Bayer CropScience US; and Helen Tinwell, Bayer CropScience SAS, France.

Primary Endorser: Regulatory and Safety Evaluation Specialty Section

Chemical perturbation of the endocrine system has been the subject of high focus for several decades. A critical in-depth evaluation of a chemical for endocrine disruption (ED) properties is now routinely performed by global regulators and industry alike as part of a rigorous chemical safety assessment. According to the current European ED scientific criteria, ED conclusions are based on adversity with a biologically plausible link to activity associated principally with the estrogen, androgen, thyroid, and/or steroidogenesis (EATS) modalities. Extensive knowledge has been gained concerning these modalities and validated guideline studies are available to identify activity and/or adversity, thus allowing robust ED conclusions. The concept of modalities other than EATS, the so-called non-EATS, is gaining traction; however, contrary to the EATS modalities, existing scientific knowledge and available methods are less advanced for non-EATS modalities. This can lead to uncertainty for applicants and regulators as well as potential inconsistencies in decision-making processes. This session will focus on the current state of the science regarding non-EATS modalities, specifically those concerning metabolic disorders. During the session, on-going initiatives on method validation and fundamental research will be presented, as well as regulatory approaches, considerations, and challenges when considering evaluation of chemicals for non-EATS associated ED properties. The session will provide insight into the current state-of-scientific-knowledge and future directions necessary to ensure robust hazard and risk assessment of the non-EATS modalities.

Abstract #

- | | | |
|-------|----------|---|
| #1308 | 8:30 AM | Endocrine Disruption and Non-EATS Modalities: State of the Science for Metabolic Disorders and Next Steps. |
| | 8:30 AM | Introduction. L. Zorrilla. Bayer CropScience US, Chesterfield, MO. |
| #1309 | 8:35 AM | Non-EATS Modalities: An ECETOC Taskforce Initiative to Determine the State of the Science and Future Needs. H. Tinwell. Bayer CropScience SAS, Sophia Antipolis, France.
Sponsor: L. Zorrilla |
| #1310 | 9:00 AM | Regulatory Viewpoint EU Including Learnings from EATS Modalities. P. Marx-Stoelting. Bundesinstitut für Risikobewertung (BfR), Berlin, Germany. Sponsor: L. Zorrilla |
| #1311 | 9:25 AM | OECD and Considerations of Endocrine Disruptors under the UN Globally Harmonised System of Classification and Labeling. P. Browne. Organisation for Economic Co-operation and Development, Paris, France. Sponsor: L. Zorrilla |
| #1312 | 9:50 AM | Factors Contributing to the Development of Human Metabolic Disorders: Preliminary Results of a Review. J. Reed. Bayer CropScience USA, Chesterfield, MO. Sponsor: L. Zorrilla |
| #1313 | 10:15 AM | The European GOLIATH Project: Development and Validation of Methods for Identifying Metabolism-Disrupting Chemicals. J. Legler. Universiteit Utrecht, Utrecht, Netherlands.
Sponsor: L. Zorrilla |
| #1314 | 10:40 AM | How to Identify Chemicals with Metabolic Disruption: A Health Canada Perspective. E. Atlas. Health Canada, Ottawa, ON, Canada. Sponsor: L. Zorrilla |
| | 11:05 AM | Panel Discussion/Q&A. L. Zorrilla. Bayer CropScience US, Chesterfield, MO. |

Thursday, March 20, 8:30 AM to 11:15 AM, Room W204A, Convention Center

S Symposium Session: Translational Toxicology: Comparative *In Vivo* Models: Charting Efficacy and Safety in Cell and Gene Therapy Development

Chair(s): Tracey Papenfuss, StageBio; and Laura Hoon-Hanks, Inotiv.

Primary Endorser: Comparative Toxicology, Pathology, and Veterinary Specialty Section

Other Endorser(s): Immunotoxicology Specialty Section

Cell and gene therapies (CGTs) are an exciting area of transformative therapies that hold great promise in precision medicine and for treating a multitude of diseases. In recent years, there's an ever-increasing number of CGTs being approved by the US Food and Drug Administration and the European Medicines Agency. The process by which these different classes of medicine move through safety and efficacy evaluation in the drug development pipeline differ from more traditional therapies, which require special, often a case-by-case, approach. In this session, we will discuss recent advances in development, application, evaluation, regulatory considerations, and emerging trends of CGTs. We will include the evaluation of programmatic considerations in the development, assessment, and shepherding of CGTs using relevant therapeutic models, discuss on-target and platform-related immune effects often seen with CGTs, and review the considerations involved in navigating the complex environment of regulatory review of these novel therapies.

Abstract #

- | | | |
|-------|----------|---|
| #1315 | 8:30 AM | Translational Toxicology: Comparative <i>In Vivo</i> Models: Charting Efficacy and Safety in Cell and Gene Therapy Development. |
| | 8:30 AM | Introduction. <i>T. Papenfuss</i> . StageBio, Mount Jackson, VA. |
| #1316 | 8:35 AM | Osteoarthritis Model Selection for Use with Gene Therapies. A. Johnson. Inotiv, Boulder, CO. Sponsor: <i>T. Papenfuss</i> |
| #1317 | 9:05 AM | Gene Therapy Program Development: Considerations for Model Selection, Efficacy, and Safety Endpoints and Navigating Regulatory Concerns/Expectations. J. Wicks. Spark Therapeutics, Philadelphia, PA. Sponsor: <i>T. Papenfuss</i> |
| #1318 | 9:35 AM | Program Development and Model Considerations for Cell Therapy Treatments. <i>Y. Yang</i> . AbbVie Inc., North Chicago, IL. |
| #1319 | 10:05 AM | Payload- and Platform-Related Immune Effects: Study Design and Evaluation Considerations for Evaluating Immune System Responses to Cell and Gene Therapies. <i>T. Papenfuss</i> . StageBio, Mount Jackson, VA. |
| #1320 | 10:35 AM | Nonclinical Considerations in the Regulation of Cell and Gene Therapy Products: An FDA/CBER Perspective. A. Shearin. US FDA, Silver Spring, MD. Sponsor: <i>T. Papenfuss</i> |
| | 11:05 AM | Panel Discussion/Q&A. <i>T. Papenfuss</i> . StageBio, Mount Jackson, VA. |

Workshop Session: Computational Dynamic Systems Models for Predictive Hazard Assessment

Chair(s): Harm Heusinkveld, Rijksinstituut voor Volksgezondheid en Milieu (RIVM), Netherlands; and Thomas Knudsen, US EPA.

Primary Endorser: Reproductive and Developmental Toxicology Specialty Section

Other Endorser(s): Biological Modeling Specialty Section; Molecular and Systems Biology Specialty Section

The session will begin by emphasizing the critical need for new approach methodologies (NAMs) in toxicology and highlighting how integrating models and diverse data sources can enhance the predictability and reliability of toxicological assessments while reducing animal testing. The introduction will set the stage for the subsequent presentations by addressing the challenges and importance of NAM validation. The next presenter will provide an overview of ontology maps, which are computational tools that organize and visualize diverse biological and toxicological data. These maps focus on six case studies related to liver, kidney, and brain toxicities. Using the Systems Biology Graphical Notation (SBGN) and the MINERVA platform, these maps integrate various data types into a machine-readable, visually interpretable format. They aid in setting up *in vitro* test batteries and *in silico* models to evaluate toxicity endpoints, supporting next-generation risk assessment through enhanced collaboration between toxicology and systems biology experts. The third speaker will discuss advancements in quantitative adverse outcome pathways (qAOPs) through integration with large language models (LLMs). This approach enables LLMs to interpret AOPs in natural language, preserving crucial details when converting qualitative pathway data into quantitative models. By minimizing information loss in this translation, AI-enhanced qAOPs improve the reliability, transparency, and trustworthiness of dose-response predictions for regulatory assessments. The presentation will conclude with a forward-looking perspective on qAOPs as dynamic “knowledge kernels,” models enriched with real-time scientific insights that could transform the landscape of toxicological assessment. The following presenter will showcase a case study on neural tube closure defects, demonstrating a dynamic systems model developed in the CompuCell3D environment. This agent-based model simulates pivotal physiological signals and cellular dynamics involved in neural tube formation. By calibrating the model with gene expression perturbation data from literature and clinical studies, it offers probabilistic assessments of developmental toxicity. This model underscores the potential of dynamic systems models in predicting and preventing human birth defects, like spina bifida, without relying on animal studies. The concluding speaker will explore the integration of experimental and computational dynamic and kinetic systems models into regulatory frameworks. Emphasizing open science and interdisciplinary collaboration, the presentation will discuss how these integrative methods can construct robust regulatory frameworks that predict toxicological and beneficial public health outcomes. This approach aligns with the principles of One Health, addressing health crises arising from pathogens and chemicals with agility and precision. The session will end with a discussion fostering an integrated dialogue among panelists and attendees on advancing the use of dynamic systems models in toxicology for improved public health and regulatory preparedness. *Disclaimer: This session does not reflect the policy of any government agency.*

Abstract #

- | | | |
|-------|---------|--|
| #1321 | 8:30 AM | Computational Dynamic Systems Models for Predictive Hazard Assessment. |
| | 8:30 AM | Introduction. <i>H. Heusinkveld.</i> Rijksinstituut voor Volksgezondheid en Milieu (RIVM), Bilthoven, Netherlands. |
| #1322 | 8:35 AM | Building Knowledge: Ontology Maps for Applications in Toxicology. <i>B. Staumont.</i> Université de Liège, Liège, Belgium. Sponsor: <i>H. Heusinkveld</i> |
| #1323 | 9:10 AM | AOPs Unleashed: The Power of Natural Language in Depicting Toxicological Mechanisms. <i>C. Wittwehr,</i> European Commission Joint Research Centre, Ispra, Italy. Sponsor: <i>J. Berkhout</i> |
| #1324 | 9:45 AM | Toward a Virtual Embryo: A Dynamic Systems Model for the Prediction of Neural Tube Closure Defects. <i>J. Berkhout.</i> Universiteit Utrecht, Utrecht, Netherlands. |

- #1325 10:20 AM **Advancing One Health Preparedness: Integrating Computational Dynamic and Kinetic Systems Models into Regulatory Frameworks.** *N. Kleinstreuer.* NIEHS/NICEATM, Research Triangle Park, NC.
- 10:55 AM **Panel Discussion/Q&A.** *T. Knudsen.* US EPA, Research Triangle Park, NC.

Thursday, March 20, 8:30 AM to 11:15 AM, Room W202A, Convention Center



Workshop Session: Do the ENDS Justify the Means? Exploring Vaping Exposures Through Varied Models

Chair(s): Nikola Kukolj, McGill University, Canada; and Vincenza Caruana, McGill University, Canada.

Primary Endorser: Inhalation and Respiratory Specialty Section

Other Endorser(s): Women in Toxicology Special Interest Group

Amidst the rapid growth of electronic nicotine delivery systems (ENDS) and the advent of new cannabis technologies, there is an urgent need to understand their implications on public health. This Workshop Session is student run and navigates the evolving landscape of ENDS and cannabis products from their chemical makeup to human exposure. Within the last decade, thousands of new products have emerged onto the market, and older products have evolved to best fit the need of the new demographic of vapers: young never-smokers. ENDS products evolve so quickly with the latest generation being only in 2022. This Workshop Session will explore chemical, mechanistic, and physiologic outcomes of the consequences of vaping via various models and extend this to epidemiological exposure assessment in humans. The session will also touch upon newer issues associated with vaping, such as the introduction of cannabis vaping and ENDS-associated metal exposures. The first presentation will discuss toxicities of the chemical constituents of nicotine- and cannabis-containing products. The second presentation will touch upon e-cigarette and cannabis use during pregnancy and lactation and the effects of vaping on germ cell epigenetic memory and transgenerational asthma. The third speaker will evaluate the consequences of an ENDS exposure using an *in vivo* model to assess inflammation in various organs, including the brain, colon, liver, and kidneys. The fourth talk will explore the pioneering use of LA-ICP-MS, a cutting-edge method, to assess the consequences of ENDS exposure on metal deposition in the lungs, specifically focusing on the spatial localization of metals post-exposure. The last speaker bridges the gap between benchwork and the impact of vaping on humans by elucidating the effects of ENDS on cardiovascular outcomes across different use patterns. This session will dissect the methodologies and outcomes from various scientific models to evaluate whether the ends—the variety of outcomes—justify the means, which include the use of these products as potential harm reduction tools or as recreational alternatives. This critical exploration will advance the conversation on how evolving products are analyzed, understood, and potentially regulated. The session will not only to serve as a forum for presenting current research but also will act as a catalyst for future interdisciplinary collaborations. It will highlight the importance of inclusivity in scientific discourse. Ultimately, the Workshop Session will contribute substantially to the ongoing debate on the responsible management of ENDS and cannabis products, ensuring that scientific integrity and public health remain at the forefront of this dynamic field.

Abstract #

- #1326 8:30 AM **Do the ENDS Justify the Means? Exploring Vaping Exposures through Varied Models.**
8:30 AM **Introduction.** *N. Kukolj.* McGill University, Montréal, QC, Canada.
- #1327 8:35 AM **Not All Vaping Is the Same: Understanding Differences in the Toxicants Emitted from Various Vaping Products.** *M. Goniewicz.* Roswell Park Comprehensive Cancer Center, Buffalo, NY.
- #1328 9:00 AM **The Molecular Mechanisms of Perinatal E-cigarette-Induced Asthma.** *D. Hatai.* University of California Los Angeles, Los Angeles, CA. Sponsor: *N. Kukolj*
- #1329 9:25 AM **Leveraging Animal Models to Identify Long-Term Health Effects of ENDS.** *L. Crotty Alexander.* University of California San Diego and VA San Diego Healthcare System, San Diego, CA. Sponsor: *N. Kukolj*

- #1330 9:50 AM **Tracing Vaping Trails: Advanced Metal Mapping in Murine Lungs.** *V. Caruana.* McGill University, Montréal, QC, Canada.
- #1331 10:15 AM **E-cigarette Use and Subclinical Cardiovascular Disease in Young Adults: The VapeScan Study.** *A. Navas-Acien.* Columbia University, New York, NY. Sponsor: *N. Kukolj*
- 10:40 AM **Panel Discussion/Q&A.** *V. Caruana.* McGill University, Montréal, QC, Canada.

Thursday, March 20, 8:30 AM to 11:15 AM, Room W304A, Convention Center

W Workshop Session: Integrating Epidemiological, Animal, and NAM Evidence to Move Beyond Correlation and into Causality

Chair(s): Paul Whaley, Lancaster University, United Kingdom; and Heather Schaefer, US FDA.

Primary Endorser: Occupational and Public Health Specialty Section

Other Endorser(s): Regulatory and Safety Evaluation Specialty Section; Risk Assessment Specialty Section

Assessing risks to human health from exposure to chemical substances is based on analysis of three streams of evidence: epidemiology, animal studies, and new approach methodologies (NAMs). The major distinguishing features of the streams are their relative reliability and human relevance: experimental studies (i.e., animal studies and NAMs) can more readily interrogate causality but are not conducted in people, while epidemiology studies are in people but are more challenging for establishing cause-effect relationships. “Evidence integration” is the process of attempting to combine the best features of all three evidence streams, using mechanistic insights from experimental research to support conclusions about the causal relationships suggested by epidemiological studies. Evidence integration has become a major point of discussion in chemical assessment, as assessors are increasingly expected to make full, systematic use of all evidence relevant to an assessment question. The goal of this Workshop Session is to promote further progress in this space by sharing the latest techniques and strategies for integrating evidence in chemical assessment and by encouraging identification and open discussion of areas of ongoing challenge. The Workshop’s session’s introductory talk will give an overview of the three evidence streams, highlighting the challenges associated with evidence integration in relation to characterizing uncertainty and causality. The first full talk will show how quantitative bias analysis can improve causal inference for observational evidence. The second talk will reveal, through case studies, how a government agency is innovating around evidence integration. The third talk will discuss the critical role that biological plausibility plays in merging information from disparate evidence streams into one integrated conclusion regarding causality. The fourth talk will address challenges for evidence integration when evidence is lacking and uncertainty high. The final talk will propose a general framework for evidence integration based on an updated interpretation of Bradford Hill’s concept of biological plausibility. Because many of the concepts presented will be novel, challenging, and controversial for the toxicology community, the Workshop Session will end with facilitated breakout discussions where the audience and speakers will be able to directly debate with each other the ideas put forward in the talks.

Abstract #

- #1332 8:30 AM **Integrating Epidemiological, Animal, and NAM Evidence to Move Beyond Correlation and Into Causality.**
- #1333 8:30 AM **An Introduction to Evidence Integration.** *H. Schaefer.* US FDA, College Park, MD.
- #1334 8:40 AM **Analyzing Bias in Epidemiological Research.** *M. Fox.* Boston University School of Public Health, Boston, MA. Sponsor: *P. Whaley*
- #1335 9:05 AM **Practical Examples of Evidence Integration.** *A. Kraft.* US EPA, Washington, DC. Sponsor: *P. Whaley*
- #1336 9:30 AM **The Critical Role of Biological Plausibility in Evidence Integration.** *M. Vincent.* ToxStrategies LLC, Cincinnati, OH.
- #1337 9:55 AM **Evidence Integration and Uncertainty.** *S. Hoffmann.* Evidence-Based Toxicology Collaboration, Paderborn, Germany.

- #1338 10:20 AM **Reconfiguring the Concept of Biological Plausibility for 21st-Century Toxicology.** *P. Whaley.* Lancaster University, Lancaster, United Kingdom.
- 10:45 AM **Panel-Led Breakout: Exploration of Opportunities and Concerns in Evidence Integration.** *P. Whaley¹, and H. Schaefer.²* ¹Lancaster University, Lancaster, United Kingdom; and ² US FDA, College Park, MD.

Thursday, March 20, 8:30 AM to 11:15 AM, Room W203A, Convention Center

W Workshop Session: Unlocking the Power of Read-Across for Safety Assessment: Current Practices and Approaches

Chair(s): Cathy Lester, Procter & Gamble; and Holger Moustakas, Research Institute for Fragrance Materials.

Primary Endorser: Computational Toxicology Specialty Section

Other Endorser(s): Regulatory and Safety Evaluation Specialty Section; Risk Assessment Specialty Section

Read-Across is a widely used animal alternative method for filling toxicological data gaps and eliminates testing chemicals on animals when structurally related, well-tested compounds can be identified. Important applications for protecting human health include evaluating chemicals found in hazardous waste sites or providing rapid toxicology predictions during emergency situations. Other more routine uses include safety assessment of chemicals in industries such as fragrances, cosmetics, and pesticides. The purpose of this Workshop Session is to describe the practice of read-across by different organizations, leading to scientifically sound and transparent safety assessment for a variety of uses and applications. Read-Across is simple in theory but challenging in practice, and often the most challenging aspect is selecting analogues and demonstrating they will cause a similar toxicological response as the target. After introducing read-across, the first speaker will describe a novel approach for finding analogues that is based on matched molecular pair principles adopted by Procter & Gamble. Once selected, methodology that quantifies similarity in metabolism, reactivity, and physical chemical properties will be shared, providing a similarity score consistent with the suitability of an analogue for use in the prediction. The second speaker will describe an approach developed by researchers at the Research Institute for Fragrance Materials that involves classifying chemicals according to their Structural Activity Groups (SAGs) resulting in a method that is robust, reliable, and reproducible. Because each organization possesses unique chemistries, expertise, and approaches, the third speaker will introduce the SOT Read-Across Collaborative Working Group, which has been established to share experiences, establish common best practices, and promote regulatory acceptance of the technique. The US Environmental Protection Agency (US EPA) uses read-across to assess the human health effects of data-poor chemicals found at contaminated sites across the US. Examples of this application will be shared by the fourth presenter who will describe an updated framework and incorporation of new approach methodology data to support the US EPA's Provisional Peer-Reviewed Toxicity Value assessments. With regulatory acceptance of read-across often elusive, the final speaker will summarize results from the analysis of European Chemicals Agency read-across and grouping submissions from the past 15 years, sharing information that may facilitate acceptance of future submissions. The session will conclude with an interactive panel discussion where all of the speakers will further discuss and answer questions regarding the various tools and approaches that can be used to strengthen the practice of read-across.

Abstract #

- #1339 8:30 AM **Unlocking the Power of Read-Across for Safety Assessment: Current Practices and Approaches.**
- #1340 8:30 AM **A Matched Molecular Pair Approach for Selecting Analogues for Read-Across Supported with Quantitative Comparisons of Similarities in Metabolism, Reactivity, and Physical Chemical Properties.** *C. Lester.* Procter & Gamble, Mason, OH.
- #1341 9:00 AM **Development and Application of Structural Activity Groups for Chemical Clustering and Read-Across in Nonanimal Safety Assessments.** *H. Moustakas.* Research Institute for Fragrance Materials, Mahwah, NJ. Sponsor: *C. Lester*
- #1342 9:25 AM **Use of Read-Across in Different Scenarios: Lessons Learned and Best Practices Implementation.** *K. Cross.* Instem, Columbus, OH.

- #1343 9:50 AM **Application of a Read-Across Framework to Support US EPA's Provisional Peer-Reviewed Toxicity Value Program.** L. Lizarraga. US EPA/CPHEA, Cincinnati, OH. Sponsor: C. Lester
- #1344 10:15 AM **To Accept or Not to Accept a Read-Across Adaptation: A Systematic Analysis of 15 Years of Testing Proposal Decisions by the European Chemicals Agency.** I. Rusyn. Texas A&M University, College Station, TX.
- 10:40 AM **Panel Discussion/Q&A.** C. Lester. Procter & Gamble, Mason, OH.

Thursday, March 20, 8:30 AM to 11:30 AM, W Hall A4, Convention Center

PS Late-Breaking Poster Sessions

Poster Sessions will be announced in February 2025.

SOT | Society of
Toxicology

Engage with SOT on Social Media

Use #2025SOT and #ToxExpo
in your posts about the meeting.

Follow SOT on social media.



grazie 谢谢 ขอขอบคุณ
 merci Σας ευχαριστώ tákkbedankt
 tack Спасибо धन्यवाद ありがとう
 gracias **thank you** terima kasih
 teşekkür ederim شكرًا 고마워요
 danke kiitos köszönjük

SOT Council

Laurie Couture Haws
 PRESIDENT

Cynthia V. Rider
 VICE PRESIDENT

James P. Luyendyk
 VICE PRESIDENT-ELECT

Dori R. Germolec
 PAST PRESIDENT

Matthew J. Campen
 SECRETARY

Brian S. Cummings
 TREASURER

Rebecca C. Fry
 TREASURER-ELECT

COUNCILORS

Lauren M. Aleksunes

Chidozie J. Amuzie

Darryl B. Hood

Agnes L. Karmaus

Betina J. Lew

Jennifer L. Rayner

Continuing Education Committee

Bethany R. Hannas
 CHAIR

Kelly M. Almond-Abbate
 CO-CHAIR

Betina J. Lew

Alicia Marie Bolt

Marie Meagher Bourgeois

Elena Chung
 STUDENT REPRESENTATIVE

Melissa Heintz

Kristin Noell

Nisha S. Sipes

Sambasivarao Tadepalli

David S. Umbaugh
 POSTDOCTORAL REPRESENTATIVE

Caren M. Villano

Scientific Program Committee

Cynthia V. Rider
 CHAIR

James P. Luyendyk
 CO-CHAIR

Roderick Todd Bunch

Mark Collinge

Andrea De Vizcaya-Ruiz

Rodrigo Franco

Aileen F. Keating

Nynke Irene Kramer

Somshuvra Mukhopadhyay

Sharmilee P. Sawant

Lena Smirnova

Lisa Truong

Daniele Staskal Wikoff

Leah M. Zorrilla