Final Program

2019 Annual Meeting

SRA 2019
Risk Analysis in the Data Analytics Era

December 8 - 12 · Arlington, VA
THE FUTURE OF SYSTEMATIC REVIEWS IS HERE.

DistillerSR
SYSTEMATIC REVIEW SOFTWARE
Meeting Highlights

Meeting Events! Most events take place at the Crystal Gateway Marriott. Start with the Opening Reception on Sunday, December 8, 6:00-7:30 PM (cash bar), and continue to the closing T-shirt Giveaway and Raffle (with the possibility of winning registration to the 2020 Annual Meeting), Wednesday, December 11, 5:00 PM. The meeting includes three plenary sessions, and complimentary box lunch on Monday, Awards Banquet Lunch on Tuesday (included in your registration), and a Plenary Luncheon on Wednesday (also included in your registration fee). Don’t forget workshops on Sunday and Thursday - there is still room!

Meeting Theme – “Risk Analysis in the Data Analytics Era” highlights the important role risk analysts have in tackling risk problems and improving the science and practice of risk analysis.

Poster Reception! The meeting will feature a poster reception with food and drinks on Monday evening from 6:00 PM – 8:00 PM. Poster set up starts at 3:00 PM and poster presenters will be at their posters for questions and discussion during the reception. Vote for the best poster awards on the app! Don’t miss it!

Special Student Events

Sunday, December 8
Students & Young Professionals Business Meeting
4:00 PM – 5:00 PM – Rosslyn
Welcome Mixer and Seminar for Students, Young Professionals, and New Members
5:00 PM – 6:00 PM – Rosslyn

Monday, December 9
New Member, Student/Young Professionals Breakfast
7:00 AM – 8:00 AM – Skyview
Students and Young Professionals Mixer
8:30 PM – 10:00 PM – Offsite: Crystal City Sports Pub

Tuesday, December 10
Graduate Student Breakfast
7:00 AM – 8:00 AM – Lee
2019 Council
President: Katherine McComas
President-Elect: Seth Guikema
Secretary: Elisabeth Gillmore
Treasurer: Henry Willis
Past Treasurer: Bilal Ayyub
Past President: Terje Aven
Executive Secretary: Brett Burk
Managing Director: Jill Drupa

Councilors
Mark Borsuk
Royce Francis
Jacqueline MacDonald Gibson
Sally Kane
Myriam Merad
Shital Thekdi
Shoji Tsuchida
Pia-Johanna Schweizer
Vanessa Schweizer

2019 Program Committee
Seth Guikema, president-elect and chair
Stanley Levinson, co-chair
Jennifer Rosenberg and Jill Drupa, SRA secretariat
Deborah Aiken
Terje Aven
Amanda Bailey
Dominic Balog-Way
Hiba Baroud
Sweta Chakraborty
Chris Clarke
Ingrid Druwe
James Ede
Roger Flage
Chris Greene
Diane Henshel
Cameron MacKenzie
Myriam Merad
Amir Mokhtari
Mary O’Reilly
Willy Roed
Vanessa Schweizer
Yvonne Stevens
Ben Trump
Jamie Wardman
Amina Wilkins

Mark your calendar!
Dates for the 2020 - 2022 Annual Meetings:

2020
December 13-17
JW Marriott Austin • Austin, Texas

2021
December 5-9
Wardman Park Marriott • Washington, DC

2022
December 4-8
Tampa Waterside Marriott • Tampa, Florida

2023
December 3-7
Wardman Park Marriott • Washington, DC

Oral Presenter
Ready Room Reminder
See Page 5 for Hours
If you are presenting an oral presentation, don’t forget to upload your presentation in the Speaker Ready Room (Arlington Ballroom Office) at least 24 hours prior to your presentation. If you have already uploaded your presentation file, come by the Ready Room to ensure it has been received and uploaded correctly.
Conference Events, Committee Meetings

Sunday, December 8

SRA Council Meeting
12:00 PM – 5:00 PM – Alexandria

Editorial Staff Meeting
3:30 PM – 5:00 PM – Jefferson

Students & Young Professionals Business Meeting
4:00 PM – 5:00 PM – Rosslyn

Welcome Mixer and Seminar for Students, Young Professionals, and New Members
5:00 PM – 6:00 PM – Rosslyn

World Congress Meeting
5:00 PM – 6:00 PM – Lee

Poster Reception
6:00 PM – 8:00 PM – Arlington Ballroom Salon III-VI

Students and Young Professionals Mixer
8:30 PM – 10:00 PM – Offsite: Crystal City Sports Pub

Tuesday, December 10

Graduate Student Breakfast
7:00 AM – 8:00 AM – Lee

Regions Committee Meeting
7:30 AM – 8:30 AM – Madison

Communications Committee Meeting
7:30 AM – 8:30 AM – Jackson

Audit Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Wednesday, December 11

Specialty Group Chairs Breakfast
7:00 AM – 8:00 AM – Jefferson

SRA Agenda Environment, Systems, Decisions
Editorial Board Meeting
7:30 AM – 8:30 AM – Lee

Education Committee Meeting
7:30 AM – 8:30 AM – Jackson

Membership Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Plenary Luncheon
12:00 PM – 1:25 PM – Arlington Ballroom Salon III-VI

T-shirt Giveaway and Raffle
5:00 PM – 5:30 PM – Arlington Registration Desk

Monday, December 9

New Member, Student/Young Professionals Breakfast
7:00 AM – 8:00 AM – Skyview
All SRA Students, Young Professionals, and 2018 and 2019 New Members (badges with a New Member ribbon) are welcome to attend.

Conferences and Workshops Committee Meeting
7:30 AM – 8:30 AM – Jackson

Finance Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Opening Plenary Session
8:30 AM – 10:00 AM – Arlington Ballroom Salon III-VI

Specialty Group Meetings
12:00 PM – 1:30 PM - See page 5
pickup your box lunch by the SRA registration desk

Tuesday, December 10

Graduate Student Breakfast
7:00 AM – 8:00 AM – Lee

Regions Committee Meeting
7:30 AM – 8:30 AM – Madison

Communications Committee Meeting
7:30 AM – 8:30 AM – Jackson

Audit Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Wednesday, December 11

Specialty Group Chairs Breakfast
7:00 AM – 8:00 AM – Jefferson

SRA Agenda Environment, Systems, Decisions
Editorial Board Meeting
7:30 AM – 8:30 AM – Lee

Education Committee Meeting
7:30 AM – 8:30 AM – Jackson

Membership Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Plenary Luncheon
12:00 PM – 1:25 PM – Arlington Ballroom Salon III-VI

T-shirt Giveaway and Raffle
5:00 PM – 5:30 PM – Arlington Registration Desk

Monday, December 9

New Member, Student/Young Professionals Breakfast
7:00 AM – 8:00 AM – Skyview
All SRA Students, Young Professionals, and 2018 and 2019 New Members (badges with a New Member ribbon) are welcome to attend.

Conferences and Workshops Committee Meeting
7:30 AM – 8:30 AM – Jackson

Finance Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Opening Plenary Session
8:30 AM – 10:00 AM – Arlington Ballroom Salon III-VI

Specialty Group Meetings
12:00 PM – 1:30 PM - See page 5
pickup your box lunch by the SRA registration desk

Tuesday, December 10

Graduate Student Breakfast
7:00 AM – 8:00 AM – Lee

Regions Committee Meeting
7:30 AM – 8:30 AM – Madison

Communications Committee Meeting
7:30 AM – 8:30 AM – Jackson

Audit Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Wednesday, December 11

Specialty Group Chairs Breakfast
7:00 AM – 8:00 AM – Jefferson

SRA Agenda Environment, Systems, Decisions
Editorial Board Meeting
7:30 AM – 8:30 AM – Lee

Education Committee Meeting
7:30 AM – 8:30 AM – Jackson

Membership Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Plenary Luncheon
12:00 PM – 1:25 PM – Arlington Ballroom Salon III-VI

T-shirt Giveaway and Raffle
5:00 PM – 5:30 PM – Arlington Registration Desk

Monday, December 9

New Member, Student/Young Professionals Breakfast
7:00 AM – 8:00 AM – Skyview
All SRA Students, Young Professionals, and 2018 and 2019 New Members (badges with a New Member ribbon) are welcome to attend.

Conferences and Workshops Committee Meeting
7:30 AM – 8:30 AM – Jackson

Finance Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Opening Plenary Session
8:30 AM – 10:00 AM – Arlington Ballroom Salon III-VI

Specialty Group Meetings
12:00 PM – 1:30 PM - See page 5
pickup your box lunch by the SRA registration desk

Tuesday, December 10

Graduate Student Breakfast
7:00 AM – 8:00 AM – Lee

Regions Committee Meeting
7:30 AM – 8:30 AM – Madison

Communications Committee Meeting
7:30 AM – 8:30 AM – Jackson

Audit Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Wednesday, December 11

Specialty Group Chairs Breakfast
7:00 AM – 8:00 AM – Jefferson

SRA Agenda Environment, Systems, Decisions
Editorial Board Meeting
7:30 AM – 8:30 AM – Lee

Education Committee Meeting
7:30 AM – 8:30 AM – Jackson

Membership Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Plenary Luncheon
12:00 PM – 1:25 PM – Arlington Ballroom Salon III-VI

T-shirt Giveaway and Raffle
5:00 PM – 5:30 PM – Arlington Registration Desk

Monday, December 9

New Member, Student/Young Professionals Breakfast
7:00 AM – 8:00 AM – Skyview
All SRA Students, Young Professionals, and 2018 and 2019 New Members (badges with a New Member ribbon) are welcome to attend.

Conferences and Workshops Committee Meeting
7:30 AM – 8:30 AM – Jackson

Finance Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Opening Plenary Session
8:30 AM – 10:00 AM – Arlington Ballroom Salon III-VI

Specialty Group Meetings
12:00 PM – 1:30 PM - See page 5
pickup your box lunch by the SRA registration desk

Tuesday, December 10

Graduate Student Breakfast
7:00 AM – 8:00 AM – Lee

Regions Committee Meeting
7:30 AM – 8:30 AM – Madison

Communications Committee Meeting
7:30 AM – 8:30 AM – Jackson

Audit Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Wednesday, December 11

Specialty Group Chairs Breakfast
7:00 AM – 8:00 AM – Jefferson

SRA Agenda Environment, Systems, Decisions
Editorial Board Meeting
7:30 AM – 8:30 AM – Lee

Education Committee Meeting
7:30 AM – 8:30 AM – Jackson

Membership Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Plenary Luncheon
12:00 PM – 1:25 PM – Arlington Ballroom Salon III-VI

T-shirt Giveaway and Raffle
5:00 PM – 5:30 PM – Arlington Registration Desk

Monday, December 9

New Member, Student/Young Professionals Breakfast
7:00 AM – 8:00 AM – Skyview
All SRA Students, Young Professionals, and 2018 and 2019 New Members (badges with a New Member ribbon) are welcome to attend.

Conferences and Workshops Committee Meeting
7:30 AM – 8:30 AM – Jackson

Finance Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Opening Plenary Session
8:30 AM – 10:00 AM – Arlington Ballroom Salon III-VI

Specialty Group Meetings
12:00 PM – 1:30 PM - See page 5
pickup your box lunch by the SRA registration desk

Tuesday, December 10

Graduate Student Breakfast
7:00 AM – 8:00 AM – Lee

Regions Committee Meeting
7:30 AM – 8:30 AM – Madison

Communications Committee Meeting
7:30 AM – 8:30 AM – Jackson

Audit Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Wednesday, December 11

Specialty Group Chairs Breakfast
7:00 AM – 8:00 AM – Jefferson

SRA Agenda Environment, Systems, Decisions
Editorial Board Meeting
7:30 AM – 8:30 AM – Lee

Education Committee Meeting
7:30 AM – 8:30 AM – Jackson

Membership Committee Meeting
8:00 AM – 9:00 AM – Jefferson

Plenary Luncheon
12:00 PM – 1:25 PM – Arlington Ballroom Salon III-VI

T-shirt Giveaway and Raffle
5:00 PM – 5:30 PM – Arlington Registration Desk

### Additional Information

- **Three Lunches Included**

  - Monday Box Lunch
  - Tuesday Awards Banquet
  - Wednesday Plenary Luncheon

- **in your Registration Fees**

- Please see the registration desk if you have dietary restrictions

- **All Meetings Are Open**

  All meetings announced in this program are open, everyone is welcome and encouraged to attend.
### 2019 Specialty Group Winners

<table>
<thead>
<tr>
<th>Specialty Group</th>
<th>Winners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Materials and Technologies</td>
<td>Thelma Ameh</td>
</tr>
<tr>
<td>Applied Risk Management</td>
<td>Julia Coxen</td>
</tr>
<tr>
<td>Decision Analysis and Risk</td>
<td>Kyle Hunt</td>
</tr>
<tr>
<td>Dose-Response</td>
<td>Dienye Tolofari, Zheng Zhou</td>
</tr>
<tr>
<td>Engineering and Infrastructure</td>
<td>Riley Mulhern</td>
</tr>
<tr>
<td>Exposure Assessment</td>
<td>Mona Dai</td>
</tr>
<tr>
<td>Foundational Issues in Risk Analysis</td>
<td>Elnaz Kabir</td>
</tr>
<tr>
<td>Microbial Risk Analysis</td>
<td>Chase Golden</td>
</tr>
<tr>
<td>Occupational Health and Safety</td>
<td>Huang Shao-Zu</td>
</tr>
<tr>
<td>Resilience Analysis</td>
<td>Katarzyna Klasa</td>
</tr>
<tr>
<td>Risk and Development</td>
<td>Winifred Ekezie</td>
</tr>
<tr>
<td>Risk Policy &amp; Law</td>
<td>Nick Gray</td>
</tr>
<tr>
<td>Security &amp; Defense</td>
<td>Xue Lei</td>
</tr>
</tbody>
</table>

### 2019 Specialty Group Winners

<table>
<thead>
<tr>
<th>Specialty Group</th>
<th>Winners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose-Response</td>
<td>Dienye Tolofari, Zheng Zhou</td>
</tr>
<tr>
<td>Engineering and Infrastructure</td>
<td>Riley Mulhern</td>
</tr>
<tr>
<td>Exposure Assessment</td>
<td>Mona Dai</td>
</tr>
<tr>
<td>Foundational Issues in Risk Analysis</td>
<td>Elnaz Kabir</td>
</tr>
<tr>
<td>Microbial Risk Analysis</td>
<td>Chase Golden</td>
</tr>
<tr>
<td>Occupational Health and Safety</td>
<td>Huang Shao-Zu</td>
</tr>
<tr>
<td>Resilience Analysis</td>
<td>Katarzyna Klasa</td>
</tr>
<tr>
<td>Risk and Development</td>
<td>Winifred Ekezie</td>
</tr>
<tr>
<td>Risk Policy &amp; Law</td>
<td>Nick Gray</td>
</tr>
<tr>
<td>Security &amp; Defense</td>
<td>Xue Lei</td>
</tr>
</tbody>
</table>

### Student and International Travel Award Winners

<table>
<thead>
<tr>
<th>Award Category</th>
<th>Winners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student and International Travel Award Winners</td>
<td>Chase Golden, Nick Gray, Joshua Hall, Charlotte Heinzlef, Alvaro Javier Hernandez, Joel Hirales-Rochin, Kelsey Hollenbach, Emily Howell, Shao-Zu Huang, Kyle Hunt, Matthew Joyner, Elnaz Kabir, Shraddda Karanth, Katarzyna Klasa, Corrado Lanera, Xue Lei, Jia-Ru Lin, Zhuling Liu, Kang-Yong Liu, Sixiao Liu, Tom Logan, Din Kuei Lu, En-Hsuan Lu, Burhan Mamajiwala, Deniz Marti, Cass McAllister, Nikki McClaran, Somayeh Mohammadi, Sanja Mrksic Kovacevic, Riley Mulhern, Renee Obringer, Chuanshen Qin, Alex Sego Cohen, Abinaya Sekar, Julia Smachylo, Anna Sperotto, Anne St Clair, Danyelle Stringari, Pooja Suresh, Dienye Tolofari, Neha Tyagi, Hanne Van Den Berg, Liam Wells, Tim Williams, Jody Chin Sing Wong, Zeinab Y. Jasour, Takahiro Yabe, Hwa-Lung Yu, Yangjunna Zhang, Zheng Zhou,</td>
</tr>
</tbody>
</table>
Committee Meetings and Events

Specialty Group Meetings
Monday, December 9 - 12:10-1:25 PM
All specialty group meetings will take place during lunch time. Pick up your box lunch near the registration desk and attend the meeting(s) of your choice.

12:10-12:45 PM
- Dose Response (DRSG) – Salon A
- Economics & Benefits Analysis (EBASG) – Salon B
- Occupational Health & Safety (OHSSG) – Salon C
- Decision Analysis & Risk (DARSG) – Salon FG
- Security & Defense (SDSG) – Salon H
- Ecological Risk Assessment (ERASG) – Salon K
- Foundational Issues in Risk Analysis (FRASG) – Salon 1
- Risk, Policy & Law (RPLSG) – Salon 2

12:50-1:25 PM
- Exposure Assessment (EASG) – Salon A
- Risk & Development (RDSG) – Salon B
- Applied Risk Management (ARMSG) – Salon C
- Risk Communication (RCSG) – Salon FG
- Advanced Materials and Technologies (AMTSG) – Salon H
- Resilience Analysis Specialty Group Meeting (RASG) – Salon J
- Engineering & Infrastructure (EISG) – Salon K
- Microbial Risk Analysis (MRASG) – Salon 1

Specialty Group Mixers
Tuesday, December 10 - 6:00-7:30 PM
- Mixer 1 - DRSG, MRASG, EASG, ARMSG – Skyview
- Mixer 2 - SDSG, DARSG, EISG, FRASG - Lee
- Mixer 3 - ERASG, RCSG, OHSSG, RASG – Jackson
- Mixer 4 - EBASG, AMTSG, RDSG – Madison
- Mixer 5 - RPLSG – Offsite at the National Press Club in Washington, DC

Key to Specialty Group Designations
- AMTSG = Advanced Materials and Technologies
- ARMSG = Applied Risk Management
- DARSG = Decision Analysis and Risk
- DRSG = Dose-Response
- EASG = Exposure Assessment
- EBASG = Economics & Benefits Analysis
- EISG = Engineering and Infrastructure
- ERASG = Ecological Risk Assessment
- FRASG = Foundational Issues in Risk Analysis
- MRASG = Microbial Risk Analysis
- OHSSG = Occupational Health & Safety
- RCSG = Risk Communication
- RASG = Resilience Analysis
- RDSG = Risk & Development
- RPLSG = Risk, Policy and Law
- SDSG = Security and Defense

Speaker Ready Room Hours
Arlington Ballroom Office
Sunday, December 8 .......................... 3:00 PM – 8:00 PM
Monday, December 9 .......................... 7:00 AM – 5:00 PM
Tuesday, December 10 .......................... 7:00 AM – 5:00 PM
Wednesday, December 11 ......................... 7:00 AM – Noon

Registration Desk Hours
Arlington Ballroom Foyer
Sunday, December 8 ......................... 4:00 PM – 6:30 PM
Monday, December 9 ......................... 7:00 AM – 5:00 PM
Tuesday, December 10 ....................... 8:00 AM – 5:00 PM
Wednesday, December 11 .................... 8:00 AM – 5:00 PM
Evidence Partners is the developer of DistillerSR, the world’s most advanced systematic review software. DistillerSR helps leading research organizations, regulatory bodies, government agencies, and medical device and pharmaceutical companies to manage and deliver high quality reviews more efficiently.

ICF (NASDAQ:ICFI) is a global consulting services company with over 7,000 full- and part-time employees, but we are not your typical consultants. At ICF, business analysts and policy specialists work together with digital strategists, data scientists and creatives. We combine unmatched industry expertise with cutting-edge engagement capabilities to help organizations solve their most complex challenges. Since 1969, public and private sector clients have worked with ICF to navigate change and shape the future. Learn more at icf.com.

International Society of Exposure Science (ISES)

The International Society of Exposure Science (ISES) promotes and advances exposure science as it relates to the complex inter-relationships between human populations, communities, ecosystems, wildlife, and chemical, biological, and physical agents, and non-chemical stressors. ISES members have diverse expertise and training in biological, physical, environmental, and social sciences, as well as various engineering disciplines. ISES’ multidisciplinary expertise and international reach make it the premiere professional society for practitioners associated with all aspects of exposure science.

Ramboll

Ramboll is a leading engineering, design and consultancy company. Our globally recognized Environment & Health practice has earned a reputation for technical and scientific excellence, innovation and client service. We strive to achieve inspiring and exacting solutions that make a genuine difference to our clients, end-users and society at large.
The Society of Environmental Toxicology and Chemistry is a not-for-profit, global professional organization comprised of some 5,349 members and institutions dedicated to the study, analysis and solution of environmental problems, the management and regulation of natural resources, research and development, and environmental education. Since 1979, the society has provided a forum where scientists, managers and other professionals exchange information and ideas.

Springer Nature
1 New York Plaza
New York, NY 10004
212-726-9293
www.springer.com

Springer is a leading global scientific, technical and medical publisher, providing researchers in academia, scientific institutions and corporate R&D departments with quality content via innovative information products and services. Springer is part of Springer Nature, one of the world’s leading global research, educational and professional publishers.

Toxicology Education Foundation
4303 Kirby Avenue
Cincinnati, OH 45223
513-542-8940
toxedfoundation.org

The mission Toxicology Education Foundation (TEF) is to enhance public understanding of toxicology through access to objective, science-based information on the safety of chemicals and other agents encountered in daily life. Why TEF? The amount of unsubstantiated information filling internet and other sources is growing exponentially. If you value TEF’s efforts to provide credible scientific information that is relevant to you, then be sure to like us on Facebook, Link In with us, follow our Tweets, choose Toxicology Education Foundation as your preferred charity through Smile.Amazon.com, and make a generous 100% tax free contribution through our Donate page. We are especially grateful for your support and encouragement!

U.S. EPA Office of Research and Development
109 T.W. Alexander Dr.
Research Triangle Park, NC 27709
919-541-1552
www.epa.gov/research

The U.S. Environmental Protection Agency’s (EPA) Office of Research and Development (ORD) conducts cutting-edge research that provides the underpinning of science and technology for policies and decisions made by federal, state and other governmental organizations. ORD’s work is organized into six national research programs and five research centers, located in 10 facilities.

University of Tennessee – Risk Assessment Information System (RAIS)
Oak Ridge National Laboratory
Oak Ridge, TN 37830
865-576-5450
rais.ornl.gov

The University of Tennessee, in conjunction with the Oak Ridge National Laboratory and the US Department of Energy, develops The Risk Assessment Information System (RAIS). The RAIS is a web-based system used to disseminate risk tools and supply information for human health and ecological risk assessment activities. Taking advantage of searchable and executable databases, menu-driven queries, and data downloads using the latest Web technologies, the RAIS offers essential tools and information for the risk assessment process and can be tailored to meet site-specific needs. Additionally, the RAIS platform houses numerous chemical and radionuclide risk tools created for the Environmental Protection Agency.

U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency (CISA) / National Risk Management Center (NRMC)
Washington, DC
888-282-0870
www.cisa.gov/national-risk-management

The National Risk Management Center (NRMC) is the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency’s (CISA) planning, analysis, and collaboration center, working to identify and address the most significant risks to the Nation’s critical infrastructure.
## Continuing Education Workshops

<table>
<thead>
<tr>
<th>Workshop #</th>
<th>Workshop Title</th>
<th>Day/Time</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>WK1AMS</td>
<td>Eliciting Judgments from Experts and Non-experts to Inform Decision-making</td>
<td>Sunday, December 8th 8:00AM—12:00PM</td>
<td>$250</td>
</tr>
<tr>
<td>WK6PMS</td>
<td>Health Risk Assessment of Environmental Chemical Mixtures Part 2. Analyses Using Whole Mixture Data</td>
<td>Sunday, December 8th Afternoon</td>
<td>$215</td>
</tr>
<tr>
<td>WK7ALLS</td>
<td>SOLD OUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WK8ALLS</td>
<td>Introduction to Quantitative Risk Assessment Modeling</td>
<td>Sunday, December 8th Full day</td>
<td>$325</td>
</tr>
<tr>
<td>WK11ALLS</td>
<td>Monte Carlo Simulation And Probability Bounds Analysis in R with Hardly Any Data</td>
<td>Sunday, December 8th Full day</td>
<td>$300</td>
</tr>
<tr>
<td>WK12ALLS</td>
<td>Risk Communication and Stakeholder Engagement for Improving Risk Management Outcomes</td>
<td>Sunday, December 8th Full day</td>
<td>$450</td>
</tr>
<tr>
<td>WK15ALLTH</td>
<td>Dose-Response Modeling for Risk Assessments – BMDS 3.2 and Bayesian Modeling Averaging</td>
<td>Thursday, December 12th Full day</td>
<td>$350</td>
</tr>
<tr>
<td>WK17ALLTH</td>
<td>Monte Carlo simulation and probability bounds analysis in R with hardly any data</td>
<td>Thursday, December 12th Full day</td>
<td>$300</td>
</tr>
<tr>
<td>WK18ALLTH</td>
<td>Probabilistic Dose-Response Assessment: Guidance from the World Health Organization</td>
<td>Thursday, December 12th Full day</td>
<td>$300</td>
</tr>
</tbody>
</table>

Workshops are offered Sunday and Thursday, either Full Day, AM Half Day, or PM Half Day. Full descriptions of each workshop are provided. Students enjoy a substantial discount on workshop registration.

## AM WORKSHOPS

**SUNDAY December 8th, 8:00AM—12:00PM**

**WK1AMS: Eliciting Judgments from Experts and Non-experts to Inform Decision-making**

**Cost: $250**

**Instructors:** Cristina McLaughlin, US FDA; Aylin Sertkaya, Eastern Research Group, Inc. (ERG); Roger Cooke, Compass Resource Management Ltd.; Frank Hearl, National Institute for Occupational Safety and Health (NIOSH)

**Location:** Salon A

Decision makers must frequently rely on data or information that is incomplete or inadequate in one way or another. Judgment, often from experts and occasionally from non-experts, then plays a critical role in the interpretation and characterization of those data as well as in the completion of information gaps. But how experts or non-experts are selected and their judgments elicited matters – they can also strongly influence the opinions obtained and the analysis on which they rely. Several approaches to eliciting judgments have evolved. The workshop will cover topics ranging from recruitment, elicitation protocol design, different elicitation techniques (e.g., individual elicitations, Delphi method, nominal group technique, etc.) to aggregation methods for combining opinions of multiple individuals. The role of judgment elicitation and its limitations, problems, and risks in policy analysis will also be addressed. The workshop will include presentation of two case studies that will include a discussion of the selection process; elicitation protocol development, elicitation technique utilized, and the various issues that arose before, during, and after the elicitation process and the manner in which they were resolved. The class will also include two hands-on exercises where participants will 1) learn about calibration of experts using a mobile application and 2) apply the Delphi and nominal group techniques to examine risk management issues associated with a popular topic.
WK6PMS: Health Risk Assessment of Environmental Chemical Mixtures
Part 2. Analyses Using Whole Mixture Data
Cost: $215


Location: Salon A

This problems-based, half-day, intermediate-level workshop focuses on methods using whole-mixture data to assess health risks posed by exposures to chemical mixtures in the environment. Whole-mixture methods use exposure and toxicity data from toxicology and epidemiology studies on the complex substance itself or on a sufficiently similar mixture to assess human health risk. This workshop presents key concepts and terminology used to implement whole-mixture-based approaches. Topics include developing whole-mixture toxicity values, evaluating whole-mixture exposures, determining sufficient similarity of two or more mixtures, deciding how to toxicologically evaluate whole-mixture data, and using complex mixture fractions to evaluate risk. The risk assessment examples developed in the workshop are adapted from real-world mixture analyses, e.g., waste site contaminants, tobacco smoke, total petroleum hydrocarbons, and drinking water disinfection by-products. The “hands-on” exercise, demonstrating the methods is an essential part of this workshop. Discussions include real world examples, exercise results, and answers to general questions. Participants can enroll in only Part 2 of this workshop if so desired.

The views expressed in this abstract are those of the authors and do not necessarily reflect the views or policies of the USEPA.

WK7ALLS: Introduction to Quantitative Risk Assessment Modeling
Cost: $325

Instructor: Emma Hartnett, Risk Sciences International

Location: Salon B

This full day workshop will introduce participants to the principles and methodologies commonly used in quantitative risk assessment. We will discuss the basic modeling concepts, including options for quantitative approaches (deterministic and probabilistic modeling), the role of simulation, and understanding Monte-Carlo methods. Software options will also be discussed with case studies demonstrated in widely available risk assessment software platforms (@RISK, Analytica and R). Participants will have the opportunity to gain hands-on experience in building and analyzing a simple computer-based probabilistic model and will be provided with pre-built models (with choice of software platform) to explore and scrutinize and will involve elements of real world risk assessments designed to support current policy and risk management. The principles and methods presented at this workshop are applicable across a wide domain of risk assessment applications. Examples and exercises will include risk issues considering chemical, toxicological, and microbial hazards.

Participants should bring a laptop with at least one of the packages @RISK (free trial version is sufficient), Analytica (free 101 version is sufficient), Analytica or R installed. Note, this workshop is limited to 15 participants.

WK8ALLS: Probabilistic Benchmark Dose Modeling for Dichotomous, Categorical, and Continuous Data
Cost: $250

Instructor: Kan Shao, Indiana University School of Public Health – Bloomington

Location: Madison

This full-day workshop will provide participants with fundamental knowledge of probabilistic dose-response assessment and hands-on experience of using Bayesian Benchmark Dose (BBMD) modeling system in support of chemical risk assessment. The workshop will cover a number of topics, including benchmark dose modeling and analysis, probabilistic dose-response assessment in a Bayesian framework (including distributional BMD estimation), and the use of web-based Bayesian BMD (BBMD) modeling system to estimate BMD from dichotomous, categorical and continuous dose-response data, as well as probabilistic
low-dose extrapolation from the estimated point of departure (i.e., BMD). The probabilistic BMD modeling and analysis involves using Markov Chain Monte Carlo (MCMC) algorithm to fit mathematical dose-response models to toxicity data and estimating the distributions of model parameters and quantities of interest (e.g., BMD), using appropriate statistics to evaluate goodness of fit and compare the statistical plausibility of dose-response models, and employing Monte Carlo simulation for probabilistic low-dose extrapolation. In additional to the probabilistic feature, the workshop will fully explore the important features and functionalities of the BBMD system, including model averaged BMD estimation for all three data types, reliable and robust BMD estimation based on various definitions of BMR, and analyzing individually unique exposure response data (e.g., epidemiological data) for BMD estimation. Moreover, the distributional estimates of BMD generated in BBMD can be seamlessly used to facilitate the WHO/IPCS probabilistic dose-response assessment framework. In short, the workshop will provide participants both theoretical and practical skills for probabilistic dose-response assessment.

**WK11ALLS: Monte Carlo Simulation And Probability Bounds Analysis in R with Hardly Any Data**

**Cost:** $300

**Instructors:** Scott Ferson, Institute for Risk and Uncertainty, University of Liverpool, UK; Dominic Calleja, Institute for Risk and Uncertainty, University of Liverpool, UK

**Location:** Lee

This full-day workshop features hands-on examples worked in R on your own laptop, from raw data to final decision. The workshop introduces and compares Monte Carlo simulation and probability bounds analysis for developing probabilistic risk analyses when little or no empirical data are available. You can use your laptop to work the examples, or just follow along if you prefer. The examples illustrate the basic problems risk analysts face: not having much data to estimate inputs, not knowing the distribution shapes, not knowing their correlations, and not even being sure about the model form. Monte Carlo models will be parameterized using the method of matching moments and other common strategies. Probability bounds will be developed from both large and small data sets, from data with non-negligible measurement uncertainty, and from published summaries that lack data altogether. The workshop explains how to avoid common pitfalls in risk analyses, including the multiple instantiation problem, unjustified independence assumptions, repeated variable problem, and what to do when there’s little or no data. The numerical examples will be developed into fully probabilistic estimates useful for quantitative decisions and other risk-informed planning. Emphasis will be placed on the interpretation of results and on how defensible decisions can be made even when little information is available. The presentation style will be casual and interactive. Participants will receive handouts of the slides and electronic files with software for the examples.

**WK12ALLS: Risk Communication and Stakeholder Engagement for Improving Risk Management Outcomes**

**Cost:** $450

**Instructors:** Steve Ackerlund, Ecology & Environment, Inc.; Dan Kovacs, Decision • Partners

**Location:** Jackson

Successful risk management and resilience depends on the design, adoption, and implementation of plans and processes that achieve individual and/or organization behavioral change. These plans and processes often fall short of achieving optimal outcomes because the technical elements are not aligned with stakeholders’ values, needs, interests and priorities. This full-day workshop will introduce the state-of-the-science concepts and practices of risk communications and stakeholder engagement to systematically understand and influence stakeholder judgment, decision making and behavior as an integrated element of effective risk management and resilience planning. Using introductory lectures, case study review and interactive class exercise formats, the course “facilitators” will provide tools, templates and practical frameworks for integration of risk communication, risk management and resilience. These will be demonstrated using examples from successful real-world projects. The Mental Models approach will be presented and discussed as a core technique for understanding stakeholder perceptions of risk and integrating these into effective risk management. The workshop will feature applied problem-solving sessions where participants will be encouraged to share their own risk challenges and workshop solutions with other participants and workshop leaders, thereby enabling participants to develop solutions to current needs in their organizations.
averaging concepts. In particular, model averaging approaches will be highlighted given they have recently been suggested as a preferred approach to address modeling uncertainty in dose-response assessments. Dichotomous model averaging was implemented in BMDS 3.0, which simplified the workflow for modeling by fully implementing all BMDS analyses in Microsoft Excel. Recently, EPA has released a new version of its Benchmark Dose Software program (BMDS 3.2) that implements Bayesian model averaging methods for continuous data using maximum a posteriori methods in conjunction with model weights based on the Laplace approximation. The model averaging approach for continuous data implemented in BMDS 3.2 improves on other model averaging methods by not only averaging over a model suite, but also across distributional assumptions. Historically, different organizations have a priori assumed either a normal or lognormal distribution for the continuous endpoint being modeled. However, this determination has typically been based on assumptions rather than empirical evidence. Thus, the use of distributional assumptions has also introduced uncertainty into continuous dose-response analyses. Therefore, the ability of a continuous model averaging approach to average over models and distributions accounts for both model and distributional uncertainty. Additionally, new versions of BMDS have recently been developed 1) in the R statistical programming language and 2) online in EPA’s HAWC interface. The R-BMDS version represents a fully customizable “research” version of BMDS, whereas HAWC-BMDS is a fully interoperable option for performing dose-response analyses online. The focus of this training will center on how to use the BMDS 3.2 Excel interface and the theory and application of the new models, particularly the model averaging methods. The new R- and HAWC-BMDS versions will also be briefly covered. Participants need to bring their own laptops, with BMDS 3.2 installed to the workshop. The latest version of the software programs can be found at: www.epa.gov/bmds. Also, users should have a recent internet browser installed (Google Chrome is preferred).

The views expressed in the abstract are those of the authors and do not necessarily reflect the views or policies of the U.S. EPA.

**WK17ALLTH: Monte Carlo simulation and probability bounds analysis in R with hardly any data**

**Cost:** $300

**Instructors:** Scott Ferson, Institute for Risk and Uncertainty, University of Liverpool, UK; Dominic Calleja, Institute for Risk and Uncertainty, University of Liverpool, UK

**Location:** Jackson

This full-day workshop features hands-on examples worked in R on your own laptop, from raw data to final decision. The workshop introduces and compares Monte Carlo simulation and probability bounds analysis for developing probabilistic risk analyses when little or no empirical data are available. You can use your laptop to work the examples, or just follow along if you prefer. The examples illustrate the basic problems risk analysts face: not having much data to estimate inputs, not knowing the distribution shapes, not knowing their correlations, and not even being sure about the model form. Monte Carlo models will be parameterized using the method of matching moments and other common strategies. Probability bounds will be developed from both large and small data sets, from data with non-negligible measurement uncertainty, and from published summaries that lack data altogether. The workshop explains how to avoid common pitfalls in risk analyses, including the multiple instantiation problem, unjustified independence assumptions, repeated variable problem, and what to do when there’s little or no data. The numerical examples will be developed into fully probabilistic estimates useful for quantitative decisions and other risk-informed planning. Emphasis will be placed on the interpretation of results and on how defensible decisions can be made even when little information is available. The presentation style will be casual and interactive. Participants will receive handouts of the slides and electronic files with software for the examples.

**WK18ALLTH: Probabilistic Dose-Response Assessment: Guidance from the World Health Organization**

**Cost:** $300

**Instructors:** Weihsueh A. Chiu, Texas A&M University; Greg Paoli, Risk Sciences International

**Location:** Lee

WHO/IPCS published in 2014 a guidance document on evaluating uncertainties in human health dose-response assessment. Rather than single values for the point of departure (POD) and any adjustment/uncertainty factors, the WHO/IPCS approach uses uncertainty distributions that reflect the assumed or estimated uncertainties in each of those aspects. Additionally, it quantitatively defines the protection goals in terms of incidence (I) and magnitude (M) of the critical effect in the human population. By contrast, traditional approaches for developing toxicity values result in a single value (e.g., RfD, ADI) whose uncertainty is not known and for which the associated values for I and M are not quantified. By quantifying the overall uncertainties in the target human dose at explicitly specified values of I and M, the WHO/IPCS probabilistic approach allows risk managers to better weigh the benefits from reduced human health effects associated with different risk management options against other considerations. Further, the probabilistic analyses can inform the value of information associated with different options for developing a higher tier assessment. This hands-on training Workshop is aimed at both risk professionals interested in applying the latest approaches to dose-response assessment, as well as students and researchers interested in developing new methods for dose-response. The Workshop will include an overview of the WHO/IPCS approach, case study exercises developing probabilistic dose-response toxicity values using an Excel spreadsheet tool, and a discussion of broader applications, such as life cycle analysis, alternatives assessment, and economic benefit-cost analyses. A laptop with Microsoft Excel is required.
Plenary Sessions

All plenary sessions are held in the Crystal Gateway Marriott, Arlington Ballroom, Salon III & IV

**Monday, December 9, Morning Plenary**

**What Can Data Tell Us About Risk Management?**

Most traditional decision and risk analyses, benefit-cost analyses, and policy analyses depend on “closed world” assumptions in which different possible outcomes of each alternative risk management action (or of inaction) are assumed to be known, with probabilities summing to 100%. The real world is different: “black swans,” “unknown unknowns,” “emerging threats,” “disruptive changes,” unconscious assumptions and biases, and other unpredictable and novel risks wrap important risks and decisions in a fog of un-modeled uncertainties. These are open-world risks — risks not limited by pre-understood rules, constraints, and possibilities, but emerging from a world that is only partly understood when decisions must be made. They are familiar to many business leaders, entrepreneurs, generals, and policy makers, but challenge traditional risk assessment and analytics methods. Managing open-world risks requires not only planning and training, but improvisation and innovation, initiative and resilience, and creation of new options and goals on the fly as conditions change. How can data and data science support open-world risk management and decision-making? Data science has recently produced a host of new techniques for detecting and responding to novel threats, from anomaly detection to deep learning and adaptive learning systems for exploring and exploiting new opportunities without succumbing to new threats. Advances in artificial intelligence, machine learning, and robotics are now being tapped by the military for principles to help meet the challenges of planning, acting, and adapting in open-world environments. Advances in causal analysis are enabling analysts to better generalize from what is known and what has been observed to predict what else might happen that has never been seen before. This talk discusses principles for using data science and advanced analytics strategically, to improve the odds of success in preparing for and responding to unpredictable events and novel risks.

**Speaker:** Anthony Louis Cox, Jr.

**Machine Learning for Risk Analysis – Perspectives from the Front Lines**

As machine learning methods move beyond recognizing pictures and videos, and expand into other industries and fields, the world is going to see tremendous enterprise value created through smart data driven systems that bring together disparate forms of data and stakeholders. With improvements in computational efficiency, AI and machine learning techniques are able to combine volumes of new data with an historical understanding of natural phenomena physics to far better emulate the physical world and its interconnectedness, thereby discovering risks which previously had never been understood. This is key, from a risk modeling standpoint, since ascribing data dependencies, means ascribing business value, value which will ultimately lead to new business models aimed at democratizing the pursuit of resilience and the fight against climate change.

**Speaker:** Ahmad Wani

**Tuesday, December 10, Morning Plenary**

**Data Analytics for Risk Analysis – Past, Present, and Future**

Data analytics is of potentially significant benefit for risk analysis, but it comes with potential pitfalls as well. The Tuesday plenary will be a round table style discussion among leaders in developing and using data analytic methods for risk analysis. The discussion will focus on how data analytics methods have been used, what the current state of development is, and the future of data analytics in risk analysis. What is the proper role for data analytics in risk analysis? What are the strengths and limitations? When are data analytic methods most useful? When might they be misleading? What future developments are needed for data analytic methods to better meet the needs of risk analysts?

**Panel:**
Hiba Baroud, Giovanni Sansavini, Mark Borsuk, Anthony Louis Cox, Jr.

**Lunch Wednesday**

**The Reality of Human Trafficking and the Role of Risk Analysis**

Human trafficking occurs throughout the United States and touches almost every commercial industry. Despite its scope it is often misunderstood and misrepresented. In this talk, Bridgette Carr, J.D., University of Michigan Law School, will explain the reality of human trafficking in the U.S. and discuss how risk analysis may be a critical and as yet underutilized tool in combating human trafficking.

**Speaker:** Bridgette Carr
### Monday

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 AM-8:00 AM</td>
<td><strong>New Member, Student/Young Professional Breakfast</strong></td>
</tr>
<tr>
<td>8:30 AM-10:00 AM</td>
<td><strong>Plenary Session</strong> – What Can Data Tell Us About Risk Management?</td>
</tr>
<tr>
<td></td>
<td>Machine Learning for Risk Analysis – Perspectives from the Front Lines, Arlington Ballroom, Salon III &amp; IV</td>
</tr>
<tr>
<td>10:00 AM-10:30 AM</td>
<td><strong>Coffee Break</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 AM-12:00 PM</td>
<td><strong>Salon A</strong></td>
</tr>
<tr>
<td></td>
<td>M2-A Climate Change Communication, Adaptation, and Resilience, Part 1</td>
</tr>
<tr>
<td></td>
<td><strong>Salon B</strong></td>
</tr>
<tr>
<td></td>
<td>M2-B Symposium: From Open to Big Data: Using Risk Science to Better Deliver Benefits to Patients</td>
</tr>
<tr>
<td></td>
<td><strong>Salon C</strong></td>
</tr>
<tr>
<td></td>
<td>M2-C Symposium: Study of Violent Crime and Gun Violence</td>
</tr>
<tr>
<td></td>
<td><strong>Salons DE</strong></td>
</tr>
<tr>
<td></td>
<td>M2-D Symposium: Benchmark Dose Guidance Across the Globe and Avenues for Harmonization of Modeling Methodologies</td>
</tr>
<tr>
<td></td>
<td><strong>Salons FG</strong></td>
</tr>
<tr>
<td></td>
<td>M2-E Symposium: Risk Assessment, Economic Evaluation, and Decisions, Part 1</td>
</tr>
</tbody>
</table>

- Pick up your box lunch near the registration desk and attend the specialty group meeting(s) of your choice.
- 12:10 PM-12:45 PM - Dose Response (DRSG), Economics & Benefits Analysis (EBASG), Occupational Health & Safety (OHSSG), Decision Analysis & Risk (DARSG), Security & Defense (SDSG), Ecological Risk Assessment (ERASG), Foundational Issues in Risk Analysis (FRASG), Risk, Policy & Law (RPLSG)
- 12:50 PM-1:25 PM - Exposure Assessment (EASG), Risk & Development (RDSG), Applied Risk Management (ARMSG), Risk Communication (RCSG), Advanced Materials & Technologies (AMTSG), Resilience Analysis Specialty Group Meeting (RASG), Engineering & Infrastructure (EISG), Microbial Risk Analysis (MRASG)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM-3:00 PM</td>
<td><strong>Salon A</strong></td>
</tr>
<tr>
<td></td>
<td>M3-A Climate Change Communication, Adaptation, and Resilience, Part 2</td>
</tr>
<tr>
<td></td>
<td><strong>Salon B</strong></td>
</tr>
<tr>
<td></td>
<td>M3-B Roundtable: Current Foundational Issues in the Field of Risk Analysis</td>
</tr>
<tr>
<td></td>
<td><strong>Salon C</strong></td>
</tr>
<tr>
<td></td>
<td>M3-C Global Catastrophic Risks</td>
</tr>
<tr>
<td></td>
<td><strong>Salons DE</strong></td>
</tr>
<tr>
<td></td>
<td>M3-D Disaster Risk Analysis and Modeling</td>
</tr>
<tr>
<td></td>
<td><strong>Salons FG</strong></td>
</tr>
<tr>
<td></td>
<td>M3-E Risk Assessment and Benefits Analysis Interface</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:00 PM-3:30 PM</td>
<td><strong>Coffee Break</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:30 PM-5:00 PM</td>
<td><strong>Salon A</strong></td>
</tr>
<tr>
<td></td>
<td>M4-A Health Risk Perception and Communication</td>
</tr>
<tr>
<td></td>
<td><strong>Salon B</strong></td>
</tr>
<tr>
<td></td>
<td>M4-B Roundtable: Tomorrows Perspective on Todays Risk: Technology, Environment, and Society</td>
</tr>
<tr>
<td></td>
<td><strong>Salon C</strong></td>
</tr>
<tr>
<td></td>
<td>M4-C Symposium: Risk, Security, and Trust of Embedded Hardware in Cyber-Physical Systems</td>
</tr>
<tr>
<td></td>
<td><strong>Salons DE</strong></td>
</tr>
<tr>
<td></td>
<td>M4-D Symposium: Engineering and Infrastructure Solutions for Natural Hazards Risk Management</td>
</tr>
<tr>
<td></td>
<td><strong>Salons FG</strong></td>
</tr>
<tr>
<td></td>
<td>M4-E Benefit Cost Analysis: Theory and Application</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00 PM-8:00 PM</td>
<td><strong>Poster Reception</strong>, Arlington Ballroom, Salon III-VI</td>
</tr>
</tbody>
</table>
### Monday

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 AM-8:00 AM</td>
<td><strong>New Member, Student/Young Professional Breakfast</strong></td>
</tr>
<tr>
<td>8:30 AM-10:00 AM</td>
<td><strong>Plenary Session</strong> – What Can Data Tell Us About Risk Management?</td>
</tr>
<tr>
<td></td>
<td>Machine Learning for Risk Analysis – Perspectives from the Front Lines, Arlington Ballroom, Salon III &amp; IV</td>
</tr>
<tr>
<td>10:00 AM-10:30 AM</td>
<td><strong>Coffee Break</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Salon H</strong></td>
</tr>
<tr>
<td></td>
<td>M2-F Symposium: Building a Risk-based Food Safety System from Scratch</td>
</tr>
<tr>
<td></td>
<td><strong>Salon J</strong></td>
</tr>
<tr>
<td></td>
<td>M2-G Risk Analysis in the Developing World and Remote Areas: Data, Perspectives, and Models</td>
</tr>
<tr>
<td></td>
<td><strong>Salon K</strong></td>
</tr>
<tr>
<td></td>
<td>M2-H Symposium: Protecting People and Changing Their Behavior</td>
</tr>
<tr>
<td></td>
<td><strong>Salon 1</strong></td>
</tr>
<tr>
<td></td>
<td>M2-I Challenging Risk Assessment Practices to Improve Regulatory Decision-Making</td>
</tr>
<tr>
<td></td>
<td><strong>Salon 2</strong></td>
</tr>
<tr>
<td></td>
<td>M2-J Poster Platform: Risk Perception, Communication, and Digital Technology</td>
</tr>
<tr>
<td>10:30 AM-11:30 AM</td>
<td>Pick up your box lunch near the registration desk and attend the specialty group meeting(s) of your choice.</td>
</tr>
<tr>
<td>11:00 AM-12:10 PM</td>
<td><strong>M2-F Symposium: Building a Risk-based Food Safety System from Scratch</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M2-G Risk Analysis in the Developing World and Remote Areas: Data, Perspectives, and Models</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M2-H Symposium: Protecting People and Changing Their Behavior</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M2-I Challenging Risk Assessment Practices to Improve Regulatory Decision-Making</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M2-J Poster Platform: Risk Perception, Communication, and Digital Technology</strong></td>
</tr>
<tr>
<td>12:10 PM-12:45 PM</td>
<td>Dose Response (DRSG), Economics &amp; Benefits Analysis (EBASG), Occupational Health &amp; Safety (OHSSG), Decision Analysis &amp; Risk (DARSG), Security &amp; Defense (SDSG), Ecological Risk Assessment (ERASG), Foundational Issues in Risk Analysis (FRASG), Risk, Policy &amp; Law (RPLSG)</td>
</tr>
<tr>
<td>12:50 PM-1:25 PM</td>
<td>Exposure Assessment (EASG), Risk &amp; Development (RDSG), Applied Risk Management (ARMSG), Risk Communication (RCSG), Advanced Materials &amp; Technologies (AMTSG), Resilience Analysis Specialty Group Meeting (RASG), Engineering &amp; Infrastructure (EISG), Microbial Risk Analysis (MRASG)</td>
</tr>
<tr>
<td>1:30 PM-3:00 PM</td>
<td><strong>M3-F Symposium: The Role of Predictive Microbiology and its Impact on Food Safety Quantitative Microbiological Risk Assessment and Beyond: Leveraging Scientific Advances</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M3-G Managing Risk: Balance, Communication, and Trust</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M3-H Roundtable: Worker Considerations as EPA Implements the 2016 Toxic Substances Control Act Amendments</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M3-I Symposium: Global Disease Burden Caused by Foodborne Chemicals and Toxins</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M3-J Poster Platform: Perspectives on Risk-based Decision Making</strong></td>
</tr>
<tr>
<td>3:00 PM-3:30 PM</td>
<td><strong>Coffee Break</strong></td>
</tr>
<tr>
<td>3:30 PM-5:00 PM</td>
<td><strong>M4-F Epistemic Issues Around Risk and Resilience</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M4-G From Analysis to Management: Natural Hazards &amp; Petroleum</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M4-H Symposium: Risk Analysis of Engineered Nanomaterials: Where Have We Been, Lessons Learned, and Transfer of Knowledge to Other Emerging Technologies</strong></td>
</tr>
<tr>
<td></td>
<td><strong>M4-J Poster Platform: Application of QMRA in Water Quality</strong></td>
</tr>
<tr>
<td>6:00 PM-8:00 PM</td>
<td><strong>Poster Reception, Arlington Ballroom, Salon III-VI</strong></td>
</tr>
</tbody>
</table>
### Tuesday

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 AM-10:00 AM</td>
<td><strong>Plenary Session</strong> – Data Analytics for Risk Analysis – Past, Present, and Future, Arlington Ballroom, Salon III &amp; IV</td>
</tr>
<tr>
<td>10:00 AM-10:30 AM</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>Noon</td>
<td><strong>Salon A</strong></td>
</tr>
<tr>
<td>Noon-1:30 PM</td>
<td><strong>SRA Awards Luncheon and Business Meeting</strong>, Arlington Ballroom, Salon III &amp; IV</td>
</tr>
<tr>
<td>1:30 PM-3:00 PM</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>3:00 PM-3:30 PM</td>
<td><strong>Salon A</strong></td>
</tr>
<tr>
<td>3:30 PM-5:00 PM</td>
<td>T4-A Risk Communication Best Practices, Part 1</td>
</tr>
<tr>
<td>6:00 PM-7:30 PM</td>
<td><strong>Specialty Group Mixers</strong>, see page 5</td>
</tr>
</tbody>
</table>
### Tuesday

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8:30 AM-10:00 AM</strong></td>
<td><strong>Plenary Session</strong> – Data Analytics for Risk Analysis – Past, Present, and Future, Arlington Ballroom, Salon III &amp; IV</td>
</tr>
<tr>
<td><strong>10:00 AM-10:30 AM</strong></td>
<td>Coffee Break</td>
</tr>
<tr>
<td><strong>10:30 AM-Noon</strong></td>
<td>Sala H: T2-F Symposium: Advances in Antibiotic Resistance Risk Assessment</td>
</tr>
<tr>
<td>Noon</td>
<td>Sala K: T2-H Symposium: Risk Assessment and Communication Approaches for Emerging Products and Materials</td>
</tr>
<tr>
<td>Noon-1:30 PM</td>
<td><strong>SRA Awards Luncheon and Business Meeting</strong>, Arlington Ballroom, Salon III &amp; IV</td>
</tr>
<tr>
<td>Noon-1:30 PM</td>
<td>Sala H: T3-F Roundtable: Food safety -- An Integrated Approach to Risk for Resilient and Sustainable Management</td>
</tr>
<tr>
<td>1:30 PM-3:30 PM</td>
<td>Sala K: T3-H Symposium: Driving Organizational Risk Decision Making Improvement with EHSS</td>
</tr>
<tr>
<td>3:00 PM-3:30 PM</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>3:00 PM-5:00 PM</td>
<td>Sala H: T4-F Using QMRA to Inform Risk Management Decisions</td>
</tr>
<tr>
<td>3:30 PM-5:00 PM</td>
<td>Sala K: T4-H Symposium: Risk and Resilience Observatories: Methods, Tools and Results</td>
</tr>
<tr>
<td>6:00 PM-7:30 PM</td>
<td><strong>Specialty Group Mixers</strong>, see page 5</td>
</tr>
</tbody>
</table>

*Final Program*
<table>
<thead>
<tr>
<th>Time</th>
<th>Salon A</th>
<th>Salon B</th>
<th>Salon C</th>
<th>Salons DE</th>
<th>Salons FG</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 AM-10:00 AM</td>
<td>W1-A Risk Communication Best Practices, Part 2</td>
<td>8:00 AM – 9:00 AM</td>
<td>W1-B Special Session:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>W1-B Special Session:</td>
<td>Emergence of Emerging Risks at DHS Panel Discussion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:30 PM-3:00 PM</td>
<td>W3-A Media Representations of Risk</td>
<td>W3-B Foundational Issues in Risk Analysis, Part 2 - Uncertainty and Risk Conceptualizations</td>
<td>W3-C Symposium: Decision and Risk Analysis in a Digital Era</td>
<td>W3-D Symposium: Risk Analysis of Cybersecurity in Critical Infrastructure Systems</td>
<td></td>
</tr>
<tr>
<td>3:00 PM-3:30 PM</td>
<td>Coffee Break</td>
<td>W3-B Foundational Issues in Risk Analysis, Part 2 - Uncertainty and Risk Conceptualizations</td>
<td>W3-C Symposium: Decision and Risk Analysis in a Digital Era</td>
<td>W3-D Symposium: Risk Analysis of Cybersecurity in Critical Infrastructure Systems</td>
<td></td>
</tr>
<tr>
<td>5:00 PM - 5:30 PM</td>
<td>T-Shirt Giveaway - Registration Area, Arlington Ballroom Foyer, Registration desk</td>
<td>W4-B Symposium: Foundational Issues in Risk Analysis, Part 3</td>
<td>W4-C Symposium: Early Warning Systems for Emerging or Disruptive Technologies in Countering Weapons of Mass Destruction</td>
<td>W4-D Symposium: Data-Driven Risk Modeling Using Predictive Analytics Approach</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Salon H</td>
<td>Salon J</td>
<td>Salon K</td>
<td>Salon 1</td>
<td>Salon 2</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>10:00 AM - 10:30 AM</td>
<td>Coffee Break</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noon - 1:30 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noon - 1:30 PM</td>
<td>Plenary Luncheon – The Reality of Human Trafficking and the Role of Risk Analysis, Arlington Ballroom, Salon III &amp; IV (Included in registration fee)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:00 PM - 3:30 PM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:30 PM - 5:00 PM</td>
<td>Coffee Break</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:00 PM - 5:30 PM</td>
<td>T-Shirt Giveaway - Registration Area, Arlington Ballroom Foyer, Registration desk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Salon A</td>
<td>Salon B</td>
<td>Salon C</td>
<td>Salons DE</td>
<td>Salons FG</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------</td>
<td>-----------------------------</td>
<td>-----------------------------------</td>
<td>--------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>Aoyagi M National Institute for Environmental Studies</td>
<td>Bolog-Way DHP Cornell University</td>
<td>Chair: Robyn Wilson</td>
<td>Chair: Frederic Boudier</td>
<td>Chair: Lisa Robinson</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>M2-A.1 Climate change risk perceptions and adaptation measures around Asia</td>
<td>M2-B.1 Bridging the risk science-policy gap: are regulatory agencies ready?</td>
<td>M2-C.1 Measuring the effectiveness of counterterrorism measures</td>
<td>M2-D.1 Development of a Unified Model Suite for Dichotomous and Continuous Toxicological Data</td>
<td>M2-E.1 Converting between Measures of Health Impact: Health Gap to Health Expectancy</td>
</tr>
<tr>
<td>10:50 AM</td>
<td>M2-A.2 UK public understanding of climate impacts, risks and adaptation strategies</td>
<td>M2-B.2 One risk Culture to bind them all?</td>
<td>M2-C.2 Analysis and forecasting of mass shootings using change point detection</td>
<td>M2-D.2 EPA and EFSA Approaches for Benchmark Dose Modeling</td>
<td>M2-E.2 Recent advances in probabilistic dose-response assessment to inform socioeconomic benefits analysis</td>
</tr>
<tr>
<td>11:10 AM</td>
<td>M2-A.3 A question of adaptation vs. mitigation? Communicating climate change risks and national responses</td>
<td>M2-B.3 Foundational Challenges for Risk Communication in Pharma: An Industry Perspective</td>
<td>M2-C.3 The effects of three common gun laws on firearms deaths</td>
<td>M2-D.3 The World Health Organization’s update to guidance on dose-response assessment and benchmark dose modeling</td>
<td>M2-E.3 Premature Deaths, Statistical Lives, and Years of Life Lost: Identification, Quantification, and Valuation of Mortality Risks</td>
</tr>
<tr>
<td></td>
<td>Wilson RS, Beetsra M, Stockwell R The Ohio State University</td>
<td>M2-B.5 University of Stavanger</td>
<td>Sponsored by: Security and Defense Specialty Group</td>
<td>Sponsored by: Dose Response Specialty Group</td>
<td>Sponsored by: Society for Benefit Cost Analysis and EBASG</td>
</tr>
</tbody>
</table>

Sponsored by: Risk Communication Specialty Group

Sponsored by: Foundational Issues in Risk Analysis Specialty Group

Sponsored by: Dose Response Specialty Group
<table>
<thead>
<tr>
<th>Time</th>
<th>Salon H</th>
<th>Salon J</th>
<th>Salon K</th>
<th>Salon I</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chair: Kara Morgan</td>
<td>Chair: Vanessa Schweizer</td>
<td>Chair: Frank Pagone</td>
<td>Chair: Hank Jenkins-Smith</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>M2-F.1 Food safety in Low and Middle Income Countries – An opportunity for risk-based decision making</td>
<td>M2-G.1 Risk Analysis in the Developing World: Integrating Data and Decisions through an Interdisciplinary Approach</td>
<td>M2-H.1 Plutonium (Pu): Historical Perspective on Evaluation of Health Risks of a New Element from Discovery to the Present</td>
<td>M2-I.1 Make risk assessment great again: slow the march towards systematic review, magic thresholds, and hormesis policy</td>
</tr>
<tr>
<td></td>
<td>Morgan KM, Kowalcyk BB Ohio State University</td>
<td>Baroud H Vanderbilt University</td>
<td>McClellan RO Toxicology and Risk Analysis</td>
<td>Finkel AM University of Michigan</td>
</tr>
<tr>
<td></td>
<td>Wilson RS The Ohio State University</td>
<td>Williams TG, Guikema SD, Brown DG, Agrawal A</td>
<td>Heckman BJ RHP Risk Management Inc.</td>
<td>Wells LM Erasmus University Rotterdam</td>
</tr>
</tbody>
</table>

**Sponsored by:**
- Risk and Development Specialty Group
Monday

10:30 AM – 12:00 PM

Salon 2
M2-J Poster Platform: Risk Perception, Communication, and Digital Technology
Chair: TBD

10:30 AM
M2-J.2
Tracking Misinformation on Social Media: A Machine Learning Approach
Hunt KH, Agarwal P, Zhuang J
University at Buffalo

10:30 AM
M2-J.3
Using Linguistic Markers to Detect Risk Perception Factors within Opioid Abuse Digital and Social Discussions to Enable Enhanced Risk Communication Effectiveness. A Text Analytics and Machine Learning Study
Sardella A, Sardella V
Washington University in St. Louis, Loyola University Chicago

10:30 AM
M2-J.4
Communicating Uncertainty in Deep Learning Models for High Stakes Decisions
Canfield CI, Shank D, Andrews L, Dagli C
Missouri University of Science & Technology

10:30 AM
M2-J.5
Comparative analysis of emotions and social network structures in social media discourse about different scientific issues
Okada T, Xenos M
University of Wisconsin-Madison

10:30 AM
M2-J.7
5G technology and public concern: a discussion on effective science communication
Dapert PJ, Graf KL
Exponent

10:30 AM
M2-J.9
Risk Perception, Social Media and Social Trust of Artificial Intelligence
Des Marcellis-Warin N, Warin T
Polytechnique Montreal, Skema Business School and CIRANO

1:30 PM – 3:00 PM

Salon A
M3-A Climate Change Communication, Adaptation, and Resilience, Part 2
Chair: Elspeth Spence

1:30 PM
M3-A.1
Understanding stakeholder perceptions of advanced preparedness systems for addressing climate-related natural disasters in Peru
Wirz CD, Brossard D, Block P
UW-Madison

1:45 PM
M3-A.2
Are we gaining ground or already behind? Motivating climate adaptation through loss aversion
Walpole EH, Wilson RS, Toman E
The Ohio State University

2:00 PM
M3-A.3
Public acceptability of the use of enhanced weathering to help reduce climate change
Spence ES, Pidgeon NF, Cox EM
Cardiff University

2:15 PM
M3-A.4
The effect of risk and benefit perception on consumers’ acceptance of products derived from captured carbon
Lutzke LA, Arvai JL
University of Michigan

2:30 PM
M3-A.5
Cycles of media attention, narrative themes, and institutional change: the evolution of oysters from risk objects to catalysts of environmental initiatives
Holley JR
Cornell University

Sponsored by:
Risk Communication Specialty Group

1:30 PM – 3:00 PM

Salon B
M3-B Roundtable: Current Foundational Issues in the Field of Risk Analysis
Chair: Roger Flage

The purpose of this roundtable, organized as an interactive small roundtable group and plenary discussion, is to raise debate on some current foundational issues in the field of risk analysis. The session will start with the introduction of a set of questions related to the foundations of risk analysis, including: Why should risk matrices be used with care? Do logical probabilities exist? What is causality? Is subjective expected utility theory useful in (and adequate for) risk analysis? Are mathematical and behavioral game theory useful in risk analysis? Attendees will form working groups, based on their own preference. Each group will discuss one of the questions raised and develop some main points to present and discuss in plenary towards the end of the session.

Roundtable participants include:
- Roger Flage
- Terje Aven
- Seth Guikema
- Tony Cox

Sponsored by:
Foundational Issues in Risk Analysis Specialty Group

1:30 PM – 3:00 PM

Salon C
M3-C Global Catastrophic Risks
Chair: Anthony Barrett

1:30 PM
M3-C.1
Global Catastrophic Risk Decision Analysis
Baum SD
Global Catastrophic Risk Institute

1:45 PM
M3-C.2
U.S. Policy for Reducing Global Catastrophic Risk
Brown J
Future of Life Institute and the Global Catastrophic Risk Institute

2:00 PM
M3-C.3
Biotechnology as an emerging global catastrophic risk
Ackerman GA
University at Albany

2:15 PM
M3-C.4
The Caveman and the Bomb: Psychological Obstacles to Rational Decisions About the Use of Nuclear Weapons
Slovic P
Decision Research and University of Oregon

2:30 PM
M3-C.5
Regulating Best-Case Scenarios
Rowell A
University of Illinois College of Law

Sponsored by:
Security and Defense Specialty Group
1:30 PM – 3:00 PM
Salons DE
M3-D Disaster Risk Analysis and Modeling
Chair: Stanley Levinson

1:30 PM
M3-D.1
Coupling Equilibrium Models with Electricity Capacity Expansion Investments to Hedge against Large-scale Electric Power Infrastructure Disruptions
Shittu E
George Washington University

1:45 PM
M3-D.2
Government policy development and analysis for hurricane risk management
Wang D, Davidson RA*, Nazick LK, Trainor JE, Kruse J
University of Delaware

2:00 PM
M3-D.4
A portfolio decision analysis of emergency medicine buffer stocks
Montibeller G, Angelis A, Kanavos P
Loughborough University

2:15 PM
M3-D.5
A framework for risk analysis and health monitoring for complex engineering systems
Groth KM, Moradi R
University of Maryland

Sponsored by:
Engineering and Infrastructure Specialty Group

1:30 PM – 3:00 PM
Salons FG
M3-E Risk Assessment and Benefits Analysis Interface
Chair: Aliya Sassi

1:00 PM
M3-E.1
The Pebble Remains in the Master’s Hand: Two Careers Spent Learning (Still) from John Evans
Gray G, Finkel AM
GWU Milken Institute School of Public Health

1:15 PM
M3-E.2
Towards a disutility function for risk: asking (not telling) the public how probabilities of grave harm affect them
Finkel AM, Johnson BB
University of Michigan School of Public Health and Decision Research

2:00 PM
M3-E.3
A Method for Estimating the Benefits of Avoiding Toxicological Endpoints on the Pathway to Cancer that Non-experts Do Not Understand
Belter RB
Good Intentions Paving Co.

2:15 PM
M3-E.4
Two Market Failure Arguments in Pipeline Safety Regulations: Free Rider Problem in Public Goods or Externalities to Third Parties
Gungor AG
U.S. Department of Transportation

2:30 PM
M3-E.5
The Environmental Burden of Disease project: Health risk ranking of hazards for decision-makers
Greco SL, Drudge C, Kim JH, Copes R
Public Health Ontario

Sponsored by:
Society for Benefit Cost Analysis and EBASG

1:30 PM – 3:00 PM
Salon H
M3-F Symposium: The Role of Predictive Microbiology and its Impact on Food Safety Quantitative Microbiological Risk Assessment and Beyond: Leveraging Scientific Advances
Chairs: Yuhuan Chen, Elizabeth Williams

1:00 PM
M3-F.1
Predictive Microbiology and Quantitative Microbial Risk Assessments (QMRA), what has been accomplished during the last thirty and twenty years
Buchanan RL
University of Maryland and Center for Food Safety and Security Systems

1:15 PM
M3-F.2
How Predictive Microbiology and Risk Assessment Modeling Tools have Changed Food Microbiology
Whiting RC
Exponent

2:00 PM
M3-F.3
What could we do that we are not doing yet regarding predictive microbiology and QMRA approaches to food safety?
Oscar T
USDA, ARS

2:15 PM
M3-F.4
How Predictive Microbiology and Risk Assessments can be used more effectively
Zwietering M
 Wageningen University

2:30 PM
M3-F.5
The future of Predictive Microbiology and QMRA: Leveraging new data and technology
Van Doren JM
U.S. Food and Drug Administration

Sponsored by:
Microbial Risk Analysis Specialty Group

1:30 PM – 3:00 PM
Salon J
M3-G Managing Risk: Balance, Communication, and Trust
Chair: Jason Bassett

1:00 PM
M3-G.1
Soane EC
London School of Economics and Political Science

1:15 PM
M3-G.2
Risk managing decision-making processes: A focus on carbon capture technologies in Canada
Larkin PM, Bird SD, Gattinger M
University of Ottawa

2:00 PM
M3-G.3
Beyond Data Analytics - Communicating Risk Insights through Visualization
Dyer RD
Management School

2:15 PM
M3-G.4
Adopting a risk informed approach to stakeholder selection and engagement for software requirements elicitation
Egbokhare FA, Aziken GO*, Ohoohe O, Ariave G
University of Benin Nigeria

Sponsored by:
Applied Risk Management Specialty Group

1:30 PM – 3:00 PM
Salon K
M3-H Roundtable: Worker Considerations as EPA Implements the 2016 Toxic Substances Control Act Amendments
Chair: Steve Gibb

The 2016 amendments to the Toxic Substances Control Act create specific safeguards for atpotentially exposed or susceptible subpopulations — such as infants, children, pregnant women, workers, or the elderly. It might be easy to overlook "workers" among the listed at-risk groups but that would be a mistake. Unions and worker health advocates who have spent years fighting for TSCA reform believe the wording is no small feat. The revised law gives the Environmental Protection Agency the power to restrict chemicals based on health risks. The addition of "worker" is a big change given unions’ perceptions that Occupational Safety and Health Administration permissible exposure limits are sometimes out of date, weak, or don’t cover relevant toxins in the workplace. This session will leverage the insights of industry consultants, current and former EPA scientists, union representatives, and an academic to discuss EPA’s early implementation of worker protections in its decisions on methylene chloride, NMP, and other chemicals it has reviewed and made regulatory decisions about. A similar session on TSCA implementation at the 2017 conference drew about 100 participants to focus on the “conditions of use” of chemicals as they are regulated under TSCA and other policy implementation challenges.

Sponsored by:
Occupational Health and Safety Specialty Group, and Risk and Development Specialty Group
<table>
<thead>
<tr>
<th>Time</th>
<th>Location/Panel Name</th>
<th>Details</th>
</tr>
</thead>
</table>
| 1:30 PM – 3:00 PM  | Salon 1                                     | M3-I Symposium: Global Disease Burden Caused by Foodborne Chemicals and Toxins  
Chair: Felicia Wu |
| 1:30 PM | M3-I.1                                      | Global Burden of Foodborne Disease: Introduction and Methylmercury  
Gibb HJ  
Gibb Epidemiology Consulting LLC |
| 1:45 PM | M3-I.2                                      | aflatoxin in corn and nuts: cancer and Immunological effects  
Wu F, Saha Turma N  
Michigan State University |
| 2:00 PM | M3-I.3                                      | Global estimates for the impact of lead from food on IQ and Disability Adjusted Life Years  
Carrington CD, Devleesschauwer B, Gibb H, Bolger PM  
Spoiled Hike LLC |
| 2:15 PM | M3-I.4                                      | Cassava Cyanide and Children’s Cognitive Impairment  
Chen C, Wu F  
Michigan State University |
| 2:30 PM | M3-I.5                                      | Exposure-based estimation of the global burden of coronary heart disease from dietary arsenic  
Barchowsky A, Oberoi S, Devleesschauwer B, Gibb HJ  
University of Pittsburgh |
|              | Sponsored by: Exposure Assessment Specialty Group |                                                                 |

<table>
<thead>
<tr>
<th>Time</th>
<th>Location/Panel Name</th>
<th>Details</th>
</tr>
</thead>
</table>
| 1:30 PM – 3:00 PM  | Salon 2                                     | M3-J Poster Platform: Perspectives on Risk-based Decision Making  
Chair: TBD  
1:30 PM | M3-J.1                                      | Development of a combined vulnerability index supporting climate change adaptation in the Italian coastal area  
Bonato M, Furlon E, Torresan S, Dalla Pozza P, Critto A, Michetti M, Marcomini A  
Ca’ Foscari University Venice and Euro-Mediterranean Center on Climate Change |
| 1:30 PM | M3-J.2                                      | Risk Tradeoffs between Climate Change and Solar Radiation Management  
Felgenhauer TN, Mallampalli V, Borsuk ME, Wiener JB  
Duke University |
| 1:30 PM | M3-J.3                                      | Implementing a framework to evaluate the impact of food intake shifts on risk of illness using a case study with infant cereal  
Santillana Farakos S, Poullat R, Spungen J, Flannery B, Dolan L, Van Doren J  
U.S. Food and Drug Administration |
| 1:30 PM | M3-J.4                                      | Holistic judgments and protection intentions: an empirical test of a model of perceived risk  
Walpole HD, Wilson RS  
The Ohio State University |
| 1:30 PM | M3-J.5                                      | A review of the literature on risk-based decision making  
Crawford A, Morgan KM  
Ohio State University |
| 1:30 PM – 3:00 PM  | Salon A                                     | M4-A Health Risk Perception and Communication  
Chair: Jacqueline Patterson  
3:30 PM | M4-A.1                                      | Risk Communication with Pregnant Inuit Women in Arctic Canada  
Washington State University |
| 3:30 PM | M4-A.2                                      | Reports of social circles’ and own vaccination behavior: a national longitudinal survey  
Bruine de Bruin W, Parker AM, Galesic M, Vardavas R  
University of Leeds, Carnegie Mellon University, RAND, Santa Fe Institute and Max Planck Institute |
| 4:00 PM | M4-A.3                                      | Pandemic Futures: Public Health and Infectious Disease - Lessons Learned from Zika  
Berube D  
North Carolina State University |
| 4:15 PM | M4-A.4                                      | Intentions to seek information about the flu vaccine: The role of norms, anticipated and experienced affect, and information insufficiency among vaccinated and unvaccinated people  
Li H, Winne K M, Jamieson KH, Albarracin D  
University of Pennsylvania |
| 4:30 PM | M4-A.5                                      | The influence of psychological distance on discrete emotions and risk perception in a measles outbreak  
McAllister CA, Yang JZ  
University at Buffalo, SUNY |
|              | Sponsored by: Risk Communication Specialty Group |                                                                 |

<table>
<thead>
<tr>
<th>Time</th>
<th>Location/Panel Name</th>
<th>Details</th>
</tr>
</thead>
</table>
| 3:30 PM – 5:00 PM  | Salon B                                     | M4-B Students and Young Professionals Roundtable and Workshop  
Chair: Tom Logan  
How will society address the complex challenges it faces in the future? This is a question extremely pertinent to young people. How risk science will contribute to solving these challenges lies in the hands of tomorrow’s risk analysts: the students and young professionals of our society.  
This is a precursor to next May’s workshop for students and young professionals where we will explore the role of risk analysis in solving emerging challenges in technology, environment, and society. In this panel, we will begin this discussion in a low-pressure atmosphere, discuss ideas between students and young professionals, and reflect upon the question “is modern risk science prepared for tomorrow’s challenges?”  
Participants:  
- Sara Gray  
- Mariana Caines  
- Tim Williams  
- Ben Rachunok  
- Brennan Chapman  
- Tom Logan  
Sponsored by: Foundational Issues in Risk Analysis Specialty Group |
| 3:30 PM – 5:00 PM  | Salon C                                     | M4-C Symposium: Risk, Security, and Trust of Embedded Hardware in Cyber-Physical Systems  
Chair: Zachary Collier  
Advantages of the CHEST NSF IUCRC to Industry and the DoD  
Emmert JM  
University of Cincinnati |
| 3:30 PM | M4-C.1                                      | Overview of NRMC’s work on conducting a Supply Chain Analysis and Assessment  
Covel C  
Cybersecurity and Infrastructure Security Agency |
| 4:00 PM | M4-C.2                                      | Enterprise risk and resilience in emerging technologies and embedded hardware systems  
Andrews DJ  
University of Virginia |
| 4:30 PM | M4-C.3                                      | Overview of NRMC’s work on conducting a Supply Chain Analysis and Assessment  
Covel C  
Cybersecurity and Infrastructure Security Agency |
| 4:30 PM | M4-C.4                                      | Enterprise risk and resilience in emerging technologies and embedded hardware systems  
Andrews DJ  
University of Virginia |
| 4:30 PM | M4-C.5                                      | Enterprise risk and resilience in emerging technologies and embedded hardware systems  
Andrews DJ  
University of Virginia |
|              | Sponsored by: Security and Defense Specialty Group |                                                                 |
Monday

3:30 PM – 5:00 PM
Salons DE
M4-D Symposium: Engineering and Infrastructure Solutions for Natural Hazards Risk Management
Chair: David Johnson

3:30 PM
M4-D.1
Temporary Housing after Natural Disasters: Maximizing Community Resilience While Minimizing Financial Risk
Perrucci DV, Baroud H
Vanderbilt University

3:45 PM
M4-D.2
Resilient Production Cost Modeling: Can our Electric Grid Better Weather the Storm?
Sandia National Labs

4:00 PM
M4-D.3
Improving emergency management services in coastal communities prone to repetitive flooding
Y. Jasour Z, Reilly A
University of Maryland College Park

4:15 PM
M4-D.4
Flood risk reduction benefits of coastal restoration and green infrastructure projects
Johnson DR
Purdue University

4:30 PM
M4-D.5
Regarding Enhanced Residential Construction and Community Resiliency Subject to Extreme Events
Lester HD
University of South Alabama

Sponsored by:
Engineering and Infrastructure Specialty Group

---

3:30 PM – 5:00 PM
Salons FG
M4-E Benefit Cost Analysis: Theory and Application
Chair: Chris Dockins

3:30 PM
M4-E.1
The value of reducing mortality risk: benefit-cost analysis, social welfare functions, and fair innings
Adler MD, Ferranna M, Hammitt JK*, Treich N
Harvard University and Toulouse School of Economics

3:45 PM
M4-E.2
Benefit cost ratio of vaccination to control paratuberculosis in Canadian dairy cattle
Hall DC, Rasmussen P
University of Calgary

4:00 PM
M4-E.3
Benefit-Cost Problem Formulation - The Case of Cell-Based Meat
Williams RA
Author

4:15 PM
M4-E.4
Public Judgments about National-Level Tradeoffs between Life-Prolonging Regulatory Benefits and Their Costs
Johnson BB, Finkel AM
Decision Research, University of Michigan

4:30 PM
M4-E.5
AI and Indicator-based Assessment of Societal & Social Acceptability of Systemic Impacts Caused by Multi-hazard Threats to Critical Infrastructures
Jovanovic AS
Steinbeis R-Tech / EU-VRI

Sponsored by:
Society for Benefit Cost Analysis and EBASG

---

3:30 PM – 5:00 PM
Salon H
M4-F Epistemic Issues Around Risk and Resilience
Chair: Henry Willis

3:30 PM
M4-F.1
Resilience: What’s it worth to you? Willis HH
RAND Corporation

3:45 PM
M4-F.2
Resilience of Small Teams – Theory, Methods, and Applications
Gaalitsi SE, Trump BD, Wells EM, Linkov I
US Army Corps of Engineers, Risk and Decision Science

4:00 PM
M4-F.3
Regulatory Responses to Resilience in UK Financial Services
Hall IS
University of Northampton

4:15 PM
M4-F.4
Understanding personal concern for climate change related extreme events in the context of geographic risks and community resilience
Shao W, Gardezi M
University of Alabama and South Dakota State University

4:30 PM
M4-F.5
Risk assessment of an underground pipeline carrying methane crossing vertically the Magdalena River
Alarcon M, Torres ES, Munoz-Giraldo F
Pontificial Catholic University of Chile

Sponsored by:
Applied Risk Management Specialty Group

---

3:30 PM – 5:00 PM
Salon J
M4-G From Analysis to Management: Natural Hazards & Petroleum
Chair: Kelsey Hollenback

3:30 PM
M4-G.1
Perception during crises. Seeing the forest, but not the trees.
Aarset M, Juvkam PC
NTNU Norwegian University of Science and Technology

3:45 PM
M4-G.2
Preparedness for natural hazards on coastal communities of Chile and its main predictors
Cisternas PC, Cifuentes LA, Bronfman NC, Repetto PB
Pontificial Catholic University of Chile

4:00 PM
M4-G.3
Risk Assessment and Governance of Synthetic Biology - Lessons Learned From Emerging Technology Scholarship
Trump BD, Linkov I
US Army Corps of Engineers

4:15 PM
M4-G.4
Exposure and Risk Assessment Approaches for Emerging Consumer Technologies and Materials
Thomas T
US Consumer Product Safety Commission

4:30 PM
M4-G.5
Nano/Synbio Techno Revolutions: Different names, same missed opportunities for risk governance?
Kuiken T
North Carolina State University

Sponsored by:
Advanced Materials and Technologies Specialty Group

---

3:30 PM – 5:00 PM
Salon K
M4-H Symposium: Risk Analysis of Engineered Nanomaterials: Where Have We Been, Lessons Learned, and Transfer of Knowledge to Other Emerging Technologies
Chair: Khara Grieger

3:30 PM
M4-H.1
Application of a DoD Nanomaterial Risk Assessment Framework to Evaluate the Health and Environmental Impacts of Additive Manufacturing Technologies
Ede JD, Shatkin JA
Vireo Advisors

3:45 PM
M4-H.2
Transferring Knowledge from the Field of Nanomaterial Risk Analysis for Other Emerging Technologies
Grieger KD
North Carolina State University

4:00 PM
M4-H.3
Risk Assessment and Governance of Synthetic Biology - Lessons Learned From Emerging Technology Scholarship
Grieger KD
North Carolina State University

4:15 PM
M4-H.4
Exposure and Risk Assessment Approaches for Emerging Consumer Technologies and Materials
Thomas T
US Consumer Product Safety Commission

4:30 PM
M4-H.5
Nano/Synbio Techno Revolutions: Different names, same missed opportunities for risk governance?
Kuiken T
North Carolina State University

Sponsored by:
Advanced Materials and Technologies Specialty Group

---
**Monday**

**3:30 PM – 5:00 PM**

**Salon 2**

**M4-J Poster Platform: Application of QMRA in Water Quality**

*Chair: Patrick Gurian*

**3:30 PM**

**M4-J.1**

Water quality simulation to inform design of a disinfectant-free floating pool in New York City

Dale AL, Lemay JC, Lynch HN, Bowers TS

Gradient Corporation

**3:30 PM**

**M4-J.2**

Challenges in estimating health risks of simultaneous exposures of pathogens, antibiotics and antibiotics-resistant genes during water reuse: A case study of Delhi, India

Tyagi N, Jain H, Lila K, Gurian PL, Munir M, Kumar A

Indian Institute of Technology Delhi

**3:30 PM**

**M4-J.3**

Quantitative Microbial Risk Assessment for Microbiological Specification Setting for Listeria monocytogenes Contamination in Wastewater Reuse in Pasteurized Fluid Milk Processing

Dogan OB, Meneses YE, Flores RA, Wang B

University of Nebraska-Lincoln, New Mexico State University

**3:30 PM**

**M4-J.4**

Understanding challenges in conducting QMRA of pathogen exposure from Yamuna river water using sensor based data

Tyagi N, Kumar A, Jha S, Perumal V, Rose JB, Mulchandani A

Indian Institute of Technology Delhi

**3:30 PM**

**M4-J.5**

Inferring hidden exposure parameters based on dose–response information for Naegleria Fowleri

Rasheduzzaman M, Bartrand T, Haas CN, Singh R, Gurian PL

Drexel University, ESPRI

**3:30 PM**

**M4-J.6**

Identifying public health risk factors associated with water use and water quality in a green home

Julien R, Mitchell J*

Michigan State University

**3:30 PM**

**M4-J.7**

A quantitative model for evaluating risk trade-offs in Legionnaires’ Disease risk, energy cost, and scalding risk for hot water systems

Heida AJ, Mraz A, Weir M, Hamilton KA

Arizona State University

**3:30 PM**

**M4-J.8**

Development of a Microcystin Drinking Water Risk Model Using an Adaptation of the QMRA Framework

Weir MH, Wood T

The Ohio State University

**3:30 PM**

**M4-J.9**

Risk assessment framework as a tool to quantify water quality changes in building plumbing systems in terms of disability adjusted life years


Drexel University

**Sponsored by:**

Microbial Risk Analysis Specialty Group
Monday

6:00 PM – 8:00 PM

Arlington Ballroom
P Poster Session

P.1 Risk analysis based on urban geology from the city of La Paz, B.C.S., Mexico (southeast portion)
Hirales-Rochin J
Technological Institute of La Paz

P.2 Incorporating Analytical Variance into a Comparative Quantitative Risk Assessment (QRA) Approach for Tobacco Products
Anderson CA, Hoase V, Ehman KD, Wiecinski PN, Smith DC
Altria Client Services LLC

P.3 Re-evaluating Political Risk Characterization in Regional Context
Hetou G
Rutgers University and iStrategic LLC

P.4 Guidelines, tips and suggestions for how to improve your human health and ecological risk assessments
Rapal KM, Coutinho CD
TechLaw, Inc.

P.5 Science for a Risky World: Implementing the new USGS Plan for Risk Research and Applications
Ludwig KA, Ramsey DW, Wood NJ, Pennaz AB, Godt JG, Plant NG, Luco N
U.S. Geological Survey

P.6 Spatiotemporal groundwater pumping estimation in the resilient management
Lee CH, Yu HL*
National Taiwan University

P.7 The risk of cyber security attacks on autonomous vehicles
Mamajiwala B, Maeda Y
Shizuoka University

P.8 Exposure Assessment with Cluster Analysis and Bayesian Statistics to Incorporate Existing Data from Similar Occupational Scenarios
Huang SZ, Chuang YC, Wu KY
National Taiwan University

P.10 Probabilistic assessment of aggregate exposure risk for Di(2-ethylhexyl) phthalate (DEHP) in Northern-Taiwan
Chang WS, Huang WU
Taiwan University

P.11 Scenario-based analysis of reduction effects of improving sewage facilities’ diffusion rate on ecological risk: A case study focusing on emission of detergents
Toyo-hiko N
Ochanomizu University

P.12 From table-tops to digital twins: industrial experiments in cyber risk
Crowther KG
General Electric

P.13 Value Alignment Strategies for AI Catastrophe Risk Management
Barrett AM
Global Catastrophic Risk Institute

P.14 Assessment of Risk of Variant Creutzfeldt-Jakob Disease (vCJD) from Use of Bovine Heparin
U.S. Food and Drug Administration

P.15 Evaluating specificity and sensitivity of different diagnostic methods to identify Toxoplasma gondii in freshly cut meats of lambs and goats
Rani S, Dubey JP, Pradhan AK*
University of Maryland and United States Department of Agriculture

P.16 Identification of phenotypic proxies for Salmonella pathogenicity in chicken - applicability into a risk assessment framework
Karanth S, Tanui CK, Pradhan AK
University of Maryland and Center for Food Safety and Security Systems, University of Maryland

P.17 Ranking the 45 Commonly Used Solvents Listed on the Toxic Release Inventory
Brown L, Forth H, Chiger A, Reiche L, McFadden A
Abt Associates

P.18 Development of an Anthropometric Data Measurement Chair for Designing Ergonomic Office Chairs
Idada OR, Ariavie GO
University of Benin, Federal University

P.19 Exposure risk for Di(2-ethylhexyl) phthalate (DEHP) in Northern-Taiwan
Chang WS, Huang WU
Taiwan University

P.20 Identification of potential biomarkers and characterization of Salmonella strains in ground chicken using whole genome sequences
Tanui CK, Karanth, Pradhan
University of Maryland

P.21 Risk Assessment of Contaminated Sites Vulnerable to Inundation due to Sea Level Rise
Faraji Najarkolaie K, Bensi MT, Reilly AC
University of Maryland

P.22 A review of joint probability studies used for estimation of flood hazards due to combinations of flooding mechanisms
Mohammadi S, Bensi M, Kao SC, DeNeale ST, Carr M, Banney J
University of Maryland, Oak Ridge National Laboratory, United States Nuclear Regulatory Commission

P.23 Preliminary study to identify high-touch surfaces in food service establishments as a potential means of improving future food establishment cleaning protocols
Zilko S, UL-Huda N, Williams L, Liggans G, Fanasselle W
Food and Drug Administration, University of Maryland

P.24 Assessing ISA Tree Risk Assessment Approach Using Econometrics Analysis
Kabir E, Guikema SD, Koester A, Martinez J, Hyun Kim J
University of Michigan, University of Florida

P.25 Mitigating the Limits of Expert Judgement through Alternative Tools and Methods
Marinelli J
Global Risk Intel

P.26 Hazard Assessment of Six Selected Per- and Poly-fluoroalkyl Substances (PFAS) for Potential Impacts to National Defense
Vogel CM, Maples A, Glaccum W, Mallard T, Rik A, Scanlon KA, Underwood P, Graham MR
Nobilis, Inc., IPC - Association Connecting Electronics Industries®, Department of Defense

P.27 The configuration and visualization of an integrated database for the user of food safety authorities from food commodity inspection data to quantitative health risk
Huang SZ, Lin HC, Lee LC, Tu KM, Li HF, Chuang YC*
National Taiwan University

P.28 The configuration and visualization of an integrated database for the user of food safety authorities from food commodity inspection data to quantitative health risk
Huang SZ, Lin HC, Lee LC, Tu KM, Li HF, Chuang YC*
National Taiwan University

P.29 Identifying Knowledge Gaps in Building Water Quality Management: Experts’ Perspective and Review of Existing Guidance Documents
Singh R, Rashiduzzaman MD, Yang Z, Hamilton K, Gurian PL
Drexel University
Advanced Materials and Technologies
P.30 Handling missing data in air pollution studies: a comparison of different approaches based on multivariate time-series models
Unit of Biostatistics, Epidemiology and Public Health, Department of Cardiac, Thoracic and Vascular Sciences, University of Padova
P.31 Nanosilver carriers as antimicrobial agents for control of plant disease
Ane T, Sharp B, Varzeas T, Sayes C, Braswell E
Baylor University, USDA APHIS PPQ CFHST

Applied Risk Management
P.32 Assessing Bias in Disease Incidence Rates for Repeat Blood Donors in the United States: A Simulation-based Approach
US Food and Drug Administration

Decision and Risk
P.33 Investigating the Effect of Locally Intense Rainfall Events on Precipitation Frequency Analysis Estimates and Addressing Sources of Uncertainty
Al Kajbaf A, Bensi MT
Research Assistant, University of Maryland

Dose Response
P.34 Implications of the threshold approach for risk assessment of inorganic arsenic in drinking water.
Lange SS
Texas Commission on Environmental Quality
P.35 Exploring associations between blood volatile organic compounds and changes in hematologic and biochemical profiles in a population based study.
Cakmok S, Hebbeln C, Andrade J, Dales R
Health Canada
P.36 Assessing Potential for Non-Monotonic Dose Response for BPA in the CLARITY-BPA study
Reiss R, Bading M, Barraj L, Williams A, Scrafitt C
Health Canada
P.37 Updates to a concentration-response function for lead and cardiovascular mortality
Lynch MTK, Brown L
Abb Associates
P.38 Incidence estimates of varicella zoster: a machine learning approach for routinely collected ambulatory records
University of Padova and University of Torino and Società Servizi Telematici Peditan

Engineering and Infrastructure
P.39 Not all components are equal: which haloacetic acids drive the toxicity of haloacetic acid mixtures?
Simmons JE, Tripplett CA, Plewa MJ, Wagner ED, Aune LL, Feder PI
ORD, U.S. EPA, Battelle, Univ. of Illinois
P.40 Critical appraisal tools for the evaluation of in vitro study bias and quality in risk assessment: Utilities and challenges
Urban JD, Fitch SE, Pham LL, Wikoff DW
TaxStrategies, Inc.
P.41 Development of a Data Simulation Method to Optimize A Mechanistic Dose-Response Model for Viral Loads of Hepatitis-A
Wei MH
The Ohio State University

Engineering Infrastructure Specialty Group
P.43 A network-of-networks approach for cyber-based contingency analysis of interdependent infrastructure networks under uncertainty
Pacific Northwest National Laboratory, Northeastern University-Boston, Indian Institute of Technology-Gandhinagar, Volpe National Transportation Systems Center, Rensselaer Polytechnic Institute

P.44 Risk of Civil Infrastructure Obsolescence from Reactionary Planning and Design: Operational Needs for Multiple Objective Temporal Scenario Analysis
Penneti C
University of Virginia
P.45 The link between expertise and risk in context: A Fuzzy Trace Theory Approach to NASA’s Engineering Decisions
Martin HD, Broniatowski DA
The George Washington University
P.46 An attempt of risk comparison on a hydrogen refueling station and a gas station in Japan
Ono K
National Institute of Advanced Industrial Science and Technology (AIST)

Exposure Assessment
P.47 Implementing a probabilistic human health risk assessment framework for ranking Indian dumping sites: A case study of dermal and ingestion exposures of heavy metals from contaminated groundwater
Guleria A, Kumar A
Indian Institute of Technology Delhi
P.48 Comparative Studies on the Degradability of Recalcitrant Polycyclic Aromatic Hydrocarbons
Oshomogho F, Ariavie G, Owabor C
University of Benin
P.49 Application of a gestational physiologically based pharmacokinetic (PBPK) model for perfluorooctane sulfonate (PFOS) in risk assessment for pregnant women and fetuses
Chou WC, Lin Z*
Kansas State University

P.50 Systematic probabilistic risk assessment of pesticide residues in tea
Lu EH, Wu KY
Legislative Yuan, Taiwan
P.51 Risk assessment of allergic foods and air pollution on allergic rhinitis
Chou TH, Liu KY, Li CH, Lai TJ, Chiu SY, Ho WC
China Medical University
P.52 Risk assessment of air pollution and the intake of omega-3 fatty acid from fish and shellfishes on eczema.
Liu KY, Chou TH, Li CH, Lai TJ, Chiu SY, Ho WC
China Medical University
P.53 Relationship between exposure to PM2.5 in diabetic population and colorectal cancer.
Ho WC, Chou TH, Liu KY, Li CH, Lai TJ, Chiu SY, Chan WC, Tsan YT, Chen PC
China Medical University
P.54 Short-term effects of air pollution particulate matter on the atrial fibrillation onset risk in cardiac vulnerable patients
University of Padova
P.55 Estimating acute and chronic exposure of children and adults to Carbendazim in fruits and vegetables in China
Zhejiang Academy of Agricultural Sciences
P.56  Risk assessment of chronic exposure to organophosphorus pesticides in fruits and vegetables between Taiwan and United States
    Chao HW, Huang SZ, Wu KY
    National Taiwan University

P.57  Health risk assessment of exposure to methyl eugenol in food
    Lin JR, Huang SZ, Wu KY
    National Taiwan University

P.58  Probabilistic Risk Assessment to Compare Health Risks of Oral Tobacco Products
    Santamaria AB, Krotenberg ME, Drouin SM, Ehman KD, Anderson CA, Haase V, Smith DC
    Rimkus Consulting Group, Altria Client Services

P.59  A Random Forest approach to identify the simultaneous association between respiratory diseases in children and multiple pollutants
    Unit of Biostatistics, Epidemiology and Public Health, Department of Cardiac, Thoracic and Vascular Sciences, University of Padova

P.60  ExpoKids: a tool to characterize environmental chemical aggregate exposures across childhood lifestyles
    Dai M, Euling SY, Phillips L, Rice G
    Oak Ridge Institute for Science and Education, United States Environmental Protection Agency

P.61  Cadmium concentration survey in rice from 2010 to 2018 and probabilistic risk assessment of cadmium in Taiwan population
    Lien KW, Huang SZ, Wu KY
    National Taiwan University

P.62  Human Health Risk Assessment of Triclosan in drinking water
    Bhardwaj R
    Indian Institute of Technology, Delhi

P.64  Human health risk assessment from exposure to arsenic in rice grown in Brazil
    Toledo MC, Batista BL, Olympia KPK, Nardocci AC
    Sao Paulo University of Sao Paulo - School of Public Health

P.65  Estimating risks from natural gas compressor station HAPs
    Kaden DA, Huang CK
    Romboll

P.66  Use of Machine Learning techniques for case-detection of Varicella Zoster using routinely collected textual ambulatory records
    University of Padova, University of Torino and Societa Servizi Telematici Pediatria

P.67  Application of Bayesian networks to access hurricane risks to households
    Abuabar A, Medina-Cetina Z, Peacock W
    Texas A&M University

P.68  Probabilistic assessment of the cumulative dietary chronic exposure to carbamate and pyrethroid pesticides in Taiwan
    Chiang SY, Chang BS, Chuang YC, Wu KY
    China Medical University

P.69  Probabilistic Risk Assessment of Inorganic Arsenic Exposure from Rice Intake in Chinese Urban Population
    Indiana University School of Public Health – Bloomington, University of Science and Technology Beijing, Peking University College of Environmental Sciences and Engineering

Microbial Risk Analysis

P.70  A quantitative approach to characterizing data – and data gaps – on risk factors for antimicrobial resistance in the agri-food production system (IAM,AMR)
    Chapman B, Murphy CP, Smith BA
    University of Guelph and Public Health Agency of Canada

Occupational Health and Safety

P.71  Sensitivity analysis in quantitative risk assessment of a hydrogen refueling station
    Tsunemi K, Kowamoto A, Kihara T, Ono K
    National Institute of Advanced Industrial Science and Technology

P.72  Organizational Risk as a Social Field – New Promise for Advancing Risk Science
    Redinger CF
    Institute for Advanced Risk Management

P.73  Mercury detection technologies to inform metal recycling
    Finster ME, MacDonell MM, Chang YS
    Argonne National Laboratory

P.74  Glyphosate and Cancer: Risk Analysis of the Data in the Times of Controversy
    Korchevsky A
    Chemistry & Industrial Hygiene, Inc.

Resilience Analysis

P.75  Classifying the Countermeasures for Reducing Damage from Natural-hazard triggered accidents by sharing good experience in the leading six prefecture in Japan
    Kojima N, Ito L, Nakakuba T, Takai A
    Osaka University

P.76  Estimating Readiness Transition Junction for Built Environment System Disaster Recovery
    Lester HD
    University of South Alabama

Risk and Development

P.77  Influencing Factors of Street-level Bureaucrats’ Decision-making in Risk Events with Small Probability
    Shuang N, Bo F, Chuanshen Q
    Shanghai Jiao Tong University

P.79  Review of environmental impacts of plastic ban and risks hindering plastic recycling in Japan
    Suresh PP, Maeda Y
    Shizuoka University

Risk Communication

P.80  Making of a risk communication picture book
    Oiso S
    Institute of Nuclear Safety System, Incorporated

P.81  Comparison of risk perception among 13 physical risk factors in Japan
    Ohkubo C
    The Japan EMF Information Center

P.82  Seeking information about enhanced geothermal systems: The role of systematic processing and information exchanging intentions
    Lu H, Song H, McComas KA
    University of Pennsylvania, Purdue University, Cornell University

P.83  The Impact of Robust Public Participation in a 30-year Commitment to Scientifically Assess Superfund Health Outcomes in Butte Montana
    Ackerlund WS
    Ecology and Environment, Inc.

P.84  Effects of e-cigarette health warnings and advertisements on risk perception, quitting intention and purchasing intention
    Chen Y
    Sam Houston State University

P.85  Seeing is believing: how inflated self-assessments and gender affect youths’ positive risk-taking
    Wong JCS, Yang JZ
    University at Buffalo, The State University of New York
P.86 Seeing is believing: how inflated self-assessments and gender affect youths’ positive risk-taking
Wong JCS, Yang JZ
University at Buffalo, The State University of New York

P.87 The Engineering and Communication Challenges of Flooding: An Interdisciplinary Approach to Understanding the Future of Flood Management
Herovic E, Bensi M, Solano C, Patterson E, Newmier S
University of Maryland

P.88 Social science evaluation of tsunami evacuation products
Lindell MK, Bostrom A, Goltz J, Prater C
University of Washington

P.89 On the amplification of risk concern towards air pollution in China
Fan SW, Xu JH
Central University of Finance and Economics, Peking University

P.90 Designing risk messages on social media in health crisis: content analysis of Twitter posts sent from/to CDC in Zika outbreak
Kim E
Indiana University

P.91 Media use, social trust and vaccine-related risk perception and vaccination intention for parents after several vaccine scandals in China
Liu Z, Yang JZ
State University of New York, Buffalo

P.92 Scientific Uncertainty, anxiety, and engagement with an environmental problem
Qian S
University of Utah

P.93 Are they really as prepared as they think they are? Investigating self-assessment bias in a risk communication survey
Henry HGW, St Clair AE, Haegeli P, Gregory R, Klassen K
Simon Fraser University, ChoiceWorks Ltd. Avalanche Canada

P.94 How do we integrate scientific evidences and victims’ viewpoints: Case of asbestos contamination in a nursery school
Muraiyama TM
Tokyo Institute of Technology

P.95 It’s about time: analyzing the role of temporal distance perception in narrative persuasion in the context of e-cigarette prevention
Liu S, Yang JZ
University at Buffalo, SUNY

P.96 Enhancing Collaborative Analysis for Human Health Risk Assessment Decisions
Patterson J, Curran C, Maddaloni M, Maier A
University of Cincinnati, Northern Kentucky University, Cardno ChemRisk

P.97 Abstract crisis or concrete threat: analyzing the influence of psychological distance on people’s mental construal of climate change
Chu H, Yang JZ
Texas Tech University

P.98 Risk Communication in Heterogeneous Societies: From Information to Action
Lundgren ML
Mid Sweden University

P.99 Public attitudes about energy transitions and enhanced geothermal heating: the influence of place meaning, identity, and attachment
Lambert CE, McComas KA, Anderson SK
Cornell University, Cornell Cooperative Extension

P.100 Inoculating Inoculations: Using entertainment to combat vaccine misinformation
McClaran N
Michigan State University

P.101 Air Pollution - Invisible threat
Williams B
King’s College London

P.102 Out of sight, out of mind: towards a strategic approach to ocean health communication
Balog-Way DHP, McComas KA, Harvell D
Cornell University

P.103 Probabilistic Risk Assessment of PBDEs Transformation in Multi-medium in Taiwan
Lu DK, Huang SZ, Wu KY
National Taiwan University

P.104 Understanding climate change risks on the U.S. transportation system management: A comparative analysis of government professionals and U. S. public
Kim SC, Olugbemi A, Malterud A, Esmaeili B
George Mason University

P.105 Climate change impacts on the U.S. transportation system management: A demographic and audience segment analysis on behavioral intentions and policy support
Kim SC, Malterud A, Olugbemi A, Esmaeili B
George Mason University

P.106 A Review: Scientific Approaches for Effective Risk/Benefit Communication about Food Safety
Yamaguchi H
Aichi University

Risk Policy and Law

P.107 Recommended update of EPA soil action level for lead
Kountzman J
Black & Veatch Federal Services

P.108 Probabilistic Risk Assessment of PBDEs Transformation in Multi-medium in Taiwan
Lu DK, Huang SZ, Wu KY
National Taiwan University

P.109 Sharing Risk, Building Community: Cooperative Insurance as a Mechanism to Address Financial Emergencies in Atlanta
Cohen AA
Duke University

Jovanovic AS
Steinbeis R-Tech / EU-VRi

P.111 Consequences of abstract versus concrete conceptualization of genetic modification (GM): Public’s general disapproval of GM but specific approval of GM applications
Talapragada M, Hardy BW, Lybrand E, Hallman WK
Temple University

P.112 A probabilistic approach for the cancer risk characterization for the dietary nitrosamine intake pathway in Korea
Korea Institute of Toxicology

P.113 Communication about Alzheimer’s Disease and Related Dementias Research with American Indians and Alaska Natives
Boyd AD, Mayeda A, Muller C, Jernigan M, Buchwald D
Washington State University

P.114 Cost-benefit and health-benefit analyses of interventions to improve water supplies for a majority African American extraterritorial jurisdiction in North Carolina
Colley SK, MacDonald Gibson J
University of North Carolina-Chapel Hill

P.115 Factors modifying children’s inhalation risk assessment
Saadeh RA, Klaunig JE
University of North Carolina-Chapel Hill

P.116 Assessing and Mitigating the Biological Risk from Space Return Missions
Locke J, Lai B
IDA Science and Technology Policy Institute
P.118
Effects of selected lifestyle behaviors on the BMI of 50 North Carolina adults
Hibbert K, Morgan MK
U.S. Environmental Protection Agency

P.119
Construction of databases of environmental fate and ecotoxicity for the development of environmental risk evaluation system of pharmaceuticals
Hirose A, Kobayashi N, Kunimoto M, Yarnamato H, Ikarashi Y, Takashi Y
National Institute of Health Sciences

P.120
The role of study quality in examining the risk of cancer from occupational exposure to ethylene oxide
Best EA, Vincent MJ, Thompson WJ, Maier A, Dotson GS, Kozal JS, Mundt KA
Cardno Chemrisk

P.121
I do not think it means what you think it means: explorations of mental models of soil health
Beetstra MA, Wade J
The Ohio State University

P.122
Qualitative review of recent USEPA TSCA occupational inhalation exposure assessments: Recommendations for future assessments
Bare J, Maskrey J, Hallett L, Hamaji C, Unice K
Cardno ChemRisk

P.123
Environmental monitoring and application of a chemical fate prediction model for risk assessment of human pharmaceuticals in Japanese river water
Kobayashi N, Tsujiya Y, Tabata M, Komatsubara Y, Eriguchi T, Ikarashi Y
National Institute of Health Sciences

P.124
Frequency, recency, and strength: Characteristics of experienced hurricanes differentially associate with hurricane risk perceptions
Kranzler EC, Liao Y, Czajkowski J
University of Pennsylvania

P.125
Assessing a Hazard Model of Tolerance for Wolves among the General Public
Slagle KM, Wilson RS, Bruskotter JT
Ohio State University

P.126
Communicating about health risks in Native communities: Experiences in research and application
Mayeda AM, Boyd AD, Donovan D, Marson S, Buchwald D
Washington State University, University of Washington, and University of Colorado

P.127
The role of vitamin D status in the association of inflammatory risk and albuminuria with polycyclic aromatic hydrocarbon exposures in US adults
Kadry AM, Lin YS, Elfaramawi M, Sonawane B
U.S. Environmental Protection Agency, University of Arkansas for Medical Sciences & Toxicology and Risk Assessment Consulting Services

P.128
Disaster Risk Analysis of Cellular Coverage
Feeny N, Guikema S, White A
University of Michigan

P.129
Exposure Data Extraction and Data Integration Using litstream™ for Systematic Review
Hobbie KA, Riley K, McCoy J, Snow SJ, Williams A, Feiler T, Henning C, Hubbard H
ICF

P.130
Transportation Resilience and the Economic Consequences of Disruptions
University of Virginia, U.S. Army Engineer Research and Development Center, Northeastern University, Regional Economic Models Inc.
## Tuesday

### 10:30 AM – 12:00 PM

#### Salon A
**T2-A Energy Perceptions and Narratives**  
Chair: Nick Pidgeon

- **10:30 AM**  
  T2-A.1
  Narratives and Discourse Networks: Understanding Elite Construction of Risk and Benefit Attributes About Nuclear Energy  
  Jenkins-Smith H, Silva C, Ripberger J, Gupta K, Fox A  
  University of Oklahoma

- **10:50 AM**  
  T2-A.2
  The role of fairness in early characterization of new technologies: Effects on risk beliefs and selective exposure  
  Song H, Lu H, McComas KA  
  Purdue University, Annenberg Public Policy Center, Cornell University

- **11:10 AM**  
  T2-A.3
  Citizen engagement with the risks, uncertainties and everyday implications of future low-carbon energy system transitions in the industrial town of Port Talbot in South Wales  
  Pidgeon NF, Henwood KL, Groves C, Cherry C, Thomas G, Roberts E  
  Cardiff University

- **11:30 AM**  
  T2-A.4
  Understanding risk perception and trust in risk communication from a Social Identity Approach  
  Elgueta HE  
  Universidad de Magallanes

#### Salon B
**T2-B Symposium: Systemic Risks, Uncertainty, and Governance**  
Chair: Pia-Johanna Schweizer

- **10:30 AM**  
  T2-B.1
  Modeling risk and decision-making in an information-rich social environment: the CHIME project  
  Barton CM, Demuth J, Moors RE, Bergin SM  
  Arizona State University

- **10:50 AM**  
  T2-B.2
  Making sense of science for policy making: What does the SAPEA report mean for risk analysis  
  Renn O  
  Institute for Advanced Sustainability Studies (IASS)

- **11:10 AM**  
  T2-B.3
  Layers of probability. Applications and theoretical problems  
  Sahlín NE  
  Lund University

- **11:30 AM**  
  T2-B.4
  Governance of systemic risks  
  Schweizer P  
  Institute for Advanced Sustainability Studies Potsdam

#### Salon C
**T2-C Symposium: Applying the Key Characteristics Approach for Hazard Identification and Risk Assessment of Chemical Induced Cancer and Non-Cancer Effects**  
Chair: Xavier Arzuaga

- **10:30 AM**  
  T2-C.1
  Examples of using key characteristics of carcinogens in cancer hazard identification by National Toxicology Program  
  Wang A  
  National Institute of Environmental Health Sciences (NIEHS)

- **10:50 AM**  
  T2-C.2
  A key characteristics approach to organizing and assessing upstream toxicity information  
  Zeise L, Sandy MS, Elmore S, LaMerrill MA, Smith MT  
  CalEPA Office of Environmental Health Hazard Assessment, University of California Berkeley, University of California David

- **11:10 AM**  
  T2-C.3
  Demonstrations of The Utility, Feasibility, and Challenges Using the Key Characteristics in Systematic Assessments of Carcinogenicity  
  Chappell GA, Borghoff SJ, Wikoff DS  
  ToxStrategies, Inc.

- **11:30 AM**  
  T2-C.4
  Evaluation of the Mechanistic and Toxicological Evidence on Benzo[a]Pyrene-Induced Male Reproductive Effects Using the Key Characteristics Approach  
  Arzuaga X, Newhouse K, Yost E, Gibbons C, Beverly B, Congleton J  
  US Environmental Protection Agency

#### Salons DE
**T2-D Symposium: Improving Infrastructure Operability After Disasters Through Better Quantification of Uncertainty**  
Chair: Allison Reilly

- **10:30 AM**  
  T2-D.1
  Leveraging co-benefits from interdependent infrastructure on DOD installations to improve post-disaster operational readiness  
  Magoulick PF, Reilly AC  
  University of Maryland

- **10:50 AM**  
  T2-D.2
  Modeling Uncertain and Dynamic Interdependencies of Infrastructure Systems Using Stochastic Block Models  
  Yu JZ, Baroud H  
  Vanderbilt University

- **11:10 AM**  
  T2-D.3
  Risk assessment of ship allision in extreme fjord crossings - A systematic review  
  Askeland T, Dorum C, Johansen IL, Randrup-Thomsen S, Terndrup Pedersen P, Eidem M  
  Norwegian Public Roads Administration

- **11:30 AM**  
  T2-D.4
  Sources of uncertainty in interdependent infrastructure and their implications  
  Reilly A, Baroud H, Flage R  
  University of Maryland

#### Salons FG
**T2-E Symposium: Risk Assessment, Economic Evaluation, and Decisions, Part 2**  
Chair: James K. Hammitt

- **10:30 AM**  
  T2-E.1
  Cross Validation and the Random Expert Hypothesis; validating expert judgment  
  Cooke RM, Marti HD, Mazzuchi TA  
  Resources for the Future, TU Delft

- **10:50 AM**  
  T2-E.2
  Developing Estimates of the Social Costs of Air Pollutants and Their Uncertainty Using Reduced Complexity Models  
  Clark University

- **11:10 AM**  
  T2-E.3
  Potential Influences of Income and Food Price Trends on Global Patterns of Foodborne Disease  
  Hoffmann SA, Muhammad A, Meade B  
  USDA Economic Research Service

- **11:30 AM**  
  T2-E.4
  Co-Benefits, Countervailing Risks, and Cost-Benefit Analysis  
  Wiener JB, Graham JD  
  Duke University, Indiana University

**Sponsored by:**  
Society for Benefit-Cost Analysis, and Economics and Benefits Analysis Specialty Group
### Tuesday

#### 10:30 AM – 12:00 PM

**Salon H**

**T2-F Symposium: Advances in Antibiotic Resistance Risk Assessment**

Chair: Jade Michelle

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Chair</th>
<th>Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 AM</td>
<td>T2-F.1</td>
<td>Approaches to Address Spread and Risk Characterization for Antibiotic Resistance</td>
<td>Chabrelie A, Mitchell J*</td>
<td>Michigan State University</td>
</tr>
<tr>
<td>10:50 AM</td>
<td>T2-F.2</td>
<td>A systematic review and meta-analysis of antimicrobial resistance in the water and wastewater environments: Key research needs for risk assessment</td>
<td>Hamilton KA, Joshi SM, Garner E, Ashbolt N, Pruden A</td>
<td>Arizona State University</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Chair</th>
<th>Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:10 AM</td>
<td>T2-F.3</td>
<td>Metagenomic Approaches to Advancing Relative Resistome Risk Assessment</td>
<td>Pruden A, Oh M, Garner ED, Zhang L</td>
<td>Virginia Tech</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>T2-F.4</td>
<td>Spatial and temporal dispersion of antibiotic resistance genes through bioaerosol emissions from municipal sewage</td>
<td>Seong D, Al Saif A, Norman RS, Hoque S*</td>
<td>University of South Carolina</td>
</tr>
</tbody>
</table>

**Sponsored by:**

- Microbial Risk Analysis Specialty Group

### 10:30 AM – 12:00 PM

**Salon J**

**T2-G Cattle to Kids: Applied Risk Analysis**

Chair: Julia Coxen

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Chair</th>
<th>Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:50 AM</td>
<td>T2-G.2</td>
<td>Recommendations for (medical) guidelines’ setting process (meta-guidelines)</td>
<td>Esinger F</td>
<td>Aix-Marseille Univ, Inserm, Institut Paoli-Calmettes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Chair</th>
<th>Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:10 AM</td>
<td>T2-G.3</td>
<td>The SusySafe Enhanced Model for Assessing Choking Risk in Children: an update after one year of implementation</td>
<td>Gregori D, Lorenzoni G, French M, Berchialla P</td>
<td>University of Padova, Italy</td>
</tr>
</tbody>
</table>

**Sponsored by:**

- Applied Risk Management Specialty Group
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM – 3:00 PM</td>
<td><strong>Salon A</strong></td>
</tr>
<tr>
<td><strong>T3-A Natural Hazard Perception and Communication</strong></td>
<td>Chair: Steve Ackerlund</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>T3-A.1 Probability vs. consequences in public perceptions of tornado risk Allan, JN, Ripberger, JT, Ramasubramanian, M, Krook, M, Cho, J, Cokely, ET, Silva, CL, Jenkins-Smith, HC, University of Oklahoma</td>
</tr>
<tr>
<td>1:45 PM</td>
<td>T3-A.2 “Hey @weather, I’m really getting tired of huddling my little girls in the closet”: Using Twitter to examine risk messages, risk perceptions, and responses during tornadoes Demuth, J, Smith, D, Vickery, J, Lazarus, H, Henderson, J, Morris, R, Ash, K, National Center for Atmospheric Research</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>T3-A.3 Community-level climate risk perceptions: Linking social capital, self-efficacy and the intention to act Jensen, O, National University of Singapore</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>T3-A.4 Communicating risk for a safer society: A survey of risk information disclosure regarding potential Natchez accidents in Japan Lin, L, Cruz, A, Kyoto University</td>
</tr>
<tr>
<td><strong>Sponsored by:</strong></td>
<td>Risk Communication Specialty Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM – 3:00 PM</td>
<td><strong>Salon B</strong></td>
</tr>
<tr>
<td><strong>T3-B Roundtable: How Can We Bridge the Gap Between Safety Culture Research and Risk Science?</strong></td>
<td>Chair: Marja Ylonen</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>T3-B.1 Iterative learning for dynamic cyber-system vulnerability analysis Chattjee, S, Thekdi, S, Pacific Northwest National Laboratory and University of Richmond-Virginia</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>T3-B.2 Improving Decision-Support for Cybersecurity and Other Information-Poor Risk Management Environments Evenhagen, ST, Stevens, SI*, Cybersecurity and Infrastructure Security Agency</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>T3-B.3 Cyber risk and resilience: Challenges and opportunities Linkov, I, US Army Engineer Research and Development Center</td>
</tr>
<tr>
<td><strong>Sponsored by:</strong></td>
<td>Foundational Issues in Risk Analysis Specialty Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM – 3:00 PM</td>
<td><strong>Salon C</strong></td>
</tr>
<tr>
<td><strong>T3-C Symposium: Cyber Risk as an Experimental Discipline</strong></td>
<td>Chair: Fabio Massacci</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>T3-C.1 Urban disruption propagation through the lenses of public alerts and social media information Garcia Tapia, AGT, Ramirez Marquez, JRM, Stevens Institute of Technology</td>
</tr>
<tr>
<td>1:45 PM</td>
<td>T3-C.2 Understanding population recovery patterns after disasters from mobile phone data Yabe, T, Tsubouchi, K, Fujiiwara, N, Sekimoto, Y, Ukkusuri, SV, Purdue University</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>T3-C.3 Methods for using Twitter to understand community resilience Rachunok, BA, Bennett, JB, Nateghi, R, Purdue University</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>T3-C.4 An agent-based model of subsidized flooding insurance Washington, VN, Guikema, SD, Tonn, GL, Monda, JS, University of Michigan, Delaware Department of Natural Resources and Environmental Control</td>
</tr>
<tr>
<td><strong>Sponsored by:</strong></td>
<td>Security and Defense Specialty Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM – 3:00 PM</td>
<td><strong>Salons DE</strong></td>
</tr>
<tr>
<td><strong>T3-D Symposium: Social Media, Big Data, Risk Analysis, and Disasters</strong></td>
<td>Chair: Benjamin Rachunok</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>T3-D.1 Indicator of Municipal Resources for the Reduction of Disaster Risk Pinheiro EG, Ferentz LMS, Stringari D, University Center for Studies and Research on Disasters</td>
</tr>
<tr>
<td>1:45 PM</td>
<td>T3-D.2 A Dynamic Model of Cybersecurity Investment Krutika K, Alexeev A, Jardine E, Good D, School of Public and Environmental Affairs, Indiana University</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>T3-D.3 Health burden associated with extreme cold and hot temperatures and daily temperature fluctuations over winter and summer months in Ontario, Canada Drudge C, Greco SL*, Kim JH, Copes R, Public Health Ontario</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>T3-D.4 Grid resilience as a common pool resource: Comparing willingness to pay for electricity infrastructure in India and US Gupta K, Ripberger JT, Jenkins-Smith, H, Silva, CL, University of Oklahoma</td>
</tr>
<tr>
<td><strong>Sponsored by:</strong></td>
<td>Society for Benefit Cost Analysis and EBASG</td>
</tr>
</tbody>
</table>
**Tuesday**

<table>
<thead>
<tr>
<th>1:30 PM – 3:00 PM</th>
<th>1:30 PM – 3:00 PM</th>
<th>1:30 PM – 3:00 PM</th>
<th>1:30 PM – 3:00 PM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Salon H</strong></td>
<td><strong>Salon J</strong></td>
<td><strong>Salon K</strong></td>
<td><strong>Salon 1</strong></td>
</tr>
<tr>
<td><strong>T3-F Roundtable: Food safety – An Integrated Approach to Risk for Resilient and Sustainable Management</strong>&lt;br&gt;Chair: Myriam Merad&lt;br&gt;This roundtable aims to share and exchange experiences and state-of-the-art on integrated approaches to food safety. The concept of resilience will be discussed in the light of current food safety practices and the following points:&lt;br&gt;1. Food safety in France and Europe: Strengths, weaknesses, prospects&lt;br&gt;2. General presentation of the Pralim working group (Anses)&lt;br&gt;3. Discussion around the microbiological part&lt;br&gt;4. Societal aspect&lt;br&gt;The panelists:&lt;br&gt;• Moez Sanaaa (ANSES)&lt;br&gt;• Frédérique Audiat-Perrin (ANSES)&lt;br&gt;• Jean-Christophe Augustin (Expert)&lt;br&gt;• Myriam Merad (CNRS)&lt;br&gt;<strong>Sponsored by:</strong>&lt;br&gt;Resilience Analysis Specialty Group</td>
<td><strong>T3-G Symposium: Disasters, Governance, Conflict, and Risk</strong>&lt;br&gt;Chair: Elisabeth Gilmore</td>
<td><strong>T3-H Symposium: Decision Making in Managing Risk: The Prickly and Paradoxical Hard Part</strong>&lt;br&gt;Chair: Charles Redinger</td>
<td><strong>T3-I Symposium: Derivation of Human Health Based Water Guidance for Noncarcinogens: Is it time to Change the Standard Default Approach?</strong>&lt;br&gt;Chair: Patrick Levallois</td>
</tr>
<tr>
<td><strong>T3-G.1</strong> Natural disasters, armed conflict and institutions&lt;br&gt;Tennant E, Gimore EA&lt;br&gt;Clark University</td>
<td><strong>T3-G.2</strong> Supply Chain Resilience in the Context of Natural Disasters&lt;br&gt;Kurth MK, Linkov I&lt;br&gt;Risk and Decision Science Team, US Army Research and Development Center</td>
<td><strong>T3-H.1</strong> Influencing the C-Suite and Board of Directors&lt;br&gt;Barbi GJ&lt;br&gt;Becton Dickerson, Emeritus</td>
<td><strong>T3-I.1</strong> Current default exposure values in setting drinking water guidance: present status and main issues&lt;br&gt;Levallois P, Goeden HM&lt;br&gt;Institut National de Santé Publique du Québec, Université Laval, Minnesota Department of Health</td>
</tr>
<tr>
<td>1:30 PM – 3:00 PM</td>
<td>1:30 PM – 3:00 PM</td>
<td>1:30 PM – 3:00 PM</td>
<td>1:30 PM – 3:00 PM</td>
</tr>
<tr>
<td><strong>T3-G.1</strong> Natural disasters, armed conflict and institutions&lt;br&gt;Tennant E, Gilmore EA&lt;br&gt;Clark University</td>
<td><strong>T3-G.2</strong> Supply Chain Resilience in the Context of Natural Disasters&lt;br&gt;Kurth MK, Linkov I&lt;br&gt;Risk and Decision Science Team, US Army Research and Development Center</td>
<td><strong>T3-H.1</strong> Influencing the C-Suite and Board of Directors&lt;br&gt;Barbi GJ&lt;br&gt;Becton Dickerson, Emeritus</td>
<td><strong>T3-I.1</strong> Current default exposure values in setting drinking water guidance: present status and main issues&lt;br&gt;Levallois P, Goeden HM&lt;br&gt;Institut National de Santé Publique du Québec, Université Laval, Minnesota Department of Health</td>
</tr>
<tr>
<td><strong>T3-G.2</strong> Supply Chain Resilience in the Context of Natural Disasters&lt;br&gt;Kurth MK, Linkov I&lt;br&gt;Risk and Decision Science Team, US Army Research and Development Center</td>
<td><strong>T3-H.2</strong> The human and the system in Organizational Decision Making&lt;br&gt;O’Reilly MV, Barbi G, Boeter FW, Redinger CF&lt;br&gt;State University of New York (SUNY) School of Public Health</td>
<td><strong>T3-I.2</strong> Impact of incorporating high water intake rates during early life on water guidance derivation&lt;br&gt;Greene CW, Goeden HM&lt;br&gt;Minnesota Department of Health</td>
<td><strong>T3-I.4</strong> Use of CalTOX as a standardized exposure model to account for oral, inhalation and dermal intake from drinking water&lt;br&gt;Soshilov A&lt;br&gt;CalEPA</td>
</tr>
<tr>
<td>1:45 PM – 2:00 PM</td>
<td>1:45 PM – 2:00 PM</td>
<td>1:45 PM – 2:00 PM</td>
<td>1:45 PM – 2:00 PM</td>
</tr>
<tr>
<td><strong>T3-G.3</strong> Quantification of a game-theoretic model of pre-disaster relocation for two U.S. coastal cities&lt;br&gt;Zhou Y, Bier VM, Hecht J&lt;br&gt;University of Wisconsin-Madison, University of Vermont</td>
<td><strong>T3-H.3</strong> Latent Dirichlet Allocation and the Evolving Language of Risk&lt;br&gt;Redinger CF&lt;br&gt;Institute for Advanced Risk Management</td>
<td><strong>T3-I.3</strong> Determination of data-derived exposure values and uncertainty factors for the derivation of health protective drinking water guideline for manganese&lt;br&gt;Valcke M, Bourgault MH, Gauvin D, Barbeau B, Rodriguez MJ, Vaillancourt C, Haddad S, Bouchard M, Levallois P&lt;br&gt;Institut National de Santé Publique du Québec, University of Montréal, École Polytechnique de Montréal, University Laval, Institut Armand-Frappier</td>
<td><strong>T3-I.5</strong> Embracing the elephant in the room: the critical role of breastmilk transfer as a major driver of PFOA, PFOS, and PFHxS water guidance.&lt;br&gt;Goeden HM, Greene CW, Jacobus JA&lt;br&gt;Minnesota Department of Health</td>
</tr>
<tr>
<td>2:15 PM – 3:00 PM</td>
<td>2:15 PM – 3:00 PM</td>
<td>2:15 PM – 3:00 PM</td>
<td>2:15 PM – 3:00 PM</td>
</tr>
<tr>
<td><strong>T3-G.4</strong> Strategic entry points for implementation of renewables to improve sustainability and peace outcomes&lt;br&gt;Michener SR, Olson MS&lt;br&gt;Drexel University</td>
<td><strong>T3-H.4</strong> Total health and navigating the risk decision triangle&lt;br&gt;Redinger CF, Barbi G, O’Reilly M, Boeter FW&lt;br&gt;RHP Risk Management Inc.</td>
<td><strong>T3-I.4</strong> Use of CalTOX as a standardized exposure model to account for oral, inhalation and dermal intake from drinking water&lt;br&gt;Soshilov A&lt;br&gt;CalEPA</td>
<td><strong>T3-I.5</strong> Embracing the elephant in the room: the critical role of breastmilk transfer as a major driver of PFOA, PFOS, and PFHxS water guidance.&lt;br&gt;Goeden HM, Greene CW, Jacobus JA&lt;br&gt;Minnesota Department of Health</td>
</tr>
<tr>
<td><strong>T3-G.5</strong> Stress Testing for Electric Grid Resilience&lt;br&gt;DeMenno MB, Brodenck RJ, Jeffers RF, Jones KA&lt;br&gt;Boasque Advisors</td>
<td><strong>T3-H.5</strong> Warnings of Cyber Threats And Active Risk Management&lt;br&gt;Faber I, Pate-Cornell E&lt;br&gt;CA</td>
<td><strong>T3-I.3</strong> Determination of data-derived exposure values and uncertainty factors for the derivation of health protective drinking water guideline for manganese&lt;br&gt;Valcke M, Bourgault MH, Gauvin D, Barbeau B, Rodriguez MJ, Vaillancourt C, Haddad S, Bouchard M, Levallois P&lt;br&gt;Institut National de Santé Publique du Québec, University of Montréal, École Polytechnique de Montréal, University Laval, Institut Armand-Frappier</td>
<td><strong>T3-I.5</strong> Embracing the elephant in the room: the critical role of breastmilk transfer as a major driver of PFOA, PFOS, and PFHxS water guidance.&lt;br&gt;Goeden HM, Greene CW, Jacobus JA&lt;br&gt;Minnesota Department of Health</td>
</tr>
</tbody>
</table>

Sponsored by:<br>Resilience Analysis Specialty Group, and Risk and Development Specialty Group

Sponsored by:<br>Exposure Assessment Specialty Group
<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM – 3:00 PM</td>
<td>Salon 2</td>
<td>T3-J Emerging Challenges in Risk and Decision Making</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>T3-J.1</td>
<td>The intriguing link between religion and vaccination: the role of religious affiliation and philosophical and moral beliefs in vaccine evaluations</td>
</tr>
<tr>
<td>1:45 PM</td>
<td>T3-J.2</td>
<td>Decision Analysis and Risk &amp; the Regulation of Bitcoin</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>T3-J.3</td>
<td>The Risk of the Inhumane Algorithm</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>T3-J.4</td>
<td>Legal Frameworks and Governance Options to Promote Arctic Cyber Resilience</td>
</tr>
<tr>
<td>2:30 PM</td>
<td>T3-J.5</td>
<td>Perceived risk of oil spills under ice</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>T4-A.1</td>
<td>Strength-Based Risk Communication</td>
</tr>
<tr>
<td>3:15 PM</td>
<td>T4-A.2</td>
<td>Telling stories about sustainable seafood: Using narrative persuasion in aquaculture risk communication</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>T4-A.3</td>
<td>Scientists’ goals for risk communication</td>
</tr>
<tr>
<td>3:45 PM</td>
<td>T4-A.4</td>
<td>Measuring and Explaining Public Goals for Public Participation</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>T4-A.5</td>
<td>Anticipating or Accommodating to Public Concern? Risk Amplification and the Politics of Precaution Re-examined</td>
</tr>
<tr>
<td>4:15 PM</td>
<td>T4-A.6</td>
<td>The human side of systemic risks can inform the use of big data and new analytic methods</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:30 PM – 5:00 PM</td>
<td>Salon A</td>
<td>T4-B Risk Communication Best Practices, Part 1</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>T4-B.1</td>
<td>Rethinking Resilience Analytics</td>
</tr>
<tr>
<td>3:45 PM</td>
<td>T4-B.2</td>
<td>Data-Driven Risk Analysis with Small Data: A Bayesian Approach</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>T4-B.3</td>
<td>Artificial intelligence in environmental health science and decision making: insights from the 11th Annual Research Triangle Environmental Health Collaborative Summit</td>
</tr>
<tr>
<td>4:15 PM</td>
<td>T4-B.4</td>
<td>Experts and Executives – Exploring the Differences in the Perceptions of Cyber Risk</td>
</tr>
<tr>
<td>4:30 PM</td>
<td>T4-B.5</td>
<td>Risky Business: Framing Risk Assessment for IoT Inclusive Networks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:30 PM – 5:00 PM</td>
<td>Salon B</td>
<td>T4-C Critical Infrastructure, Cyber, and Information Risks</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>T4-C.1</td>
<td>National Critical Functions: a Necessary Evolution in Critical Infrastructure Risk Management</td>
</tr>
<tr>
<td>3:45 PM</td>
<td>T4-C.2</td>
<td>Proactive Identification of Infrastructure of Concern in the Crisis-Action Decision Environment</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>T4-C.3</td>
<td>Experts and Executives – Exploring the Differences in the Perceptions of Cyber Risk</td>
</tr>
<tr>
<td>4:15 PM</td>
<td>T4-C.4</td>
<td>Risky Business: Framing Risk Assessment for IoT Inclusive Networks</td>
</tr>
<tr>
<td>4:30 PM</td>
<td>T4-C.5</td>
<td>A Quantitative Risk Analysis Of Nation State Supported Computational Propaganda</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:30 PM – 5:00 PM</td>
<td>Salon C</td>
<td>T4-D Symposium: Data-Driven Decision Making and Risk Analysis</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>T4-D.1</td>
<td>Comparative Assessment of the Risk Factors Leading to Suicide Attempts among Male and Female Youths: A Predictive Analytics Approach</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>T4-D.2</td>
<td>A multiple decision-maker approach to allocating resources to prepare and respond to disruptions</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>T4-D.3</td>
<td>Socio-spatial vulnerability analysis of interdependent water-transportation infrastructures</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>T4-D.4</td>
<td>Hotspot identification in spatial systems by the use of local Moran’s Stadle K, Flagr R, GuiKemda SM University of Stovanger</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>T4-D.5</td>
<td>Predicting Daily Power Outages Using a Bayesian Model Averaging Approach</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sponsored by:</th>
<th>Decision Analysis and Risk Specialty Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sponsored by:</td>
<td>Risk Communication Specialty Group</td>
</tr>
<tr>
<td>Sponsored by:</td>
<td>Security and Defense Specialty Group</td>
</tr>
</tbody>
</table>
3:30 PM – 5:00 PM
Salons FG
T4-E Risk Communication: Issues of Contamination and Consumption
Chair: Dominc Balog-Way

3:30 PM
T4-E.1
Promoting Private Well Water Quality Monitoring in Peri-Urban Neighborhoods Without Community Water Infrastructure: A Randomized-Controlled Trial
MacDonald Gibson J, Stillo F University of North Carolina, Chapel Hill

3:45 PM
T4-E.2
Removing the yuck out of recycled water: the effect of water source and name on perceived risk
McClaran NM, Behe BK, Huddleston P, Fernandez RT Michigan State University

4:00 PM
T4-E.3
Public Perceptions of Food Contamination Risks: A Simulation Experiment on the Psychological Impact of Incident Severity and Intentionality
Nan X, Verrill L, Daily K, Kim J University of Maryland

4:15 PM
T4-E.4
Understanding variations in consumer attitude toward farm-raised fish
Yang S, Witzling LC, Show BR, Runge K, Hartleb C, Peroff DM University of Wisconsin-Madison

4:30 PM
T4-E.5
Involving citizen experts in science communication: Evidence from the documentary film Under the Dome
Qin C, Xu J, Wang-Parodi G Shanghai Jiao Tong University, Peking University, Stanford University

Sponsored by:
Risk Communication Specialty Group

3:30 PM – 5:00 PM
Salon H
T4-F Using QMRA to Inform Risk Management Decisions
Chair: Amir Mokhtari

3:30 PM
T4-F.1
A Quantitative Microbial Risk Assessment model to evaluate the impact of free chlorine concentration in wash water during processing of romaine lettuce contaminated with E. coli O157:H7 in the U.S.
Mokhtari A, Santillana Farakos SM, Davidson GR, Pouillot R, Williams EN, Van Doren JM FDA

3:45 PM
T4-F.2
Development of Health Effects Endpoint Dose Response and QMRA Models for Healthcare Associated MRSA and Clostridium difficile
Lin JA, Verhousgaetrie M, Weir MH* The Ohio State University

4:00 PM
T4-F.3
Quantitative Microbial Risk Assessment and Escherichia coli O157:H7 Incidence Evaluation: Fresh Vegetables inNsukka and Enugu, Southeast Nigeria are a Public Health Hazard
Chigor VN, Onuora VC, Ibangha II, Nweze NO, Amaechina EC, Ogbonna JC, Chernikova TN, Golyshin PN University of Nigeria, Bangor University

4:15 PM
T4-F.4
Management of Salmonella risks in powdered infant formula products

4:30 PM
T4-F.5
A comparative quantitative assessment of human exposure risks to various antimicrobial resistant bacteria among U.S. ground beef consumers

Sponsored by:
Microbial Risk Analysis Specialty Group

3:30 PM – 5:00 PM
Salon J
T4-G Roundtable: Promoting Risk Management Analysis Quality, and Reaching Out to the Decision Makers
Chair: Willy Reed

3:30 PM
T4-G.1
This roundtable asks three interrelated questions: 1) How do we best improve quality of analyses supporting risk management decisions? 2) How do we make SRA most useful to real-world, in-the-trenches risk management decision makers? and 3) How do we attract those in-the-trenches decision makers into SRA? The panelists will give some initial reflections, followed up by discussions among the panelists and the audience. Several ongoing initiatives run by the Applied Risk Management Specialty Group (ARMSG) will be introduced. One example is a literature review of quality principles across domains in risk management. Another example is a battery of analysis quality tests (AQTs) that can be used by risk managers and risk analyst practitioners to evaluate and judge the quality of risk analyses and to support effective risk management. The battery is specifically designed to: 1) make key features of analysis quality understandable to non-specialist decision makers; 2) fully disclose the limitations of the analysis for advising decisions; and 3) explain the implications of those limitations. We will run this roundtable as a workshop. That is, in addition to a discussion among the panelists, we will seek opinions from the audience, provoking lively debate.

Panelists:
• John Lathrop
• Terje Aven
• Steve Ackerlund
• Patricia Larkin

Sponsored by
Applied Risk Management Specialty Group

3:30 PM – 5:00 PM
Salon K
T4-H Symposium: Risk and Resilience Observatories: Methods, Tools and Results
Chair: Damien Serre

3:30 PM
T4-H.1
Observatories, long term resilience monitoring: a review
Serre D, Bourlier B, Picot O, Heinzlef C*, Davies N UMR 241 EIO, Université de la Polynésie Française

3:45 PM
T4-H.2
Insights on the conceptual and operational distinctions between risk, resilience and sustainability
Myriam Merad CM CNRS

4:00 PM
T4-H.3
Assessing resilience to floods in an holistic perspective
Heinzlef CH, Serre DS Avignon University

4:15 PM
T4-H.4
Island Earth: Towards Collective Intelligence for Social-Ecological Resilience
Davies N University of California Berkeley

4:30 PM
T4-H.5
Resilience observatories in overseas territories: research perspectives
Serre D UMR 241 EIO, Université de la Polynésie Française

Sponsored by:
Risk Analysis Specialty Group, and Risk and Development Specialty Group
3:30 PM – 5:00 PM

**Salon 1**

T4-I Symposium: Derivation of Human Health Based Water Guidance: Challenges of Assessing Emerging Contaminants and Mixtures

Chair: Chris Greene

3:30 PM  
T4-I.1  
Novel methodology for deriving water screening values for pharmaceuticals and application for contextualizing potential human health risk of ambient detections  
Suchomel A, Goeden HM*  
Minnesota Department of Health

3:45 PM  
T4-I.2  
Comparative potency evaluation for PFAS drinking water values  
Baird SJS, Smith CM  
Massachusetts Dept of Environmental Protection

4:00 PM  
T4-I.3  
Class-based Assessments for Drinking Water Contaminants with Limited Toxicity Information  
Lampe BJ  
NSF International

4:15 PM  
T4-I.4  
Challenges in evaluating the full impact of petroleum releases on drinking water  
Steenson RA, Hellmann-Blumberg U  
CalEPA SF Bay Regional Water Quality Control Board, CalEPA Department of Toxic Substances Control

Sponsored by:  
Exposure Assessment Specialty Group

3:30 PM – 5:00 PM

**Salon 2**

T4-J Symposium: Wildfire Risk Management – Current Status, Future Projections and Approaches to Reducing Risk

Chair: Alison Cullen

3:30 PM  
T4-J.1  
An analysis on the effectiveness of Prescribed fires.  
Jose E, Zhuang J*, Rana A  
University at Buffalo

3:45 PM  
T4-J.2  
Wildfire characteristics as predictors of firefighting resource demand  
Podschwit HR, Cullen A  
University of Washington

4:00 PM  
T4-J.3  
Wildfire decision support tools in theory versus in the field: an exploratory study  
Rapp CE, Rabung EAL, Wilson RS, Toman E  
Ohio State University

4:15 PM  
T4-J.4  
Wildfire Risk Management - Current Status, Future Projections and Approaches to Reducing Risk  
Cullen AC, Podschwit H  
University of Washington

4:30 PM  
T4-J.5  
Burning Concerns: Wildfires and the problem of insurability in California  
Wilson SJ  
King’s College London

Sponsored by:  
Decision Analysis and Risk Specialty Group
Emerging risks are events or actions that, if realized, could contribute to significant consequences to various aspects of daily life. Where such risks are either in their early phases of existence or likely to manifest in the near term (2-5 years for DHS), emerging risks can be the result of emerging technology development and commercialization, changing social or environmental conditions, financial well-being and public health, among many others. Their uncertainty, complexity, and potential for significant disruption require dedicated policy solutions to balance risk and benefits on a national level.

The US Department of Homeland Security is currently producing an ‘Emerging Risk Matrix’ that will help identify emerging risks of concern, and assist policymakers and other stakeholders with the task of how to best address their associated challenges. This session will include presentations from US Assistant Secretary Bryan Ware (Department of Homeland Security – Cyber, Infrastructure, and Resilience Policy). Additional methodological discussion around risk and resilience analysis for emerging risk will be offered by Dr. James H. Lambert and Dr. Igor Linkov, respectively. Roundtable discussions and Q&A will follow.

Participants:
- Hon. Bryan Ware (Asst Secretary, DHS) – DHS Needs and Current R&D
- Dr. Igor Linkov (US Army Corps of Engineers) – Risk and Resilience Quantification for Emerging Risks
- James H. Lambert (University of Virginia) – Risk Analysis and Systems Engineering

Sponsored by:
Risk Communication Specialty Group
<table>
<thead>
<tr>
<th>Time</th>
<th>Salon</th>
<th>Symposium</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 AM</td>
<td>W1-I.1</td>
<td>Evidentiary reliability of alternative methodologies in support of class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>certification for product liability, mislabeling, and failure to warn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>litigation</td>
</tr>
<tr>
<td>8:50 AM</td>
<td>W1-I.2</td>
<td>Perceptions of bias: does the standard of certainty change when politics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>comes into play?</td>
</tr>
<tr>
<td>9:10 AM</td>
<td>W1-I.3</td>
<td>Standards of Certainty in Interpreting, Assessing and Managing Risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guidotti TL</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>W1-I.4</td>
<td>Managing uncertainties in controversial policy environments: a reflection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>on the low-dose radiation debate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lindberg JCH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>King’s College London, Imperial College London</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sponsors by: Risk, Policy &amp; Law Specialty Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Salon</th>
<th>Symposium</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 AM</td>
<td>W1-I.1</td>
<td>Risk Perception and Attitudes Predict Brain Response to Food Technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infographics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Davis T, LaCours M, Beyer E, Finck J, Miller M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Texas Tech University and Merck Animal Health</td>
</tr>
<tr>
<td>8:50 AM</td>
<td>W1-I.2</td>
<td>The Framing and Agenda-Setting Effects of the Mass Media on the Farm-Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Impacts of GM Crops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Galatia Bickell E, Kailatzandonakes M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University of Missouri</td>
</tr>
<tr>
<td>9:10 AM</td>
<td>W1-I.3</td>
<td>How Can Behavioral Science Help with Critical Thinking About Risk?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>McFadden BR, Riis J University of Delaware, Behavioralize</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>W1-I.4</td>
<td>Monetizing Disinformation in the Attention Economy: media signals and the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>case of GMOs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ryan CD, Schaaf A, Butner R, Swarthout J, Bayer Crop Science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sponsors by: Decision Analysis and Risk Specialty Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Salon</th>
<th>Symposium</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 AM</td>
<td>W2-A.1</td>
<td>Risk Analysis as a Critical Tool for Human Trafficking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coen J, Guikema S University of Michigan</td>
</tr>
<tr>
<td>10:45 AM</td>
<td>W2-A.2</td>
<td>Using System Dynamics to Set Strategic Priorities to Address Human</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trafficking Caddell JD United States Military Academy</td>
</tr>
<tr>
<td>11:00 AM</td>
<td>W2-A.3</td>
<td>Risk factors for the existence of illicit massage parlors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White AG, Guikema SD University of Michigan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Renken D National Intelligence University</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>W2-A.5</td>
<td>Modeling operations of human trafficking networks for effective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>interdiction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maass KL, Sharkey T, Martin L, Melander C, Barrick K, Samad T, Northeast</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ern University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sponsors by: Applied Risk Management Specialty Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Salon</th>
<th>Symposium</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 AM</td>
<td>W2-B.1</td>
<td>Applying social discounting to cultural property risk analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Waller R Protect Heritage Corp., Canadian Museum of Nature, Queen’s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University</td>
</tr>
<tr>
<td>10:50 AM</td>
<td>W2-B.2</td>
<td>Characterizing multi-hazard risks for lands, assets, resources, and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>people associated with the U.S. Department of the Interior</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wood NJ, Pennaz AB, Ludwig KA, Jones JM, Sherba JT, Henry KD, Ng P United</td>
</tr>
<tr>
<td></td>
<td></td>
<td>States Geological Survey</td>
</tr>
<tr>
<td>11:10 AM</td>
<td>W2-B.3</td>
<td>Challenges to integrated risk management from a collection care perspective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Snell S, Tompkins W* Smithsonian Institution</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>W2-B.4</td>
<td>Challenges to integrated risk management from a provider (OPS, Risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Management) perspective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hall D, Tkac K * Smithsonian Institution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sponsors by: Applied Risk Management Specialty Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Salon</th>
<th>Symposium</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 AM</td>
<td>W2-C.1</td>
<td>Department of Defense Chemical and Material Risk Management Program</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Underwood PM, Rak A, Vogel CM, Paley M* Department of Defense and Noblis</td>
</tr>
<tr>
<td>10:50 AM</td>
<td>W2-C.2</td>
<td>Assessing Supply Chain Risks of Critical Chemicals and Materials for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>National Defense</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Escola SA, Rak A*, Bruckner M Department of Defense and Noblis</td>
</tr>
<tr>
<td>11:10 AM</td>
<td>W2-C.3</td>
<td>Using Dates of Historical Site Operations to Determine Possible PFAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use at Former Military Sites</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meyer AK Army Corps of Engineers</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>W2-C.4</td>
<td>Possible Impacts to National Defense from Changes in Occupational Standards</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for Chromium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bruckner M, Rak D, Bryant S Noblis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sponsors by: Security and Defense Specialty Group</td>
</tr>
</tbody>
</table>
### Wednesday

<table>
<thead>
<tr>
<th>Time</th>
<th>Salon</th>
<th>Title</th>
<th>Chair:</th>
<th>Sponsor:</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 AM</td>
<td>DE</td>
<td>W2-D Symposium: Assessing the Resilience of Urban Systems Under Climate Change</td>
<td>Renee Obringer</td>
<td>Engineering and Infrastructure Specialty Group</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>H</td>
<td>W2-F Integrating Data Sources into QMRA: From Pathogen Survival Data to Whole Genome Sequencing</td>
<td>Ainsley Otten</td>
<td>Safety and Security Systems</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>J</td>
<td>W2-G Urban Resilience and Social Equity</td>
<td>Hanne van den Berg</td>
<td>Risk and Development Specialty Group</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>I</td>
<td>W2-I Exposure Assessment: Innovations, Models, and Methods</td>
<td>Chris Greene</td>
<td>Exposure Assessment Specialty Group</td>
</tr>
</tbody>
</table>

#### W2-D.1

**Improving Operational Resilience of Municipal Water Treatment Under A Changing Climate**
- **Vanderbilt University**
- **Robinson C, Borsuk M**

#### W2-D.2

**The Missing Piece in Climate–Demand Nexus Models: A comprehensive exploration of the measures of heat stress**
- **Purdue University**
- **Maia D, Kumar R, Nateghi R**

#### W2-D.3

**Understanding natural and human initiation and transmission of cascading hazards**
- **Duke University**
- **Robinson C, Borsuk M**

#### W2-D.4

**Projecting the interdependent water and electricity use into the future under different climate change scenarios**
- **Purdue University**
- **Obringer R, Kumar R, Nateghi R**

**Sponsored by:**
- Engineering and Infrastructure Specialty Group

#### W2-F.1

**Home style frying of steak and meat products: survival of Escherichia coli related to dynamic temperature profiles**
- **University of Maryland**
- **Pesciaroli M, Chardon J, Delfgou EHM, Kuipers AFA, Wijnands LM, Evers EG**

**Nexus Institute for Public Health and the Environment**

#### W2-F.2

**Integrating Whole Genome Sequences into a microbial risk assessment model for Salmonella spp. in ground chicken**
- **University of Maryland**
- **Tanui CK, Karanth S, Pradhan AK**

#### W2-F.3

**Incorporation of whole genome sequencing data into the exposure assessment module of risk assessment: a case study for Salmonella in chicken**
- **University of Maryland**
- **Karanth S, Tanui CK, Pradhan AK**

#### W2-F.4

**Development of a transmission dynamics model for Toxoplasma gondii infection in humans**
- **University of Maryland**
- **Rani S, Dubey JP, Pradhan AK**

**United States Department of Agriculture**

**Sponsored by:**
- Microbial Risk Analysis Specialty Group

#### W2-G.1

**Bringing (social) equity into the equation: decision-making for more resilient cities**
- **Harvard University**
- **van den Berg HJ**

#### W2-G.2

**A framework for analyzing urban pathological reaction to disasters**
- **National Cheng Kung University**
- **Huang T, Kung YH**

#### W2-G.3

**Modelling and predicting drinking water contamination risk in North Carolina using Bayesian belief networks to enhance community resilience**
- **University of North Carolina**
- **Mulherin RE, Roostaei J, MacDonald Gibson J**

**University of North Carolina at Chapel Hill**

#### W2-G.4

**Incentivized forests and capacity building for resilience**
- **Harvard University**
- **Smachylo J**

**Sponsored by:**
- Resilience Analysis Specialty Group and Risk and Development Specialty Group

#### W2-H.1

**Environmental and community exposure models used to evaluate human exposure under EPA’s TSCA program**
- **US EPA**
- **Fehrenbacher MC, Wong EM**

**National Cheng Kung University**

#### W2-H.2

**Consumer product and occupational exposure models used to evaluate human health risks under TSCA Chemical Evaluation Program**
- **US EPA**
- **Wong E, Tiwari R**

**University of Maryland**

#### W2-H.3

**Hierarchy of Consumer Product and Occupational Exposure Modeling Tools to Support Health Risk Assessments under REACH program**
- **ExxonMobil Biomedical Sciences, Inc.**
- **Qian HQ, Zaleski RZ**

**National Cheng Kung University**

#### W2-H.4

**Exposure modeling for integrated human health and ecological risk assessment**
- **NEK Associates LTD**
- **von Stackelberg KE**

**Sponsored by:**
- Exposure Assessment Specialty Group

#### W2-I.1

**Assessing Exposure Using an Image-based Land Cover Classification Model**
- **Lindenwood University**
- **Rodriguez RR**

**National Cheng Kung University**

#### W2-I.2

**Contaminated site segregation approaches for reasonable exposure point concentrations for a human health risk assessment; a case study**
- **Arcadis**
- **Pfeiffer D, Anderson P**

**National Cheng Kung University**

#### W2-I.3

**Estimating Sustainable Fish Productivity: Effect on Remediation Goals at Contaminated Sites**
- **Arcadis**
- **Mayo MJ, Marsh CM**

**University of Maryland**

#### W2-I.4

**Vapor Intrusion of 1,4-Dioxane: Does it Pose a Risk?**
- **Arcadis**
- **Sager SL, Offenberger S, Forsberg N, Bell C**

**University of Maryland**

**Sponsored by:**
- Exposure Assessment Specialty Group
<table>
<thead>
<tr>
<th>Time</th>
<th>Salon 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 AM</td>
<td><strong>W2-J Conflict and Collaboration</strong></td>
</tr>
<tr>
<td></td>
<td>Chair: Zachary Collier</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Salon A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM – 2:00 PM</td>
<td><strong>W3-A Media Representations of Risk</strong></td>
</tr>
<tr>
<td></td>
<td>Chair: Hong Lu</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>W3-A.1 Decipher social construction of risks: Comparing hydropower, GMOs and nuclear power in China by Jia H. Deng L. Department of Communication, Cornell University</td>
</tr>
<tr>
<td>1:45 PM</td>
<td>W3-A.2 CRISSPR benefit, risk, and ambivalence: The impact of the documentary Human Nature on scientists’ views of human gene editing by Howell E. L. and Scheufele D. A. University of Wisconsin-Madison</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>W3-A.3 Climate Salience Across Partisan News Media by Forde S. L. The State University of New York at Buffalo</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Salon B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM – 2:00 PM</td>
<td><strong>W3-B Foundational Issues in Risk Analysis</strong></td>
</tr>
<tr>
<td></td>
<td>Chair: Tony Cox</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>W3-B.1 Causal possibility for risk analysis with limited causal knowledge by Cox T. Cox Associates, University of Colorado</td>
</tr>
<tr>
<td>1:45 PM</td>
<td>W3-B.2 Automatic uncertainty analysis: a compiler that lets legacy software handle uncertain inputs by Gray N. De Angelis M. Ferson S. Institute for Risk and Uncertainty</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>W3-B.3 Risk: A holistic framework for resilience by Logan T. M. Williams T. G. Guikema S. D. University of Michigan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Salon C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM – 2:00 PM</td>
<td><strong>W3-C Symposium: Decision and Risk Analysis in a Digital Era</strong></td>
</tr>
<tr>
<td></td>
<td>Chair: Jun Zhuang</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>W3-C.1 Interplay of online and offline social networks for rumor spreading and debunking during natural disasters by Anwar P. Hunt K. Zhuang J. University at Buffalo</td>
</tr>
<tr>
<td>1:45 PM</td>
<td>W3-C.2 Tweet Diffusion Life-cycle: A Twitter Tale of Hurricanes by Aziz R. Zhuang J. State University of New York at Buffalo</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>W3-C.3 Harnessing Social Media Data to Understand Regional Climate Change Attitudes by Bennett J. R. Ruchonok B. A. Flage R. N. Nateghi R. Purdue University</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Salons DE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM – 2:00 PM</td>
<td><strong>W3-D Symposium: Risk Analysis of Cybersecurity in Critical Infrastructure Systems</strong></td>
</tr>
<tr>
<td></td>
<td>Chair: Unal Tatar</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>W3-D.1 Is it a Natural Disaster or a Cyber Security Attack? The US Electric Power Grid and Critical Infrastructure Protection by Baggott S. Santos JR. George Washington University</td>
</tr>
<tr>
<td>1:45 PM</td>
<td>W3-D.2 Overview of uncertainty-tolerant decision support modeling for cybersecurity Chatterjee S. Bhatacharya A. Pacific Northwest National Laboratory</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>W3-D.3 Attack graph based probabilistic cyber risk analysis by Keskin O. Tatar U. Poyraz O. Pinto C. Old Dominion University and University at Albany, State University of New York</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>W3-D.4 Implications of COTS Technologies for Cyber Risk Nussbaum B. University at Albany</td>
</tr>
</tbody>
</table>

**Sponsored by:**
- **Decision Analysis and Risk Specialty Group**
- **Risk Communication Specialty Group**
- **Foundation Issues in Risk Analysis Specialty Group**
**Wednesday**

**1:30 PM – 3:00 PM**

**Salon H**
W3-F Natural Hazard and Urban Resilience  
Chair: Huong

3:45 PM  
W3-F.1  
Influence of Severe Storms on Power System Resilience  
Silveira A, Lester HD  
University of South Alabama

4:00 PM  
W3-F.2  
Natural variability of best-estimate coastal flood depth return periods  
Meyer MR, Johnson DR*  
Purdue University

4:15 PM  
W3-F.3  
Assessing resilience of coastal systems to natural disasters: a scenario-informed methodology for the case study of Venice (Italy)  
Sperotto A, Bonato M, Torresan S, Critto A, Lambert JH, Linkov I, Marcomini A  
Cà Foscari University

4:30 PM  
W3-F.4  
Risk and Resilience in Building Design  
Jayner MD, Kurth M, Linkov I  
Northeastern University, United States Army Corps of Engineers

Sponsored by:  
Resilience Analysis Specialty Group

**Salon K**
Chair: Pamela Williams

1:30 PM  
W3-H.1  
Community-Based Exposure Modeling for Climate-Related Disasters and Other Applications  
Chaisson CF, Chari R, Osorio JC, Madrigano J, Diskin K  
The Lifeline Group, RAND Corp, NYC-Environmental Justice Alliance

1:45 PM  
W3-H.2  
Task-Based Worker and Consumer Exposure Modeling Using Probabilistic Approach  
Armstrong T, Williams PR, Drolet D  
TWABHR Occupational Hygiene Consulting, E Risk Sciences, Retired

2:00 PM  
W3-H.3  
Modeling aggregate and cumulative chemical exposures from near and far field sources  
Price P, Isaacs K, Dionisio K, Cohen Hubal E  
US Environmental Protection Agency

2:15 PM  
W3-H.4  
Approaches to modeling infectious agent transmission in workplaces  
Ramachandran G  
Bloomberg School of Public Health, Johns Hopkins University

2:30 PM  
W3-H.5  
Exposure modeling: Let’s not forget data quality  
LaKind J  
LaKind Associates, LLC

Sponsored by:  
Exposure Assessment Specialty Group and Occupational Health and Safety Specialty Group

**Salon L**
W3-I Roundtable: Combating Human Trafficking  
Chair: Seth Guikema

This roundtable will address the complex task of combating Human Trafficking. We have assembled a panel of experts from the academic, law, and law enforcement disciplines to discuss their experiences and challenges in decreasing the prevalence of human trafficking. This global problem has far-reaching impacts and these experts will discuss what they have learned from such a complicated problem and what we can do as a risk analysis community. Each member of the roundtable have 5-7 minutes to introduce themselves and discuss their expertise. The remaining time will address some prepared questions and questions from the audience that will address their expertise.

Participants:  
• Seth Guikema - University of Michigan  
• Kayse Maass - Northeastern University  
• Bridgette Carr - University of Michigan  
• Ray Renken - DHS Homeland Security Investigations

Sponsored by:  
Risk, Policy & Law Specialty Group

**Salon 1**
W3-J Symposium: Risk and Resilience: At a Crossroads  
Chair: Benjamin D. Trump

1:30 PM  
W3-J.1  
The Science and Practice of Resilience  
Linkov I, Trump B, Keisler J  
US Army Engineer Research and Development Center

1:45 PM  
W3-J.2  
Resilience for Better Risk Governance: Towards an Inclusive Approach  
Renn O  
Institute for Advanced Sustainability Studies (IASS)

2:00 PM  
W3-J.3  
Some reflections on the nexus between risk and resilience  
Aven T  
University of Stavanger

2:15 PM  
W3-J.4  
Disruption of Priorities in Large-Scale Systems  
Lambert JH  
University of Virginia

2:30 PM  
W3-J.5  
Cyber aspects of fake news  
Trammell T, Pate-Cornell E  
Stanford University

Sponsored by:  
Decision Analysis and Risk Specialty Group

**Salon A**
W4-A Symposium: The Perception of Scientific Uncertainty and Risk/Technology Acceptance  
Chair: Angela Bearth

3:30 PM  
W4-A.1  
Communication of uncertainties: Challenges and some unwanted effects  
Siegrist M  
ETH Zurich

3:45 PM  
W4-A.2  
Citizen Science: People’s risk and benefit perceptions when sharing genomic data for research  
Bearth A, Siegrist M  
Consumer Behavior, Institute for Environmental Decisions (IED), ETH Zurich

4:00 PM  
W4-A.3  
Risk perceptions, disgust, and consumer preferences regarding the use of human urine-derived fertilizers for domestic agriculture  
Segrè Cohen A, Love N, Arvai J  
University of Michigan

4:15 PM  
W4-A.4  
Paging Dr. Jarvis: Evaluating the acceptance of advice from an “A.I.” vs. a human expert  
Larkin C, Drummond C, Arvai J  
University of Michigan

4:30 PM  
W4-A.5  
Public skepticism of autonomous vehicles: Complex messaging effects  
Dixon GN  
Ohio State University

Sponsored by:  
Risk Communication Specialty Group
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Chair</th>
<th>Location</th>
<th>Presenters</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:30 PM – 5:00 PM</td>
<td>W4-B Symposium: Foundational Issues in Risk Analysis, Part 3</td>
<td>Roger Flage</td>
<td>Salon B</td>
<td>Henstra D, Rus H</td>
</tr>
<tr>
<td>3:30 PM – 5:00 PM</td>
<td>W4-C Symposium: Early Warning Systems for Emerging or Disruptive Technologies in Countering Weapons of Mass Destruction</td>
<td>Anthony Barrett</td>
<td>Salon C</td>
<td>Sin, S, Ackerman G, Barrett T, Maxwell M, University of Maryland</td>
</tr>
<tr>
<td>3:30 PM – 5:00 PM</td>
<td>W4-D Symposium: Data-Driven Risk Modeling Using Predictive Analytics Approach</td>
<td>Sayanti Mukherjee</td>
<td>Salons DE</td>
<td>Hartnett E, Wilson M, Paoli G, Risk Sciences International</td>
</tr>
<tr>
<td>3:30 PM – 5:00 PM</td>
<td>W4-F Risk Characterization of Microbiological Hazards</td>
<td>Moez Sanaa</td>
<td>Salon H</td>
<td>Coleman Scientific Consulting</td>
</tr>
</tbody>
</table>

**Wednesday**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Chair</th>
<th>Location</th>
<th>Presenters</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:30 PM – 5:00 PM</td>
<td>W4-G Symposium: Systems Thinking and Interdisciplinary Approaches for Building Resilience</td>
<td>Tom Logan</td>
<td>Salon J</td>
<td>Coleman Scientific Consulting</td>
</tr>
</tbody>
</table>

**Sponsored by:**
- Foundational Issues in Risk Analysis Specialty Group
- Security and Defense Specialty Group
- Engineering and Infrastructure Specialty Group
- Resilience Analysis Specialty Group & Risk and Development Specialty Group
Exposure models have long been used to evaluate human exposures and health risks in environmental, community, and workplace settings. However, advances in science and technology, greater emphasis on aggregate and cumulative exposures and risks, and consideration of more complex exposure scenarios has led to the development of novel and more sophisticated exposure modeling tools. What are the plethora of exposure models currently available for use and which ones should be adopted for a given purpose? What are the differences between regulatory and non-regulatory exposure models and those developed for use in different countries? What types of data inputs are needed for screening-level versus higher-tiered models? To what extent have these models been peer-reviewed and evaluated? What are the strengths and limitations of existing exposure models and modeling data gaps or research needs? The purpose of this 3-part symposium/roundtable session is to present an overview of current exposure models and modeling data daps or research needs.

Roundtable participants include:

- Cathy Fehrenbacher (U.S. EPA)
- Ritesh Tiwari (U.S. EPA)
- Rehan Choudhary (U.S. EPA)
- Hua Qian (Exxon Biomedical)
- Katherine von Stackelberg (Harvard School of Public Health)
- Christine Chaisson (LifeLine)
- Tom Armstrong (TWABHR Occupational Hygiene Consulting)
- Paul Price (U.S. EPA)
- Gurumurthy Ramachandran (Johns Hopkins University)
- Judy LaKind (LaKind Associates)

Sponsored by:

- Exposure Assessment Specialty Group and Occupational Health and Safety Specialty Group

A key theme of this discussion will be: What can the risk analysis community do to help?


Chair: Pamela Williams

3:30 PM – 5:00 PM

W4-I Exposure Assessment of Air Pollutants: New Frontiers in the Assessment of Public Health Risks

Chair: Christopher Greene

3:30 PM – 5:00 PM

W4-J Decision Making Under Uncertainty: Theories and Methods

Chair: Jalal Ali

3:30 PM – 5:00 PM
Author Index

A

Aarset M..........................25
Abuabara A.........................29
Ackerlund WS......................29
Ackerman G.........................44
Ackerman GA.......................22, 44
Adams P............................32
Adler MD..........................25
Agawal P...........................22, 42, 44
Agrawal A...........................21
Alarcón M...........................25
Alarcin D............................24
Albarracin DA......................36
Albarracin M........................36
Albert N.............................31
Alderson DL.........................36
Alexeev A.........................34, 36
Ali J..................................45
Al Kajbaf A..........................28
Allan JN..............................34
Allen M..............................33
Allday L..................30,31
Al Saif..............................13,33
Amaechina EC......................37
Amelif P..............................28
Amolemhen P.......................44
Anderson CA........................27, 29
Anderson P.........................41
Anderson SA.........................28
Anderson SK.........................30
Andrade J.........................28, 44
Andrews CJ.........................44
Andrews DJ.........................24
Andrews L...........................22
Angelis A.............................23
Aoyagi M.............................30
Ariaie G..............................23
Ariagio G.........................27, 44
Arnold PT.........................43, 44
Arnich N.........................30,31
Arthu TR..............................37
Arval J..........................42, 43, 45
Arvalt JL..............................22
Arzuaga X............................32
Ashbott N............................33
Asher DM............................27
Ash K.................................34
Askeland T.........................32
Awale LL...........................28
Aven T...............................43
Azikey GO...........................23
Aziz RA..............................42, 44
Azizolin N...........................44

B

Badger M..............................28
Baggett S............................42
Bailey L...............................33
Bains M..............................21
Baird SJS.............................38
Baldi I.................................28, 29
Balog-Whit H......................20, 30
Bao L.................................42, 24, 43
Barbeau B.........................35, 37
Barbi G...............................35
Barbi GJ..............................31
Barchowsky A......................24
Bar J.................................30,31
Baroud H...........................21, 25, 32, 36
Barraj J...............................28
Barrett A.............................44
Barrett AM.........................27, 44
Barrett T.............................44
Barrick K............................40
Barton CM..........................32
Bartrand T.........................26
Bassett J..............................33
Bastiaan P..........................30,31
Baum SD.........................29, 36
Beauch A............................43
Beaujolais C........................24
Beetstra M...........................20
Beetstra MA........................31
Behe BK..............................37
Bell C.................................44
Belov A..............................25
Belzor BR............................23
Bennett JB..........................34,42
Bensi M.............................27,30
Bensi MT............................27,28
Bentley L............................21
Berchialla P.........................28, 29, 33
Berger JJ..............................28
Bergin SM.........................32,33
Berube D............................24,42
Besley J..............................36
Bessette D.........................45, 46
Bessette DL..........................46
Best EA..............................31
Bett C.................................27
Beverly B.........................32,33
Beyer E...............................40
Bhardwaj R.........................29
Bhatia U.............................28
Bhatia Charya........................42
Bidwell D............................36
Bier VM..............................35,42

C

Bills A.................................44
Bird SD...............................23
Biever B.............................33
Block P..............................22
Boakye J.............................44
Boelter FW..........................35
Bo F.................................29
Bogomoloe T.......................42
Boiger PM...........................28
Bonad M................................24, 43
Bon M.................................35
Borgoff SJ...........................32
Borsuk M............................41
Borsuk ME...........................24
Bostrom A...........................30
Bottiglieo D........................28, 29, 45
Boulevard M.........................35
Bouder F.............................20
Bouger S.............................37
Bourguet MH.......................35
Bourlier B............................37
Bowers TS..........................37
Boy A.................................24
Boy JD.................................29
Boz E.................................36
Brand KP............................20
Brass E...............................45
Brass S...............................45
Brigant R............................28
Bristow DN.........................44
Brodie M............................27
Bronfman NC.......................25,28
Broniatowski DA..................28
Brossard D.........................22
Brown DG............................22
Brown EA............................33
Brown J...............................22
Brown L.............................27,28
Brukabak SA.......................28
Bruckner M.........................40
Brunol de Brun W..................24
Bruskotter JT......................31
Bryant S.............................40
Buchanan RL.......................23
Buchwald D.........................30,31
Burnett R...........................20
Butler R.............................40
Byrd K...............................42

Clougherty J.......................33
Cohen AA............................30
Cohen Hubal E....................43
Cokeley ET..........................34
Coleman M..........................36
Calkam S............................28
Camp JV..............................27
Canfield CJ.........................28,29
Carre C................................40
Cao S.................................29
Caron Z..............................37
Carrington CD.....................27
Carter C..............................33
Castillo A............................25
Cefalu M............................20
Cerf O.................................37
Chabne A............................33
Chaisson CF.........................44
Chatroborty L.....................43,44
Chang BS............................29
Chang WS............................27
Chang YS............................29,45
Chang YC............................36
Chan WC.............................29
Chao HW............................29
Chapman B..........................29
Chappell GA.........................32
Chardon JE..........................41
Chari R...............................43
Chatterjee SL.......................28,34,44
Chen C...............................24
Chen PC............................28
Chen T...............................44
Chen Y...............................29
Chemokova TN.....................37
Cherry C............................32
Che W.................................45
Chiang SY...........................29
Chiger A..............................27
Chigor VN...........................37
Chiu SJ...............................28
Chiu SY..............................28
Chiu WA..............................20
Cho J.................................34
Chou TH.............................28
Chou WC............................28
Chuang YC.........................27,29
Chuanshen Q.....................29,30
Chu H.................................30
Cifuentes LA........................25
Cisternas PC.........................25
Clark K...............................28

D

Dalgi C..............................22
Daily K...............................23
Dai M................................27
Dale AL..............................26
Dales R..............................26
Dalla Pozza P.....................24,35
Darbon A............................33
Dave SM............................36
Davidson GR......................37,43
Davidson RA.......................38
Davies N.............................23
Davis JA.............................20
Davis T.............................33,40
De Angelis M......................32
Delfgou EHHM.....................41
De Marcilis-Warnin N........22
DeMenno MB.......................35
Demski C............................20
Demuth J............................32
Demuth JL...........................34
Denard S............................45
DeNeale ST..........................27
Deng L...............................42
Desotelli LT.........................39
DeVleeschauwer B..............24
Dewulf B............................21
Dionisio K...........................43
Diskin K.............................43
Di Tizio G............................34
Dixon GN............................35
Doerias K...........................36
Dodd RY.............................28
Dogan OB.........................26,30
Dolan L..............................24
Dom N.................................21
Donovan D.........................31
Dopart PJ............................22
Doruk C..............................40
Dorson GS...........................31
Dourson M.........................24
Drolet D............................43
Drouin SM.........................29
Drudge C.............................23
Drummond C.......................42, 43
Duan K...............................42
Dubeu JP............................27,41
Dudo A...............................36
Dunn KL.............................30
Duret S...............................37
Dyer AD.............................23

E

Edeg JD.............................25, 39
Egbokhare FA.......................23
Ehmud KMD.........................27,29
Eidem H..............................52
Eiben K..............................28
Eichenhary SR.....................33
Eisenger F............................33
Ekizie W.............................21
Eklugbo A...........................44
Ekwaro-Osire S...................45
El-Awadi A...........................44
Elder A...............................39
Elarasmawi M.....................31
Elguta HE............................32
Emore S..............................32
Emelko MB.........................42
Emmet JMD..........................24
Engemann A.........................21
Eng N.................................34
Eriguchi T...........................34
Eren TC..............................20
Crystal Gateway Marriott – Floorplans
Getting Our Event App is a Snap!

Scan the QR code to access our iPhone, iPad or Android event app today.

https://sra2019.quickmobile.mobi

You can also download our event app from the App Store and Google Play!

Search: SRA Annual 2019
Microbial Risk Analysis is a peer-reviewed journal accepting articles dealing with the study of risk analysis applied to microbial hazards. Manuscripts should at least cover any of the components of risk assessment, risk management and/or risk communication in any microbiology field.

For the full aims & scope, to contact our editors or to submit your article online, visit: journals.elsevier.com/microbial-risk-analysis