

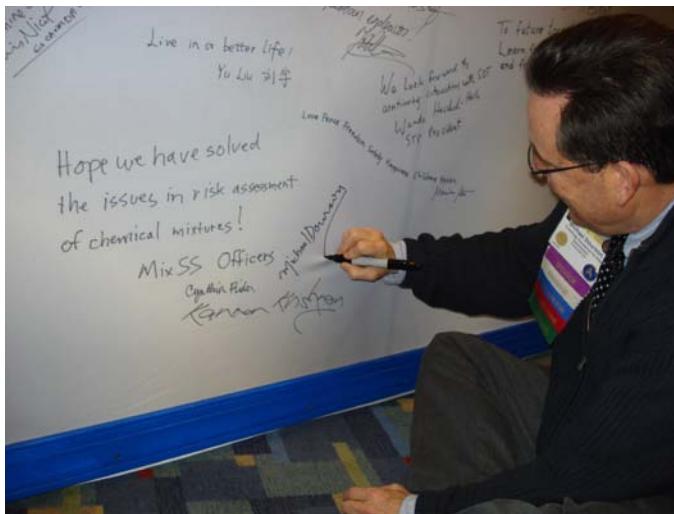
Mixtures Specialty Section Newsletter

Volume 2, Issue 2

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President's Challenge

Michael Dourson, PhD, DABT, ATS
MixSS President
Toxicology Excellence for Risk Assessment (TERA)



Michael Dourson writes a message for the SOT time capsule

Instead of the standard update on MixSS events (which can be found throughout this issue), we thought it would be interesting to put forth a challenge to our membership. In the spirit of contributing to “solving the issues in risk assessment of chemical mixtures”, we plan to feature a question-to-the-MixSS-membership in each of the next 3 issues. Please send your feedback on the question to Cynthia Rider (cynthia.rider@nih.gov) and we will print your responses in the next issue!

Here is the question:

Toxicity testing in the 21st century will be much more focused on in vitro bioassays. What kinds of methods/guidelines will mixtures researchers need to develop to both analyze and assess risks from these bioassays?

We look forward to hearing from you!

MixSS at the SOT 50th Anniversary Meeting

Cynthia Rider, PhD
MixSS Secretary/Treasurer
NIEHS/DNTP

The 50th Anniversary SOT Meeting in Washington D.C., March 6-10, provided many exciting opportunities to learn about the current state of the science of mixtures research and network with colleagues. Following is a recap of the mixtures-related events.

The Continuing Education Course **“Toxicology and Risk Assessment of Chemical Mixtures”** organized by Jane Ellen Simmons (MixSS Past President; EPA/NHEERL) was very well attended and received a lot of positive feedback. The success of the course prompted Jane Ellen to submit a proposal for an advanced mixtures course at the SOT 2012 meeting (see *details on page 4*).

At the **officers’ meeting** on Monday morning, ideas for increasing the visibility and impact of the MixSS were presented. New officers were introduced and topics discussed included: increasing membership, webinars, ideas for mixtures-related proposals for the SOT 2012 program, awards, and the MixSS reception.

There were two sessions sponsored by Mix SS:

The Monday morning symposium session, **“Emerging Issues at the Intersection of Reproductive and Mixtures Toxicology”** covered

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mixtures issues from perspectives ranging from ecotoxicology to human health research. Speakers included: Daniel Schlenk (UC Riverside), Gary Ankley (US EPA), Nancy Denslow (University of Florida), L. Earl Gray (US EPA), and Andreas Kortenkamp (University of London)

The workshop entitled **“Approaches for Incorporating Non-chemical Stressors into Cumulative Risk Assessments”** took place

Wednesday morning (see picture below). Experts provided suggested frameworks for characterizing exposure to, joint effects of, and risk associated with chemical and nonchemical stressors. The audience was interested in learning more about practical approaches for incorporating nonchemical stressors into risk assessments given the data available right now. Results from the workshop are currently being prepared for publication.



From left to right: Cynthia Rider (chair), Moiz Mumtaz (speaker), Michael Dourson (speaker), Richard Hertzberg (speaker), Jane Ellen Simmons (co-chair), and Paul Price (speaker)

In addition, there were two workshops on Thursday that were endorsed by MixSS: **“Integration of Toxicological and Epidemiological Evidence to Understand Human Risk”** and **“Role of Biomarkers in Assessing Tobacco Harm Reduction: A Toxicological Perspective”**

The **MixSS Reception** that took place Wednesday night was a great success. Following refreshments, outgoing president Kannan Krishnan welcomed everyone and updated members on MixSS activities. Then, incoming president Michael Dourson provided a look to the future and encouraged MixSS members to get involved in the field by reviewing mixtures-related manuscripts and serving as experts. In an exciting portion of the evening, incoming president-elect, Ken Wallace, presented awards for Best Mixtures Abstract, Best Student Abstract Award, and Best Post doctoral Abstract Award (see pictures to the right).



Kannan Krishnan (right) presents the Best Abstract Award to Johnathan Boyd (West Virginia University)



Martin Rothlisberger (right) presents the JAT/Wiley Sponsored Award for Best Student Abstract to Julia E. Rager (University of North Carolina)



Martin Rothlisberger (right) presents the JAT/Wiley Sponsored Award for Best Post doctoral Abstract to Suzane Ramos da Silva (Sao Paulo State University Medical School)



Michael Dourson (right) presents Kannan Krishnan with a plaque commemorating his excellent service as 2010-2011 President of the MixSS



Dieldrich Bermudez (formerly of US EPA, currently at SC Johnson) with his award-winning poster

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Mixture Mixer – Socializing at the Reception



David Herr and Danielle Carlin mix it up



Synergy! Mike DeVito, Rick Hertzberg, and Chris Gennings



Chad Blystone and Paul Price talk mixed exposures

From single-chemical toxicology to mixtures toxicology - A personal perspective

Xianglu Han, Ph.D.
MixSS Post doctoral Representative
Dow Chemical Company

I started research on mixtures toxicology one year ago and joined the SOT Mixtures Specialty Section shortly after. Though I am a “newbie” in this area, my first exposure to toxicology started way back in 1995 when I sat in a toxicology class.

The reason I decided to take the opportunity to do research on mixtures was that human beings are exposed to multiple stressors in the form of mixtures every day, but traditionally toxicology has focused on single stressors (either in lab studies or in risk assessment). After all, toxicology is application-oriented and aims to solve real world issues. Often with limited resources, toxicologists and risk assessors should try to solve issues that are in dire need (no matter how challenging they can be) and not those that are easy to deal with.

One of the aims of the SOT Mixtures Specialty Section is to coordinate research efforts on tackling the challenging issues of mixture toxicity. It facilitates communication among mixtures toxicologists and risk assessors so that the research and regulation of mixtures can move forward more smoothly.

The emerging and challenging area of mixtures toxicology is also in dire need of more toxicologists and more research funding. A prerequisite for more research funding is a broader awareness among the whole toxicological and risk assessment community of the urgency and challenges of solving mixture issues. There are several means that we (the mixtures specialty section members) can make use of to increase the awareness of mixtures issues. We can proactively communicate with members in other sections on their current research and see if there are connections between their research topics and mixtures issues. Another effective measure that has been taken is to sponsor or endorse as many mixture-related sessions as possible.

During the annual SOT meeting, there are always so many topics that every attendee has to set priorities for topics in which they will participate. Most already have a rough idea of what topics they are aiming for even before they browse the list of possibilities. However, many attendees will have some “grace” time slots for which they do need to think a little bit before finally deciding what sessions to go for. This is where we can attract their attention by carefully designing broadly appealing sessions.

SOT 51st Annual Meeting

March 11-15, 2012
San Francisco, CA



Looking ahead to SOT 2012, there are many great opportunities to learn about and discuss mixtures. Stay tuned for additional details about the following sessions in our next newsletter. Also, be sure to join us for our annual Mixtures Specialty Section Reception!

Advanced CE course:

Specialized Techniques for Dose-Response Assessment and Risk Assessment of Chemical Mixtures (PM12)

Chairs: Jane Ellen Simmons (US EPA) and Mike DeVito (NIEHS/NTP)

Description: The first lecture, presented by **Dr. Jane Ellen Simmons (US EPA/NHEERL)** will set the stage for the course by presenting in detail the risk assessment flow diagram that guides users to appropriate methods based on the available data. Data quality classification methods, whole mixtures, sufficient similarity and groups of similar chemicals (comparative potency (CP) and geographic site-specific assessment) will also be covered. The second presentation by **Dr. Rick Hertzberg (Biomathematics Consulting)** will cover two closely related component-based methods, hazard index (HI) and target-organ toxicity hazard index (TTHI) that are based on an assumption of dose addition, and the interaction-based hazard index (IntHI) that allows for consideration of nonadditivity. The third presentation by **Dr. Bob Budinsky (Dow Chemical Company)** and **Dr. Mike DeVito (NIEHS/NTP)** will cover two related component-based methods based on dose addition, toxic equivalency factors and relative potency factors. The fourth presentation by **Dr. Moiz Mumtaz (ATSDR)** will describe a risk assessment methodology, binary weight of evidence (BINWOE) that characterizes the nature of interactions (additive, greater than additive, less than additive) for risk assessment purposes. For each

methodology (whole mixture and component-based), the presenter will describe data requirements, assumptions and limitations. Examples that illustrate the application will be presented for CP, HI, TTHI, IntHI, TEF, RPF and BINWOE methodologies. At the conclusion of this course, the student will: a) be able to navigate the risk assessment flow chart and, for specific and general data situations, arrive at one or more reasonable methods; b) be familiar with the breadth of approaches and techniques for component-based assessments; c) have an understanding of the assumptions, limitations and uncertainties underlying the presented approaches; d) have clear, useful and coherent examples of six component-based approaches; and e) be able to apply both common and less frequently used risk assessment methods to their own multi-pollutant data situations, or discuss these methods more knowledgeably with experts.

Sponsored sessions:

Informational session: Evolution and Implementation of Combined Chemical Exposure Methods: International Perspectives

Session chairs: Moiz Mumtaz (ATSDR) and Bette Meek (University of Ottawa)

Workshop: Sufficient Similarity of Whole Representative Mixtures or a Relative Potency Factor Approach: PAHs as a Case Study

Session chairs: Cynthia Rider (NIEHS/NTP) and Julia Gohlke (University of Alabama at Birmingham)

Endorsed sessions:

Workshop: Chemical Standardization of Botanical Medicines for Safe and Effective Use as Therapeutic Agents

Session chairs: Madhu Soni (Soni & Associates Inc.) and Brinda Mahadevan (Abbott Laboratories)

Workshop: Novel Topics in Environmental Polycyclic Aromatic Hydrocarbon Metabolism Leading to Carcinogenesis

Session chairs: Danielle Carlin (NIEHS) and Bhagavatula Moorthy (Baylor College of Medicine)

Workshop: Advancing Food Safety in a Global Marketplace

Session chairs: Nicola Stagg (Dow AgroSciences LLC) and Michael Bolger (U.S. FDA)

Symposium: The Toxicological Impact of Metals, Crude Oil and Chemical Dispersants from the Gulf of Mexico Oil Crisis on Human and Wildlife Health

Session chairs: John Pierce Wise (University of Southern Maine) and Joe Griffitt (University of Southern Mississippi)

Upcoming Mixtures Events

NIEHS Mixtures Workshop

Dates: September 26-27, 2011

Location: Sheraton Chapel Hill, NC

Title: *Advancing Research on Mixtures: New Perspectives and Approaches for Predicting Adverse Human Health Effects*

ADVANCING RESEARCH ON MIXTURES:
New Perspectives and Approaches
for Predicting Adverse Human
Health Effects



For detailed information, see the website:
<http://tools.niehs.nih.gov/conferences/dert/mixtures/>

Format: 2-day meeting with plenary speakers and multidisciplinary breakout groups.

Registration: This meeting is open to observers from the public, but registration is limited. A registration page is available on the website above.

Key Topics to be discussed by workshop participants include:

Topic 1 - Modeling Mixture Toxicity: Constraints of Extrapolation

What are recommended research approaches to overcome the key challenges to the application of predictive models of mixture toxicity (e.g. dose addition, sufficient similarity of complex mixtures, or alternative models)?

Topic 2 - Exposure Assessment: Making Sense of Biomonitoring Data

How can we use exposure data (e.g. the Exposure Biology Program, NHANES, and the exposome) in designing toxicology and epidemiology studies to better understand the contribution of environmental exposures to human disease?

Topic 3 - Epidemiology: Reconciling Epidemiological and Toxicological Approaches to Mixtures

What are suggested research strategies that incorporate lessons from both epidemiology and toxicology to increase our understanding of the role of environmentally-relevant mixtures in human disease?

Topic 4 - Chemical Interactions: Predicting the Unpredictable

What types of in vitro to in vivo approaches are needed to screen chemicals for potential interactions and how can

they best be applied to provide biologically-meaningful information?

Topic 5 - Temporal Mixtures

What types of research approaches are required to elucidate principles of both mixture exposures and associated health effects across time?

Contact: Danielle Carlin (danielle.carlin@nih.gov) or Cynthia Rider (cynthia.rider@nih.gov)

International Toxicology of Mixtures Conference

Dates: October 21-23, 2011

Location: Sheraton National Hotel, Arlington, VA

For detailed information, see the website:
<http://www.toxicologyofmixtures.com/>

Invited speakers include: Dr. Alan Boobis (Imperial College London), Dr. Sami Haddad (Université de Montréal), Dr. Andreas Kortenkamp (University of London), Dr. Gerald LeBlanc (North Carolina State University), Dr. Hans Løkke (Aarhus University), Dr. Anna Lowit (US EPA-OPP), Dr. Bette Meek (University of Ottawa), Dr. Christopher Portier (ATSDR), Dr. Jane Ellen Simmons (US EPA-NHEERL), Dr. Nigel Walker (NIEHS-NTP), and Dr. Raymond Yang (Colorado State University), and Dr. Rosemary Zaleski (ExxonMobil Biomedical Sciences, Inc.)

From the website:

International Toxicology of Mixtures Conference 2011, will provide a dedicated platform to the discussion and debate of current evidence - based approaches to assessing the risk of mixtures. The conference will bring together the international toxicology community to not only review the conventional models and methods but to also challenge established opinions and work towards the development of more precise modes for understanding the toxicity and predicting risk.

Attracting a truly international audience, the Program will feature invited speakers presenting innovative and provocative perspectives for assessing interactions leaning towards improvement for assessing the risk of chemical mixtures. This is a unique opportunity to join your peers to discuss, debate, and challenge the current research and will provide an opportunity to effectively network with your colleagues.

A Membership-Building Challenge to All Current Members

Ken Sexton, PhD

Mixtures Specialty Section Councilor
University of North Carolina, Chapel Hill

Think back to when you first heard about the Mixtures Specialty Section and what made you interested in it. Maybe you already knew, or maybe you were curious, about the need for the Mixtures Section. Your membership was timely, because now, more than ever, there is a need to study topics of interest to the section.

For example, the EPA is developing a new approach for regulating the risk of exposure to the complex multipollutant air mixtures we breathe every day. Not everyone considers how the presence of other compounds may impact the toxicity of their compound of interest (e.g. through additive or synergistic interactions). So, by encouraging potential new members to join our specialty group, you may indirectly accelerate the field as well as help build the section.

I challenge all of us to find just one new potential member and encourage them to join!

Changes to the MixSS Bylaws

David Mattie, PhD, DABT

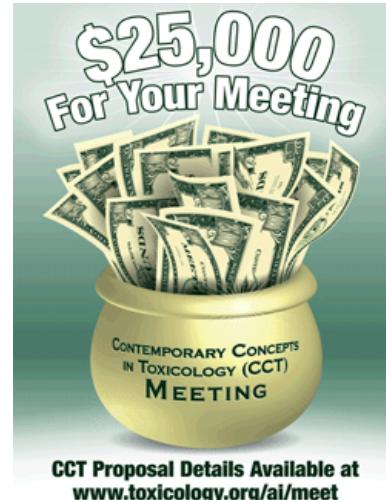
MixSS Vice President-Elect
Wright Patterson AFB

In order to align bylaws with our current practices, text was added to include graduate student and post doctoral representatives to Article V – Election of Officers, Councilors, and Representatives. The Officers have approved the changes to the bylaws and they are currently being processed by SOT. Members will be sent the revised bylaws for approval in the near future.

Good luck, David and Welcome, Julia!

Congratulations to our Graduate Student Representative, David Szabo (formerly of UNC) for his post doctoral position at US EPA NCEA. We wish him the best at his new position! The winner of our 2011 Best Student Abstract Award, Julia Rager (UNC) has graciously agreed to step in and take over as Graduate Student Representative for the remainder of 2011-2012.

SOT CCT Meetings Eligible for Seed Money and Profit Sharing



SOT Sponsors two types of meetings outside of the SOT Annual Meeting: Contemporary Concepts in Toxicology (CCT) and Non-SOT meetings. CCT meetings are one- to two-day focused, open registration, scientific meetings in contemporary and rapidly progressing areas of toxicological sciences. Non-SOT meetings are sponsored by other not-for-profit organizations and SOT will either endorse or provide sponsorship money to toxicology-related meetings.

The Society will underwrite all the liabilities of the CCT meeting with the expectation that the meeting will at least break even financially. The goal of providing \$25,000 seed funds is to stimulate the creation of CCT meeting proposals.

For more information about CCT meetings, please visit the [SOT Web site](http://www.toxicology.org/ai/meet).

If you would like to provide an opinion piece for the MixSS Newsletter (800 words or less) or get the word out about mixtures-related events, contact Cynthia Rider (cynthia.rider@nih.gov)