

# Mixtures Specialty Section Newsletter

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## President's Message

Meg Whittaker, PhD  
MixSS President  
ToxServices



Dear Members,

On behalf of the Mixtures Specialty Section (MixSS) Executive Committee, I am pleased to present the MixSS Newsletter. I am honored to serve the MixSS in the advancement of mixtures

toxicology as the 2016/2017 MixSS President. As your President, my job is to ensure that SOT-related webinars and meetings include topics relevant to mixtures, grow membership in the MixSS, as well as increase the visibility of mixtures-related topics within the Society.

The MixSS was launched in 2006, and as part of celebrating our Specialty Section's ten-year anniversary, it is important to reflect upon the progress we've made. On a world-wide scale, mixtures are now regularly considered as part of classifying and labelling hazards of mixtures in 72 countries (including the United States) as part of the Globally Harmonized System of Classification and Labeling of Chemicals ("GHS"), benefitting and protecting the health of millions of workers, the public, and the environment. A search of PubMed for publications pertaining to chemical mixtures evidences a steady increase in mixtures toxicology papers over the past 40 years, and now more than 1,200 mixtures toxicology papers are published annually.

For the fifth year in a row, MixSS is joining with the Risk Assessment Specialty Section (RASS) to co-host RASS-MixSS webinars in September, 2016 and

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## SOT 2016 Recap New Orleans Edition



Cynthia Rider, PhD  
MixSS Vice President  
NIEHS/DNTP



MixSS Officers past and present: Bruce Fowler, Meg Whittaker, Cynthia Rider, Axelle Marchand, David Herr, Julia Rager, and Nigel Walker

The MixSS Officers met on Monday, March 14<sup>th</sup> at 6:30 am to discuss logistics of the 2016 MixSS reception and distributing awards. *If you have wanted to get involved in the MixSS, serving as an officer is a great way to do so (see page 5 for details).*

Two Mixtures-related poster sessions on Tuesday, "Toxicity of Metal Mixtures" and "Mixtures," showcased the latest mixtures work and provided great opportunities to discuss details with colleagues. Most of our award-winners were featured in these poster sessions (see awards on page 3).

Scientific sessions throughout the week that were endorsed by the MixSS covered various topics of interest to members.

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January, 2017. These webinars have been a great success, and I would like to thank Dr. Kembra Howdeshell (MixSS) and Dr. Annie Jarabek (RASS) for their efforts. The September webinar by Dr. Jane Clougherty of the University of Pittsburgh, titled “Incorporating non-chemical stressors into cumulative risk assessment (CRA)” highlights challenges associated with incorporating factors such as socioeconomic status and associated psychosocial stress into CRA (see page 5). In reality, mixtures of agents and stressors result in adverse public health or environmental outcomes. It is exciting to see CRA methods advance to reflect these realities.

Student members of MixSS—reach out to members of the MixSS Executive Committee and network with us—we were once in your position, and we are all friendly! Finally, I challenge each MixSS member to recruit at least one new member. We are one of 27 specialty sections within the Society, and recruiting and retaining members is critical to our viability. If you are interested in running for open officer positions for the 2017/2018 term (see page 5) or have ideas to share, please contact me ([mwhittaker@toxservices.com](mailto:mwhittaker@toxservices.com)).

Sincerely,

*Meg Whittaker*

A workshop on Quantitative Cumulative Risk Assessment took place on Monday, March 14<sup>th</sup>. Moiz Mumtaz, former MixSS President and 2013 Arnold J. Lehman awardee, chaired the session with Gregory Brorby of ToxStrategies. Speakers included Glenn Rice (US EPA), Lauren Zeise (California EPA), Jeffrey Wickliffe (Tulane University), Mina Suh (ToxStrategies), and Junenette Peters (Boston University). Participants presented their views on the feasibility of conducting cumulative risk assessments using case study examples.

Tuesday, March 15<sup>th</sup> brought a second workshop on mixtures titled, “Unknown, unknowns: Exploring the Unidentified Fraction of Complex Mixtures. Past MixSS President, Jane Ellen Simmons (EPA), served as co-chair and speaker in the session, which focused on complex mixtures. Kim Anderson (OSU) and Dean Jones (Emory University) discussed untargeted

chemistry and metabolomics methods, while the remaining speakers, including Jane Ellen Simmons, Rick McKee (American Petroleum Institute), and Glenn Rice (EPA), discussed assessing toxicity of and performing cumulative risk assessments on whole, complex mixtures.

On Thursday, March 17<sup>th</sup> a timely workshop on “Potential Health and Environmental Effects of Hydraulic Fracturing” was chaired by Travis Knuckles (West Virginia University) and Judith Zelikoff (New York University Medical Center). This workshop qualified participants for Continuing Medical Education credit. The session started with an overview of Unconventional Gas Exploration and Possible Occupational Exposures by John Snawder of NIOSH. Speakers, including Terry Polen (West Virginia Department of Environmental Protection), Michael McCawley (WVU), Beizhan Yan (Columbia University), and Judith Zelikoff, then covered regulations, acute and chronic health effects, chemistry, and animal models to assess toxicity associated with hydraulic fracturing, respectively.



**We  
Want  
You!**

**To Submit your Mixtures-  
related session proposals for  
SOT2018**

Do you have an idea for a session that you have never seen at SOT before? Do you know of a speaker that could present a new perspective on mixtures? Do you have a half-baked idea in need of more...something?

We want to help you develop these ideas into sessions. Please contact us with your ideas or questions about how to put a session together ([cynthia.rider@nih.gov](mailto:cynthia.rider@nih.gov)).

Submit any time between now and April 1<sup>st</sup> to give us time to provide you with feedback before the submission deadline of April 30<sup>th</sup>, 2017.

## Mixtures Reception 2016

The MixSS Reception took place on Tuesday, March 16<sup>th</sup>. After some time spent catching up with old friends and getting to know new ones, we briefly discussed MixSS business, including goals for increasing membership and mixtures-related proposal submissions, current financial state of the section, and recruiting new officers. We then had a chance to thank David Herr, the outgoing MixSS president, for his excellent leadership! As a long time MixSS member, David has always had great ideas about how to increase visibility for the Specialty Section.



Meg Whittaker presents David Herr with plaque

Following was the exciting presentation of awards for best student, best postdoc, and top 6 abstracts - including best abstract (see page 4).

Next, we had our second annual Mixtures Trivia emceed by Councilor extraordinaire, Nigel Walker (NTP/NIEHS)! In case you missed it, here are some highlights (see answers on last page)

1. SOT 2016 is here in New Orleans, which is famous for Mardi Gras and the colored beads. What do the 3 colors of Mardi Gras (Purple, Gold and Green) represent?
2. New Orleans is famous for the Pat O'Briens "Hurricane." Name the 8 ingredients in a traditional Pat O'Briens Hurricane
3. One of the symposia endorsed by the Mix SS today was titled Unknown, Unknowns: Exploring the Unidentified Fraction of Complex Mixtures. Who is often credited with making famous the phrase "Unknown, unknowns" back in 2002?
4. Quite a few folks will spend the evening dining or drinking in the New Orleans French Quarter. How do you say "mixture" in French?

***Special thanks to Axelle Marchand (Former MixSS Postdoc rep and official MixSS photographer of SOT 2016)***

The winners of the trivia contest earned beads and hot sauce to celebrate the traditions of host city, New Orleans.



Some pictures from the reception...



This group knows how to say "mixtures" in French!



Deep thoughts



Nigel Walker...pub trivia Master



## MixSS Awards

### Graduate Student Award

**Parker Duffney (University of Rochester Medical Center)**

Cigarette Smoke Dampens Anti-viral Response by Disrupting TLR3/IFN Axis in Lung Epithelial Cells

### Postdoctoral Award

**Justin Conley, PhD (US EPA)**

*In vitro*-to-*in vivo* extrapolation of xenoestrogens using an estrogen responsive *in vitro* transcriptional activation assay and the *in vivo* uterotrophic assay



**Giant thanks to Wiley and to Meg Whittaker and ToxServices for supporting the MixSS awards!**

### Best Mixtures Abstract

(selected from the top 5 abstract pool)

Cynthia Rider (NTP/NIEHS)

*In Vitro* Screening to *In Vivo* Testing of Polycyclic Aromatic Compounds at the National Toxicology Program

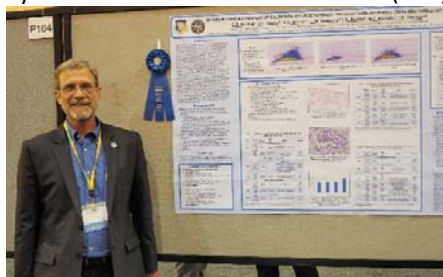
### Top 6 Abstracts

(in alphabetical order by first author)

Contact author: David Mattie (Wright-Patterson AFB)

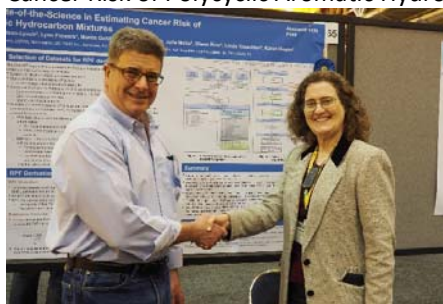
Title: Health Hazard Assessment of Alcohol-To-Jet (ATJ)

Synthetic Kerosene with Aromatics (SKA) Alternative Jet Fuel



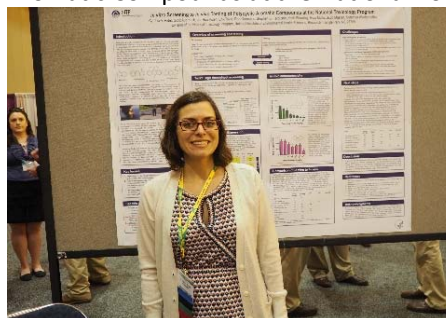
Contact author: Margaret Pratt (US EPA)

Title: Advancing the State-of-the-Science in Estimating Cancer Risk of Polycyclic Aromatic Hydrocarbon Mixtures



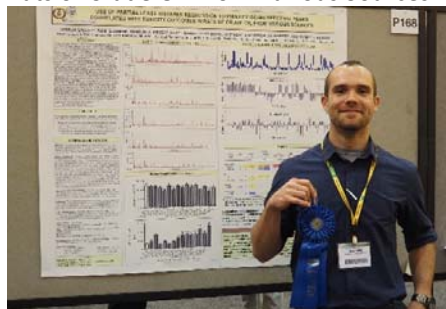
Contact author: Cynthia Rider (NIEHS/NTP)

Title: *In Vitro* Screening to *In Vivo* Testing of Polycyclic Aromatic Compounds at the National Toxicology Program



Contact author: Joshua Salley (University of Louisiana-Monroe)

Title: Use of Partial Least Squares Regression to Identify GC/MS Spectral Peaks Correlated with Toxicity Outcomes in Rats of Crude Oil From Various Sources



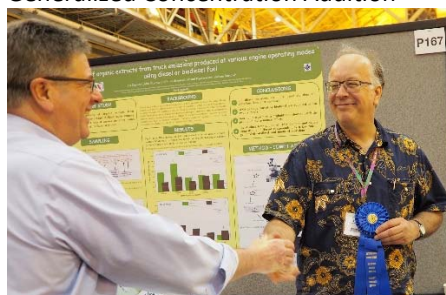
Contact author: Mathieu Valck (Université de Montréal)

Title: Evaluation of the Magnitude of The Age-dependant Adjustment Factor (ADAF): a Kinetics-based Case Study with Trichloroethylene and Vinyl Chloride



Contact author: Thomas Webster (Boston University)

Title: Mixtures of Full and Partial Agonists: Several Mechanisms of Receptor Activation are Consistent with Generalized Concentration Addition



## NOMINATE THE NEXT MixSS OFFICERS

Nominations are open for the positions of Vice President-Elect, Councilor, Secretary/Treasurer, Postdoctoral Representative, and Graduate Student Representative. Please consider nominating yourself or someone you think would be interested. Please contact **David Herr** (Herr.David@epa.gov) with nominations.

A short (1 paragraph) biosketch with the nominee's qualifications/interests is all that is needed. The Past President will lead a nominations committee that will submit the slate of candidates to SOT by December 31, 2016. Membership will then vote to elect the 2017-2018 MixSS officers.

In addition to participating in approximately 4-6 conference calls per year, officer duties include:

### **Vice President-Elect (1 year followed by transition to Vice President, President, and Past President – 4 years total)**

- Administer Graduate Student/Postdoc Award
- Present Student/Postdoc Awards during MixSS reception
- Review and update by-laws

### **Secretary/Treasurer (2 years)**

- Prepare annual report for submission to SOT HQ
- Take minutes at meetings
- Submit budget for annual meeting reception to SOT HQ
- Report on finances at SOT Annual Meeting MixSS Reception
- Purchase plaques and ribbons for SOT Annual Meeting MixSS Reception

### **Junior Councilor (1 year followed by transition to Senior Councilor position – 2 years total)**

- Work on increasing membership
- Coordinate updates to website

### **Postdoctoral Representative (1 year)**

- Report MixSS-related events to PDA
- Provide postdoctoral perspective to MixSS activities

### **Graduate Student Representative (1 year)**

- Report MixSS-related events to GSLC
- Provide student perspective to MixSS activities

## Recent RASS/MixSS Webinar

### ***Incorporating Non-Chemical Stressors into Cumulative Risk Assessment (CRA)***

**Jane Clougherty, MSc, ScD**, Department of Environmental and Occupational Health, Graduate School of Public Health, University of Pittsburgh



**Wednesday, September 14, 3:00-4:30**

**Abstract:** Socioeconomic factors and chronic stressors (e.g., noise) are increasingly shown to both confound and modify relationships between physical exposures (e.g., air pollutants) and many health outcomes. As a result, in recent years, cumulative risk assessments (CRAs) have begun to incorporate non-chemical stressors, including psychosocial stressors, into estimations of risk. Because physical and psychosocial factors influencing total exposures and susceptibility may arise from both the community and occupational environment—and exposures derived from one setting may modify impacts of exposures derived from the other—there is likewise a growing need to incorporate exposures derived from multiple environments into CRAs. In this presentation, Dr. Clougherty will discuss the current state of the knowledge on combined effects of pollutants and psychosocial stressors on health, and describe new methods for quantifying, and accounting for, potential confounding and effect modification by non-chemical stressors in environmental and occupational CRAs.

To access slides and the webinar recording of this and other RASS/MixSS webinars, go to:

<http://www.toxicology.org/groups/ss/RASS/downloads.asp>

Contact **Kembra Howdeshell** (MixSS Webinar coordinator) at [kembra.howdeshell@nih.gov](mailto:kembra.howdeshell@nih.gov) with suggestions for future webinars.

## Past Events

### Workshop: Addressing Challenges in the Assessment of Botanical Dietary Supplement Safety

**Date:** April 26-27, 2016

**Location:** NIH, Bethesda, MD

**Description:** Botanical dietary supplements represent an important public health concern, considering the high level of exposure and the lack of quality control of botanicals. Challenges in assessing botanical safety discussed at the workshop included: methods and criteria for determining sufficient similarity of complex mixture botanicals, approaches for identifying the active constituent(s) or biological effect patterns of botanical products, and challenges in conducting absorption, distribution, metabolism, and elimination studies with complex mixtures.

Videocast of the meeting is available at:

<http://ntp.niehs.nih.gov/about/presscenter/events/2016/index.html>

Stay tuned for publications describing the discussions and conclusions from the workshop.



Panelists (from right) Glenn Rice, James McGregor, Kerri LeVanseler, and Ikhlas Khan discuss sufficient similarity of botanicals; photo courtesy of Natasha Catlin



Paul Coates (Director of the NIH Office of Dietary Supplements) and Linda Birnbaum (Director of NIEHS and NTP); photo courtesy of Paula Whitacre

## Upcoming Events

### Next RASS/MixSS Webinar

**January 11, 2017**

**Marike Kolossa-Gering, PhD**

German Environmental Agency  
Berlin, Germany

**Presentation title:** German Environmental Survey and Specimen Bank and the use of the human biomonitoring data for risk assessment

**Abstract:** Humans are exposed to chemicals via the environment, food, and consumer products resulting in an aggregated exposure to a mixture of chemicals. The German Environmental Agency (UBA) employs the German Environmental Survey (GerES) and the German Environmental Specimen Bank (ESB) to quantify human exposure and support health risk assessment. The GerES is a population-representative study that includes human biomonitoring and information on exposure pathways and living conditions. The ESB is a permanent monitoring study following trends of pollutants in humans and the environment. This presentation will describe the GerES and ESB, and demonstrate how the data are being used to develop and assess human health risk assessment of individual and mixtures of chemicals, and policy measures in Europe with the European Human Biomonitoring Initiative.

## SOT Supplemental Training for Education Program (STEP)

**What:** Funding to doctoral students for pursuit of targeted professional/scientific development training outside of their graduate research area.

**When:** Apply by October 9<sup>th</sup>

**How:** Find more information at

<https://www.toxicology.org/education/st/step.asp>

### Answers to quiz questions from page 3

1. Rex, the King of Carnival, selected the Mardi gras color scheme in 1892, declaring purple for justice, green for faith and gold for power.
2. Pat O'Briens Hurricane: 2 oz light rum, 2 oz dark rum, 2 oz passion fruit juice, 1 oz orange juice, ½ oz fresh lime juice, 1 Tablespoon simple syrup, 1 Tablespoon grenadine. Enjoy responsibly!
3. Donald Rumsfeld famously referred to "unknown, unknowns" along with "known, knowns" and "known, unknowns."
4. The French term for mixture is mélange.