



# Final Program

2019 Annual Meeting



**SRA 2019**   
Risk Analysis in the Data Analytics Era

December 8 - 12 · Arlington, VA

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# Society For Risk Analysis Annual Meeting

## 2019 Final Program

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### Looking for WiFi?

**Network:** Marriott\_CONFERENCE  
**Access Code:** SRA2019

### 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

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**Treasurer:** Henry Willis

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**Past President:** Terje Aven

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Royce Francis

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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

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Diane Henshel

Terje Aven

Cameron MacKenzie

Amanda Bailey

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Amir Mokhtari

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Mary O'Reilly

Sweta Chakraborty

Willy Roed

Chris Clarke

Vanessa Schweizer

Ingrid Druwe

Yvonne Stevens

James Ede

Ben Trump

Roger Flage

Jamie Wardman

Chris Greene

Amina Wilkins

## 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.

## 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*

## SRA Worldwide Headquarters

950 Herndon Parkway, Suite 450

Herndon, VA USA 20170

+1.703.790.1745; FAX: 703.790.2672

[www.SRA.org](http://www.SRA.org), [SRA@BurkInc.com](mailto:SRA@BurkInc.com)

## Crystal Gateway Marriott

1700 Richmond Highway

Arlington, VA 22202

Phone: 703.920.3230

## 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*

#### **Editorial Board Meeting**

5:00 PM – 6:00 PM – *Jefferson*

#### **SRA Welcome Reception**

6:00 PM – 7:30 PM – *Arlington Ballroom Salon III-IV*

### 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*

#### **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*

#### **Plenary Session**

8:30 AM – 10:00 AM – *Arlington Ballroom Salon III-VI*

#### **SRA Awards Luncheon and Business Meeting**

12:00 PM – 1:30 PM – *Arlington Ballroom Salon III-VI*

#### **SRA Council Meeting**

6:30 PM – 10:00 PM – *Rosslyn*

#### **Specialty Group Mixers**

6:00 PM – 7:30 PM - See page 5

#### **National Capital Area Chapter Mixer**

6:00 PM – 7:30 PM - *Jefferson*

Join the National Capital Area Chapter for libation, friendship, and networking. Help us decide on new leaders, programs to match a new era in risk science, and ways to network among SRA members. You can help shape the future of the chapter and play a role yourself.

### 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*  
*Included in registration fee*

#### **T-shirt Giveaway and Raffle**

5:00 PM – 5:30 PM – *Arlington Registration Desk*

#### **\*\*\* Three Lunches Included \*\*\* in your Registration Fees**

Monday Box Lunch, Tuesday Awards Banquet,  
Wednesday Plenary Luncheon

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

### **Advanced Materials and Technologies**

Thelma Ameh

### **Applied Risk Management**

Julia Coxen

### **Decision Analysis and Risk**

Kyle Hunt

### **Dose-Response**

Dienye Tolofari

Zheng Zhou

### **Engineering and Infrastructure**

Riley Mulhern

### **Exposure Assessment**

Mona Dai

### **Foundational Issues in Risk Analysis**

Elnaz Kabir

### **Microbial Risk Analysis**

Chase Golden

### **Occupational Health and Safety**

Huang Shao-Zu

### **Resilience Analysis**

Katarzyna Klasa

### **Risk and Development**

Winifred Ekezie

### **Risk Policy & Law**

Nick Gray

### **Security & Defense**

Xue Lei

## Student and International Travel Award Winners

Puneet Agarwal

Azin Al Kajbaf

Thelma Ameh

Ridwan Al Aziz

Jason Bassett

Jessica Boakye

Marta Bonato

Liton Chakraborty

Hung Wei Chao

Vincent Chigor

Ting-Hsuan Chou

Mona Dai

Giorgio Di Tizio

Onay Burak Dogan

Steven Eikenbary

Winifred Ekezie

Afokeoghene Ekiugbo

Herman Elgueta

Kaveh Faraji Najarkolaie

Henry Finn

Aaron Fister

Sydney Forde

Stephanie Galaitsi

Eleni Galata Bickell

Shubhangi Gokhale

Chase Golden

Nick Gray

Joshua Hall

Charlotte Heinzlef

Alvaro Javier Hernandez

Joel Hiraes-Rochin

Kelsey Hollenbach

Emily Howell

Shao-Zu Huang

Kyle Hunt

Matthew Joyner

Elnaz Kabir

Shraddha 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 Segr 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

# 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 I*

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 I*

## 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

RASG = Resilience Analysis

RCSG = Risk Communication

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

Celebrating  
10 years!

# EJRR

EUROPEAN JOURNAL OF RISK REGULATION

At the Intersection of Global Law, Science and Policy

Editor:

**Alberto Alemanno**, HEC Paris, France

*European Journal of Risk Regulation* is an interdisciplinary forum bringing together legal practitioners, academics, risk analysts and policymakers in a dialogue on how risks to individuals' health, safety and the environment are regulated across policy domains globally. The journal's wide scope encourages exploration of public health, safety and environmental aspects of pharmaceuticals, food and other consumer products alongside a wider interpretation of risk, which includes financial regulation, technology-related risks, natural disasters and terrorism.

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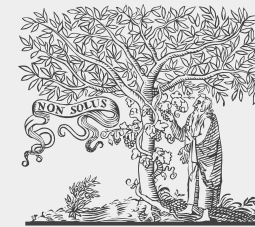
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## Exhibitors

### Exhibition – Arlington & Grand Ballroom Foyer

Monday, December 9 . . . . .	10:00 AM - 3:30 PM
Poster Reception . . . . .	6:00 PM - 8:00 PM
<i>Arlington Ballroom, Salon III-VI</i>	
Tuesday, December 10 . . . . .	9:30 AM - 4:00 PM
Wednesday, December 11 . . . . .	9:30 AM - 4:00 PM

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### International Society of Exposure Science (ISES)

7304 W 130th Street, Suite 370  
Overland Park, KS 66213  
800-869-1551  
www.intlexposurescience.org

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

One Boston Place, Suite 3520  
Boston, MA 02108  
617 946 6100  
www.ramboll.com

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.

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## SETAC

229 South Baylen Street, 2nd Floor  
Pensacola, FL 32502  
850-469-1500  
www.setac.org

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.

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## Springer Nature

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

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## Toxicology Education Foundation

4303 Kirby Avenue  
Cincinnati, OH 45223  
513-542-8940  
toxeducation.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!

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## 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.

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## 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

**Bronze Sponsor**

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

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

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.

## PM WORKSHOPS

SUNDAY December 8th, 1:00PM—5:00PM

### **WK6PMS: Health Risk Assessment of Environmental Chemical Mixtures Part 2. Analyses Using Whole Mixture Data**

**Cost: \$215**

*Instructors: Linda K Teuschler (LK Teuschler & Associates); Glenn E Rice, US EPA; J. Michael Wright, US EPA; Richard C. Hertzberg, Biomathematics Consulting; Jane Ellen Simmons, US EPA; Jeff Swartout, US EPA*

**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.*

## ALL-DAY WORKSHOPS

SUNDAY December 8th, 8:00AM—5:00PM

**SOLD OUT**

### **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 addition 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.

## ALL-DAY WORKSHOPS

THURSDAY December 12th, 8:00AM—5:00PM

### **WK15ALLTH: Dose-Response Modeling for Risk Assessments – BMDS 3.2 and Bayesian Modeling Averaging**

**Cost: \$350**

*Instructors: J. Allen Davis, US Environmental Protection Agency; Jeff Grift, US Environmental Protection Agency; Jay Zhao, US Environmental Protection Agency; Matt Wheeler, National Institute for Occupational Safety and Health*

**Location: Jefferson**

This full-day workshop will provide participants with fundamental knowledge of benchmark dose (BMD) analysis and hands-on experience in support of chemical risk assessment. The workshop will introduce benchmark dose modeling and analysis, probabilistic dose-response assessment in a Bayesian framework (including distributional BMD estimation), and model

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/bmids](http://www.epa.gov/bmids). 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

**7:00 AM-8:00 AM New Member, Student/Young Professional Breakfast**

**8:30 AM-10:00 AM Plenary Session – What Can Data Tell Us About Risk Management?**  
 Machine Learning for Risk Analysis – Perspectives from the Front Lines, *Arlington Ballroom, Salon III & IV*

**10:00 AM-10:30 AM Coffee Break**

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

**Noon-1:30 PM**  
 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 (RDSD), Applied Risk Management (ARMSG), Risk Communication (RCSG), Advanced Materials & Technologies (AMTSG), Resilience Analysis Specialty Group Meeting (RASG), Engineering & Infrastructure (EISG), Microbial Risk Analysis (MRASG)

<b>1:30 PM-3:00 PM</b>	M3-A Climate Change Communication, Adaptation, and Resilience, Part 2	M3-B Roundtable: Current Foundational Issues in the Field of Risk Analysis	M3-C Global Catastrophic Risks	M3-D Disaster Risk Analysis and Modeling	M3-E Risk Assessment and Benefits Analysis Interface
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**3:00 PM-3:30 PM Coffee Break**

<b>3:30 PM - 5:00 PM</b>	M4-A Health Risk Perception and Communication	M4-B Roundtable: Tomorrows Perspective on Today's Risk: Technology, Environment, and Society	M4-C Symposium: Risk, Security, and Trust of Embedded Hardware in Cyber-Physical Systems	M4-D Symposium: Engineering and Infrastructure Solutions for Natural Hazards Risk Management	M4-E Benefit Cost Analysis: Theory and Application
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**6:00 PM-8:00 PM Poster Reception, Arlington Ballroom, Salon III-VI**

**7:00 AM-8:00 AM New Member, Student/Young Professional Breakfast**

**8:30 AM-10:00 AM Plenary Session – What Can Data Tell Us About Risk Management?**  
 Machine Learning for Risk Analysis – Perspectives from the Front Lines, *Arlington Ballroom, Salon III & IV*

**10:00 AM-10:30 AM Coffee Break**

	<b>Salon H</b>	<b>Salon J</b>	<b>Salon K</b>	<b>Salon 1</b>	<b>Salon 2</b>
<b>10:30 AM-Noon</b>	M2-F Symposium: Building a Risk-based Food Safety System from Scratch	M2-G Risk Analysis in the Developing World and Remote Areas: Data, Perspectives, and Models	M2-H Symposium: Protecting People and Changing Their Behavior	M2-I Challenging Risk Assessment Practices to Improve Regulatory Decision-Making	M2-J Poster Platform: Risk Perception, Communication, and Digital Technology

**Noon-1:30 PM**  
 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 (RDSD), Applied Risk Management (ARMSG), Risk Communication (RCSG), Advanced Materials & Technologies (AMTSG), Resilience Analysis Specialty Group Meeting (RASG), Engineering & Infrastructure (EISG), Microbial Risk Analysis (MRASG)

<b>1:30 PM-3:00 PM</b>	M3-F Symposium: The Role of Predictive Microbiology and its Impact on Food Safety Quantitative Microbiological Risk Assessment and Beyond: Leveraging Scientific Advances	M3-G Managing Risk: Balance, Communication, and Trust	M3-H Roundtable: Worker Considerations as EPA Implements the 2016 Toxic Substances Control Act Amendments	M3-I Symposium: Global Disease Burden Caused by Foodborne Chemicals and Toxins	M3-J Poster Platform: Perspectives on Risk-based Decision Making
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**3:00 PM-3:30 PM Coffee Break**

<b>3:30 PM - 5:00 PM</b>	M4-F Epistemic Issues Around Risk and Resilience	M4-G From Analysis to Management: Natural Hazards & Petroleum	M4-H Symposium: Risk Analysis of Engineered Nanomaterials: Where Have We Been, Lessons Learned, and Transfer of Knowledge to Other Emerging Technologies		M4-J Poster Platform: Application of QMRA in Water Quality
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**6:00 PM-8:00 PM Poster Reception, Arlington Ballroom, Salon III-VI**

**8:30 AM-10:00 AM**    **Plenary Session** – Data Analytics for Risk Analysis – Past, Present, and Future, *Arlington Ballroom, Salon III & IV*

**10:00 AM-10:30 AM**    **Coffee Break**

	Salon A	Salon B	Salon C	Salons DE	Salons FG
10:30 AM-Noon	T2-A Energy Perceptions and Narratives	T2-B Symposium: Systemic Risks, Uncertainty, and Governance	T2-C Symposium: Applying the Key Characteristics Approach for Hazard Identification and Risk Assessment of Chemical Induced Cancer and Non-Cancer Effects	T2-D Symposium: Improving Infrastructure Operability After Disasters Through Better Quantification of Uncertainty	T2-E Symposium: Risk Assessment, Economic Evaluation, and Decisions, Part 2

**Noon-1:30 PM**    **SRA Awards Luncheon and Business Meeting**, *Arlington Ballroom, Salon III & IV*

Includes all SRA Awards, and the 5 Best Poster Award Winners from Monday’s Poster Reception. *(Included in registration fee)*

1:30 PM-3:00 PM	T3-A Natural Hazard Perception and Communication	T3-B Roundtable: How Can We Bridge the Gap Between Safety Culture Research and Risk Science?	T3-C Symposium: Cyber Risk as an Experimental Discipline	T3-D Symposium: Social Media, Big Data, Risk Analysis, and Disasters	T3-E Economic Analysis of Extreme or Rare Events
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**3:00 PM-3:30 PM**    **Coffee Break**

3:30 PM-5:00 PM	T4-A Risk Communication Best Practices, Part 1	T4-B Foundational Issues in Risk Analysis, Part 1 - Big Data and Data Analytics	T4-C Critical Infrastructure, Cyber, and Information Risks	T4-D Symposium: Data-Driven Decision Making and Risk Analysis	T4-E Risk Communication: Issues of Contamination and Consumption
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**6:00 PM-7:30 PM**    **Specialty Group Mixers**, *see page 5*

**8:30 AM-10:00 AM**    **Plenary Session** – Data Analytics for Risk Analysis – Past, Present, and Future, *Arlington Ballroom, Salon III & IV*

**10:00 AM-10:30 AM**    **Coffee Break**

	Salon H	Salon J	Salon K	Salon 1	Salon 2
10:30 AM-Noon	T2-F Symposium: Advances in Antibiotic Resistance Risk Assessment	T2-G Cattle to Kids: Applied Risk Analysis	T2-H Symposium: Risk Assessment and Communication Approaches for Emerging Products and Materials	T2-I Data-Driven Decision-Making: Implications for Policy and the Law	T2-J Ecological Risk, Resilience, and Adaptive Management in a Changing World

**Noon-1:30 PM**    **SRA Awards Luncheon and Business Meeting**, *Arlington Ballroom, Salon III & IV*

Includes all SRA Awards, and the 5 Best Poster Award Winners from Monday’s Poster Reception. *(Included in registration fee)*

1:30 PM-3:00 PM	T3-F Roundtable: Food safety -- An Integrated Approach to Risk for Resilient and Sustainable Management	T3-G Symposium: Disasters, Governance, Conflict, and Risk	T3-H Symposium: Driving Organizational Risk Decision Making Improvement with EHSS	T3-I Symposium: Derivation of Human Health Based Water Guidance for Noncarcinogens: Is it time to Change the Standard Default Approach?	T3-J Emerging Challenges in Risk and Decision Making
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**3:00 PM-3:30 PM**    **Coffee Break**

3:30 PM-5:00 PM	T4-F Using QMRA to Inform Risk Management Decisions	T4-G Roundtable: Promoting Risk Management Analysis Quality, and Reaching Out to the Decision Makers	T4-H Symposium: Risk and Resilience Observatories: Methods, Tools and Results	T4-I Symposium: Derivation of Human Health Based Water Guidance: Challenges of Assessing Emerging Contaminants and Mixtures	T4-J Symposium: Wildfire Risk Management - Current Status, Future Projections and Approaches to Reducing Risk
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**6:00 PM-7:30 PM**    **Specialty Group Mixers**, *see page 5*

**Wednesday**

	Salon A	Salon B	Salon C	Salons DE	Salons FG
8:30 AM-10:00 AM	W1-A Risk Communication Best Practices, Part 2	8:00 AM – 9:00 AM W1-B Special Session: Emergence of Emerging Risks at DHS Panel Discussion			
<b>10:00 AM-10:30 AM Coffee Break</b>					
10:30 AM-Noon	W2-A Symposium: Addressing Human Trafficking Risk	W2-B Symposium: Cultural Property Risk Analysis	W2-C Symposium: Identification, Assessment, and Management of the Risks Associated with Chemicals and Materials in the Department of Defense	W2-D Symposium: Assessing the Resilience of Urban Systems Under Climate Change	
<b>Noon-1:30 PM Plenary Luncheon – The Reality of Human Trafficking and the Role of Risk Analysis, Arlington Ballroom, Salon III &amp; IV (Included in registration fee)</b>					
1:30 PM-3:00 PM	W3-A Media Representations of Risk	W3-B Foundational Issues in Risk Analysis, Part 2 - Uncertainty and Risk Conceptualizations	W3-C Symposium: Decision and Risk Analysis in a Digital Era	W3-D Symposium: Risk Analysis of Cybersecurity in Critical Infrastructure Systems	
<b>3:00 PM-3:30 PM Coffee Break</b>					
3:30 PM –5:00 PM	W4-A Symposium: The Perception of Scientific Uncertainty and Risk/Technology Acceptance	W4-B Symposium: Foundational Issues in Risk Analysis, Part 3	W4-C Symposium: Early Warning Systems for Emerging or Disruptive Technologies in Countering Weapons of Mass Destruction	W4-D Symposium: Data-Driven Risk Modeling Using Predictive Analytics Approach	
<b>5:00 PM - 5:30 PM T-Shirt Giveaway - Registration Area, Arlington Ballroom Foyer, Registration desk</b>					



## Wednesday

	Salon H	Salon J	Salon K	Salon 1	Salon 2
8:30 AM-10:00 AM	W1-F Organizations, Systems and Resilience	W1-G Managing Risks of Nanomaterials, Radionuclides, Natech, & Through Inspections	W1-H Symposium: Recent Advances in the Occupational Health and Safety of Advanced Materials and Technologies	W1-I Symposium: Standards of Certainty in Scientific Risk Decision-Making	W1-J Symposium: Visual Cues and Perceptions of Risk: Modern Agriculture in the Era of Social Media
<b>10:00 AM-10:30 AM Coffee Break</b>					
10:30 AM-Noon	W2-F Integrating Data Sources into QMRA: From Pathogen Survival Data to Whole Genome Sequencing	W2-G Urban Resilience and Social Equity	W2-H Symposium: State-of-the-Art Exposure Models and Data Quality for Evaluating Environmental, Community, Consumer Product, and Workplace Exposures: Part 1	W2-I Exposure Assessment: Innovations, Models, and Methods	W2-J Conflict and Collaboration
<b>Noon-1:30 PM Plenary Luncheon – The Reality of Human Trafficking and the Role of Risk Analysis, Arlington Ballroom, Salon III &amp; IV (Included in registration fee)</b>					
1:30 PM-3:00 PM	W3-F Natural Hazard and Urban Resilience		W3-H Symposium: State-of-the-Art Exposure Models and Data Quality for Evaluating Environmental, Community, Consumer Product, and Workplace Exposures: Part 2	W3-I Roundtable: Combating Human Trafficking	W3-J Symposium: Risk and Resilience: At a Crossroads
<b>3:00 PM-3:30 PM Coffee Break</b>					
3:30 PM –5:00 PM	W4-F Risk Characterization of Microbiological Hazards	W4-G Symposium: Systems Thinking and Interdisciplinary Approaches for Building Resilience	W4-H Roundtable: State-of-the-Art Exposure Models and Data Quality for Evaluating Environmental, Community, Consumer Product, and Workplace Exposures: Part 3	W4-I Exposure Assessment of Air Pollutants: New Frontiers in the Assessment of Public Health Risks	W4-J Decision Making Under Uncertainty: Theories and Methods
<b>5:00 PM - 5:30 PM T-Shirt Giveaway - Registration Area, Arlington Ballroom Foyer, Registration desk</b>					

# Technical Program

Presenter's name is asterisked (\*) if other than first author.

10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM
<p><i>Salon A</i></p> <p><b>M2-A Climate Change Communication, Adaptation, and Resilience, Part 1</b> <i>Chair: Robyn Wilson</i></p>	<p><i>Salon B</i></p> <p><b>M2-B Symposium: From Open to Big Data: Using Risk Science to Better Deliver Benefits to Patients</b> <i>Chair: Frederic Boudier</i></p>	<p><i>Salon C</i></p> <p><b>M2-C Symposium: Study of Violent Crime and Gun Violence</b> <i>Chair: Xue Lei</i></p>	<p><i>Salons DE</i></p> <p><b>M2-D Symposium: Benchmark Dose Guidance Across the Globe and Avenues for Harmonization of Modeling Methodologies</b> <i>Chair: J. Allen Davis</i></p>	<p><i>Salons FG</i></p> <p><b>M2-E Symposium: Risk Assessment, Economic Evaluation, and Decisions, Part 1</b> <i>Chair: Lisa Robinson</i></p>
<p><b>10:30 AM</b> <b>M2-A.1</b> Climate change risk perceptions and adaptation measures around Asia <i>Aoyagi M</i> <i>National Institute for Environmental Studies</i></p>	<p><b>10:30 AM</b> <b>M2-B.1</b> Bridging the risk science-policy gap: are regulatory agencies ready? <i>Balog-Way DHP</i> <i>Cornell University</i></p>	<p><b>10:30 AM</b> <b>M2-C.1</b> Measuring the effectiveness of counterterrorism measures <i>Jore SH</i> <i>University of Stavanger</i></p>	<p><b>10:30 AM</b> <b>M2-D.1</b> Development of a Unified Model Suite for Dichotomous and Continuous Toxicological Data <i>Cortinas J</i> <i>EFSA</i></p>	<p><b>10:30 AM</b> <b>M2-E.1</b> Converting between Measures of Health Impact: Health Gap to Health Expectancy <i>Brand KP, Stieb D, Burnett R</i> <i>University of Ottawa and Health Canada</i></p>
<p><b>10:50 AM</b> <b>M2-A.2</b> UK public understanding of climate impacts, risks and adaptation strategies <i>Demski C, Steentjes K, Pidgeon N</i> <i>Cardiff University</i></p>	<p><b>10:50 AM</b> <b>M2-B.2</b> One risk Culture to bind them all? Results of a pilot study <i>Boudier FB, Milon JB</i> <i>University of Stavanger</i></p>	<p><b>10:50 AM</b> <b>M2-C.2</b> Analysis and forecasting of mass shootings using change point detection <i>Lei X, MacKenzie C</i> <i>Iowa State University</i></p>	<p><b>10:50 AM</b> <b>M2-D.2</b> EPA and EFSA Approaches for Benchmark Dose Modeling <i>Davis JA</i> <i>US Environmental Protection Agency</i></p>	<p><b>10:50 AM</b> <b>M2-E.2</b> Recent advances in probabilistic dose-response assessment to inform socioeconomic benefits analysis <i>Chiu WA, Paoli G</i> <i>Texas A&amp;M University (WAC), Risk Sciences International (GP)</i></p>
<p><b>11:10 AM</b> <b>M2-A.3</b> A question of adaptation vs. mitigation? Communicating climate change risks and national responses <i>Steentjes K, Pidgeon N, Demski C</i> <i>Cardiff University</i></p>	<p><b>11:10 AM</b> <b>M2-B.3</b> Foundational Challenges for Risk Communication in Pharma: An Industry Perspective <i>Ferstenberg LB</i> <i>Astra Zeneca</i></p>	<p><b>11:10 AM</b> <b>M2-C.3</b> The effects of three common gun laws on firearms deaths <i>Morrall AR, Schell T, Griffin BA, Cefalu M</i> <i>RAND Corporation</i></p>	<p><b>11:10 AM</b> <b>M2-D.3</b> The World Health Organization's update to guidance on dose-response assessment and benchmark dose modeling <i>Haber LT</i> <i>University of Cincinnati</i></p>	<p><b>11:10 AM</b> <b>M2-E.3</b> Premature Deaths, Statistical Lives, and Years of Life Lost: Identification, Quantification, and Valuation of Mortality Risks <i>Hammitt JK*, Morfeld P, Tuomisto J, Erren TC</i> <i>Harvard University, Toulouse School of Economics</i></p>
<p><b>11:30 AM</b> <b>M2-A.4</b> The role of message alignment and risk tolerance in promoting adaptation <i>Wilson RS, Beetstra M, Stockwell R</i> <i>The Ohio State University</i></p>	<p><b>11:30 AM</b> <b>M2-B.4</b> Genetic Risk policy in the big data age: exploring technology advanced tools to support risk communication <i>Mrksic Kovacevic S, Boudier F</i> <i>University of Stavanger</i></p>	<p><b>11:30 AM</b> <b>M2-C.4</b> Active shooter situations: an agent-based model of civilian response strategy <i>Stewart A, MacKenzie CA*</i> <i>Iowa State University</i></p>	<p><b>11:30 AM</b> <b>M2-D.4</b> Model and Distribution Averaging for Continuous Data <i>Wheeler MW</i> <i>NIOSH</i></p>	<p><b>11:30 AM</b> <b>M2-E.4</b> Dynamic Versus Static Modeling of Mortality-related Benefits of PM Reductions in the US and Chile 1990 - 2015 <i>Roman H, Fann N, Penn S, White A, Neumann J</i> <i>Industrial Economics, Inc. (IEC)</i></p>
<p><b>Sponsored by:</b> <i>Risk Communication Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Foundational Issues in Risk Analysis Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Security and Defense Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Dose Response Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Society for Benefit Cost Analysis and EBASG</i></p>

# Technical Program

Presenter's name is asterisked (\*) if other than first author.

10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM
<p style="text-align: center;"><i>Salon H</i></p> <p style="text-align: center;"><b>M2-F Symposium: Building a Risk-based Food Safety System from Scratch</b> <i>Chair: Kara Morgan</i></p>	<p style="text-align: center;"><i>Salon J</i></p> <p style="text-align: center;"><b>M2-G Risk Analysis in the Developing World and Remote Areas: Data, Perspectives, and Models</b> <i>Chair: Vanessa Schweizer</i></p>	<p style="text-align: center;"><i>Salon K</i></p> <p style="text-align: center;"><b>M2-H Symposium: Protecting People and Changing Their Behavior</b> <i>Chair: Frank Pagone</i></p>	<p style="text-align: center;"><i>Salon 1</i></p> <p style="text-align: center;"><b>M2-I Challenging Risk Assessment Practices to Improve Regulatory Decision-Making</b> <i>Chair: Hank Jenkins-Smith</i></p>
<p><b>10:30 AM</b> <span style="float: right;"><b>M2-F.1</b></span> Food safety in Low and Middle Income Countries – An opportunity for risk-based decision making <i>Morgan KM, Kowalczyk BB</i> <i>Ohio State University</i></p>	<p><b>10:30 AM</b> <span style="float: right;"><b>M2-G.1</b></span> Risk Analysis in the Developing World: Integrating Data and Decisions through an Interdisciplinary Approach <i>Baroud H</i> <i>Vanderbilt University</i></p>	<p><b>10:30 AM</b> <span style="float: right;"><b>M2-H.1</b></span> Plutonium (Pu): Historical Perspective on Evaluation of Health Risks of a New Element from Discovery to the Present <i>McClellan RO</i> <i>Toxicology and Risk Analysis</i></p>	<p><b>10:30 AM</b> <span style="float: right;"><b>M2-I.1</b></span> Make risk assessment great again: slow the march towards systematic review, magic thresholds, and hormesis policy <i>Finkel AM</i> <i>University of Michigan</i></p>
<p><b>10:50 AM</b> <span style="float: right;"><b>M2-F.2</b></span> The essential ingredients in a from-scratch recipe for risk-based food safety systems <i>Paoli GM, Hartnett E, Ruthman RT, Wiles A</i> <i>Risk Sciences International</i></p>	<p><b>10:50 AM</b> <span style="float: right;"><b>M2-G.2</b></span> Healthcare Data Management in Displacement Settings: Case Study of Internal Displacement in Nigeria <i>Ekezie W, Timmons S, Myles P, Pritchard C, Siebert P, Murray R, Bains M</i> <i>University of Nottingham, United Kingdom</i></p>	<p><b>10:50 AM</b> <span style="float: right;"><b>M2-H.2</b></span> Hazard Identification: Considerations in Evaluating Complex Issues in Defining “What is the Hazard” <i>Nocco RA</i> <i>Chevron</i></p>	<p><b>10:50 AM</b> <span style="float: right;"><b>M2-I.2</b></span> Sources of uncertainty in cannabis urine drug screening <i>Simon TW</i> <i>Ted Simon LLC</i></p>
<p><b>11:10 AM</b> <span style="float: right;"><b>M2-F.3</b></span> The Role of Economics in Risk Analysis <i>Scharff RL</i> <i>The Ohio State University</i></p>	<p><b>11:10 AM</b> <span style="float: right;"><b>M2-G.3</b></span> Enterprise Resilience of Remote Operations in Arctic Regions <i>Hollenback KS, Collier ZA, Thorisson H, Linkov I, Trump BD, Polmateer TL, Lambert JH</i> <i>University of Virginia, Collier Research Systems, U.S. Army Corps of Engineers</i></p>	<p><b>11:10 AM</b> <span style="float: right;"><b>M2-H.3</b></span> Risk Assessment of Urban Odors: Risk Communication and the Hedonic Tone <i>Pagone FJ</i> <i>RHP Risk Management Inc.</i></p>	<p><b>11:10 AM</b> <span style="float: right;"><b>M2-I.3</b></span> Risks Associated with Changing an Excipient in an Existing Drug Product <i>Cragin D, Albert N, Engemann A, Dom N, Dewulf B, Tanghe T, Orbons L, Glodek M, Herron M, Bentley L</i> <i>Merck &amp; Co.</i></p>
<p><b>11:30 AM</b> <span style="float: right;"><b>M2-F.4</b></span> A communication and decision making view of building a risk-based decision making system <i>Wilson RS</i> <i>The Ohio State University</i></p>	<p><b>11:30 AM</b> <span style="float: right;"><b>M2-G.4</b></span> Acknowledging uncertainty in models for sustainable development: a framework for robust policy analysis <i>Williams TG, Guikema SD, Brown DG, Agrawal A</i></p>	<p><b>11:30 AM</b> <span style="float: right;"><b>M2-H.4</b></span> Occupational Exposure Assessment Strategies <i>Heckman BJ</i> <i>RHP Risk Management Inc.</i></p>	<p><b>11:30 AM</b> <span style="float: right;"><b>M2-I.4</b></span> The Puzzle of Licensing and Advertising: Towards Further Explaining Transatlantic Regulatory Divergence in the Pharmaceuticals Sector Using Culture <i>Wells LM</i> <i>Erasmus University Rotterdam</i></p>
<p><b>Sponsored by:</b> <i>Risk and Development Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Risk and Development Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Occupational Health and Safety Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Risk, Policy &amp; Law Specialty Group</i></p>

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 Learnin  
*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  
*Dopart PJ, Graf KL*  
*Exponent*

**10:30 AM** **M2-J.9**  
Risk Perception, Social Media and Social Trust of Artificial Intelligence  
*De 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	1:30 PM – 3:00 PM	1:30 PM – 3:00 PM	1:30 PM – 3:00 PM	1:30 PM – 3:00 PM
<p><i>Salons DE</i></p>	<p><i>Salons FG</i></p>	<p><i>Salon H</i></p>	<p><i>Salon J</i></p>	<p><i>Salon K</i></p>
<p><b>M3-D Disaster Risk Analysis and Modeling</b> <i>Chair: Stanley Levinson</i></p>	<p><b>M3-E Risk Assessment and Benefits Analysis Interface</b> <i>Chair: Aliya Sassi</i></p>	<p><b>M3-F Symposium: The Role of Predictive Microbiology and its Impact on Food Safety Quantitative Microbiological Risk Assessment and Beyond: Leveraging Scientific Advances</b> <i>Chairs: Yuhuan Chen, Elizabeth Williams</i></p>	<p><b>M3-G Managing Risk: Balance, Communication, and Trust</b> <i>Chair: Jason Bassett</i></p>	<p><b>M3-H Roundtable: Worker Considerations as EPA Implements the 2016 Toxic Substances Control Act Amendments</b> <i>Chair: Steve Gibb</i></p>
<p><b>1:30 PM M3-D.1</b> Coupling Equilibrium Models with Electricity Capacity Expansion Investments to Hedge against Large-scale Electric Power Infrastructure Disruptions <i>Shittu E George Washington University</i></p>	<p><b>1:30 PM M3-E.1</b> The Pebble Remains in the Master's Hand: Two Careers Spent Learning (Still) from John Evans <i>Gray G, Finkel AM GWU Milken Institute School of Public Health</i></p>	<p><b>1:30 PM M3-F.1</b> Predictive Microbiology and Quantitative Microbial Risk Assessments (QMRA), what has been accomplished during the last thirty and twenty years <i>Buchanan RL University of Maryland and Center for Food Safety and Security Systems</i></p>	<p><b>1:30 PM M3-G.1</b> Helicopters and Horses and A-List Hollywood Stars: A Mixed Methods Study of Safety, Risk and Accidents in Television Production <i>Soane EC London School of Economics and Political Science</i></p>	<p>The 2016 amendments to the Toxic Substances Control Act create specific safeguards for "potentially exposed or susceptible subpopulations — such as infants, children, pregnant women, workers, or the elderly.</p>
<p><b>1:45 PM M3-D.2</b> Government policy development and analysis for hurricane risk management <i>Wang D, Davidson RA*, Nozick LK, Trainor JE, Kruse J University of Delaware</i></p>	<p><b>1:45 PM M3-E.2</b> Towards a disutility function for risk: asking (not telling) the public how probabilities of grave harm affect them <i>Finkel AM, Johnson BB University of Michigan School of Public Health and Decision Research</i></p>	<p><b>1:45 PM M3-F.2</b> How Predictive Microbiology and Risk Assessment Modeling Tools have Changed Food Microbiology <i>Whiting RC Exponent</i></p>	<p><b>1:45 PM M3-G.2</b> Risk managing decision-making processes: A focus on carbon capture technologies in Canada <i>Larkin PM, Bird SD, Gattinger M University of Ottawa</i></p>	<p>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.</p>
<p><b>2:00 PM M3-D.4</b> A portfolio decision analysis of emergency medicine buffer stocks <i>Montibeller G, Angelis A, Kanavos P Loughborough University</i></p>	<p><b>2:00 PM M3-E.3</b> A Method for Estimating the Benefits of Avoiding Toxicological Endpoints on the Pathway to Cancer that Non-experts Do Not Understand <i>Belzer RB Good Intentions Paving Co.</i></p>	<p><b>2:00 PM M3-F.3</b> What could we do that we are not doing yet regarding predictive microbiology and QMRA approaches to food safety? <i>Oscar T USDA, ARS</i></p>	<p><b>2:00 PM M3-G.3</b> Beyond Data Analytics - Communicating Risk Insights through Visualization. <i>Dyer RD Management School</i></p>	<p>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 toxics in the workplace.</p>
<p><b>2:15 PM M3-D.5</b> A framework for risk analysis and prognostics and health monitoring for complex engineering systems <i>Groth KM, Moradi R University of Maryland</i></p>	<p><b>2:15 PM M3-E.4</b> Two Market Failure Arguments in Pipeline Safety Regulations: Free Rider Problem in Public Goods or Externalities to Third Parties <i>Gungor AG U.S. Department of Transportation</i></p>	<p><b>2:15 PM M3-F.4</b> How Predictive Microbiology and Risk Assessments can be used more effectively <i>Zwietering M Wageningen University</i></p>	<p><b>2:30 PM M3-G.4</b> Adopting a risk informed approach to stakeholder selection and engagement for software requirements elicitation <i>Egbokhare FA, Aziken GO*, Ohohe O, Ariavie G University of Benin Nigeria</i></p>	<p>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.</p>
<p><b>Sponsored by:</b> <i>Engineering and Infrastructure Specialty Group</i></p>	<p><b>2:30 PM M3-E.5</b> The Environmental Burden of Disease project: Health risk ranking of hazards for decision-makers <i>Greco SL, Drudge C, Kim JH, Copes R Public Health Ontario</i></p>	<p><b>2:30 PM M3-F.5</b> The future of Predictive Microbiology and QMRA: Leveraging new data and technology <i>Van Doren JM U.S. Food and Drug Administration</i></p>	<p><b>Sponsored by:</b> <i>Applied Risk Management Specialty Group</i></p>	<p>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.</p>
<p><b>Sponsored by:</b> <i>Society for Benefit Cost Analysis and EBASG</i></p>	<p><b>Sponsored by:</b> <i>Microbial Risk Analysis Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Microbial Risk Analysis Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Occupational Health and Safety Specialty Group, and Risk and Development Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Occupational Health and Safety Specialty Group, and Risk and Development Specialty Group</i></p>

1:30 PM – 3:00 PM	1:30 PM – 3:00 PM	3:30 PM – 5:00 PM	3:30 PM – 5:00 PM	3:30 PM – 5:00 PM
<p align="center"><i>Salon 1</i></p> <p><b>M3-I Symposium: Global Disease Burden Caused by Foodborne Chemicals and Toxins</b> <i>Chair: Felicia Wu</i></p>	<p align="center"><i>Salon 2</i></p> <p><b>M3-J Poster Platform: Perspectives on Risk-based Decision Making</b> <i>Chair: TBD</i></p>	<p align="center"><i>Salon A</i></p> <p><b>M4-A Health Risk Perception and Communication</b> <i>Chair: Jacqueline Patterson</i></p>	<p align="center"><i>Salon B</i></p> <p><b>M4-B Students and Young Professionals Roundtable and Workshop</b> <i>Chair: Tom Logan</i></p>	<p align="center"><i>Salon C</i></p> <p><b>M4-C Symposium: Risk, Security, and Trust of Embedded Hardware in Cyber-Physical Systems</b> <i>Chair: Zachary Collier</i></p>
<p><b>1:30 PM</b> <b>M3-I.1</b> Global Burden of Foodborne Disease: Introduction and Methylmercury <i>Gibb HJ</i> <i>Gibb Epidemiology Consulting LLC</i></p>	<p><b>1:30 PM</b> <b>M3-J.1</b> Development of a combined vulnerability index supporting climate change adaptation in the Italian coastal area <i>Bonato M, Furlan E, Torresan S, Dalla Pozza P, Critto A, Michetti M, Marcomini A</i> <i>Ca' Foscari University Venice and Euro-Mediterranean Center on Climate Change</i></p>	<p><b>3:30 PM</b> <b>M4-A.1</b> Risk Communication with Pregnant Inuit Women in Arctic Canada <i>Boyd A, Furgal C, Pirkle C, Muckle G, Ricard S, Gauthier M, Beaulne C, Lemire M</i> <i>Washington State University</i></p>	<p>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.</p>	<p><b>3:30 PM</b> <b>M4-C.1</b> Advantages of the CHEST NSF IUCRC to Industry and the DoD <i>Emmert JM</i> <i>University of Cincinnati</i></p>
<p><b>1:45 PM</b> <b>M3-I.2</b> Aflatoxin in Corn and Nuts: Cancer and Immunological Effects <i>Wu F, Saha Turna N</i> <i>Michigan State University</i></p>	<p><b>1:30 PM</b> <b>M3-J.4</b> Risk Tradeoffs between Climate Change and Solar Radiation Management <i>Felgenhauer TN, Mallampalli V, Borsuk ME, Wiener JB</i> <i>Duke University</i></p>	<p><b>3:45 PM</b> <b>M4-A.2</b> Reports of social circles' and own vaccination behavior: A national longitudinal survey <i>Bruine de Bruin W, Parker AM, Galesic M, Vardavas R</i> <i>University of Leed, Carnegie Mellon University, RAND, Santa Fe Institute and Max Planck Institute</i></p>	<p>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?"</p>	<p><b>3:45 PM</b> <b>M4-C.2</b> Counterfeit Defect Coverage Analysis: Current Status and Future Directions <i>Guin U</i> <i>Auburn University</i></p>
<p><b>2:00 PM</b> <b>M3-I.3</b> Global estimates for the impact of lead from food on IQ and Disability Adjusted Life Years <i>Carrington CD, Devleeschauwer B, Gibb H, Bolger PM</i> <i>Spoiled Hike LLC</i></p>	<p><b>1:30 PM</b> <b>M3-J.5</b> Implementing a framework to evaluate the impact of food intake shifts on risk of illness using a case study with infant cereal <i>Santillana Farakos S, Pouillot R, Spungen J, Flannery B, Dolan L, Van Doren J</i> <i>U.S. Food and Drug Administration</i></p>	<p><b>4:00 PM</b> <b>M4-A.3</b> Pandemic Futures: Public Health and Infectious Disease - Lessons Learned from Zika. <i>Berube D</i> <i>North Carolina State University</i></p>	<p><b>Participants:</b></p> <ul style="list-style-type: none"> <li>• Sara Gray</li> <li>• Mariana Caines</li> <li>• Tim Williams</li> <li>• Ben Rachunok</li> <li>• Brennan Chapman</li> <li>• Tom Logan</li> </ul>	<p><b>4:00 PM</b> <b>M4-C.3</b> Inside Product Security Risk Management for Cyber-Physical Systems <i>Crowther KG</i> <i>General Electric</i></p>
<p><b>2:15 PM</b> <b>M3-I.4</b> Cassava Cyanide and Children's Cognitive Impairment <i>Chen C, Wu F</i> <i>Michigan State University</i></p>	<p><b>1:30 PM</b> <b>M3-J.6</b> Holistic judgments and protection intentions: an empirical test of a model of perceived risk <i>Walpole HD, Wilson RS</i> <i>The Ohio State University</i></p>	<p><b>4:15 PM</b> <b>M4-A.4</b> Intentions to seek information about the flu vaccine: The role of norms, anticipated and experienced affect, and information insufficiency among vaccinated and unvaccinated people <i>Lu H, Winneg KM, Jamieson KH, Albarracin D</i> <i>University of Pennsylvania</i></p>	<p><b>Sponsored by:</b> <i>Foundational Issues in Risk Analysis Specialty Group</i></p>	<p><b>4:15 PM</b> <b>M4-C.4</b> Overview of NRMCI's work on conducting a Supply Chain Analysis and Assessment <i>Covel C</i> <i>Cybersecurity and Infrastructure Security Agency</i></p>
<p><b>2:30 PM</b> <b>M3-I.5</b> Exposure-based estimation of the global burden of coronary heart disease from dietary arsenic <i>Barchowsky A, Oberoi S, Devleeschauwer B, Gibb HJ</i> <i>University of Pittsburgh</i></p>	<p><b>1:30 PM</b> <b>M3-J.7</b> A review of the literature on risk-based decision making <i>Crawford A, Morgan KM</i> <i>Ohio State University</i></p>	<p><b>4:30 PM</b> <b>M4-A.5</b> The influence of psychological distance on discrete emotions and risk perception in a measles outbreak <i>McAllister CA, Yang JZ</i> <i>University at Buffalo, SUNY</i></p>	<p><b>Sponsored by:</b> <i>Risk Communication Specialty Group</i></p>	<p><b>4:30 PM</b> <b>M4-C.5</b> Enterprise risk and resilience of investment in emerging technologies and embedded hardware systems <i>Andrews DJ</i> <i>University of Virginia</i></p>
<p><b>Sponsored by:</b> <i>Exposure Assessment Specialty Group</i></p>				<p><b>Sponsored by:</b> <i>Security and Defense Specialty Group</i></p>



3:30 PM – 5:00 PM	3:30 PM – 5:00 PM	3:30 PM – 5:00 PM	3:30 PM – 5:00 PM	3:30 PM – 5:00 PM
<p><i>Salons DE</i></p> <p><b>M4-D Symposium: Engineering and Infrastructure Solutions for Natural Hazards Risk Management</b> <i>Chair: David Johnson</i></p>	<p><i>Salons FG</i></p> <p><b>M4-E Benefit Cost Analysis: Theory and Application</b> <i>Chair: Chris Dockins</i></p>	<p><i>Salon H</i></p> <p><b>M4-F Epistemic Issues Around Risk and Resilience</b> <i>Chair: Henry Willis</i></p>	<p><i>Salon J</i></p> <p><b>M4-G From Analysis to Management: Natural Hazards &amp; Petroleum</b> <i>Chair: Kelsey Hollenback</i></p>	<p><i>Salon K</i></p> <p><b>M4-H Symposium: Risk Analysis of Engineered Nanomaterials: Where Have We Been, Lessons Learned, and Transfer of Knowledge to Other Emerging Technologies</b> <i>Chair: Khara Grieger</i></p>
<p><b>3:30 PM</b> <b>M4-D.1</b> Temporary Housing after Natural Disasters: Maximizing Community Resilience While Minimizing Financial Risk <i>Perrucci DV, Baroud H Vanderbilt University</i></p>	<p><b>3:30 PM</b> <b>M4-E.1</b> The value of reducing mortality risk: benefit-cost analysis, social welfare functions, and fair innings <i>Adler MD, Ferranna M, Hammitt JK*, Treich N Harvard University and Toulouse School of Economics</i></p>	<p><b>3:30 PM</b> <b>M4-F.1</b> Resilience: What's it worth to you? <i>Willis HH RAND Corporation</i></p>	<p><b>3:30 PM</b> <b>M4-G.1</b> Perception during crises. Seeing the forest, but not the trees. <i>Aarset M, Juvkam PC NTNU Norwegian University of Science and Technology</i></p>	<p><b>3:30 PM</b> <b>M4-H.1</b> Application of a DoD Nanomaterial Risk Assessment Framework to Evaluate the Health and Environmental Impacts of Additive Manufacturing Technologies <i>Ede JD, Shatkin JA Vireo Advisors</i></p>
<p><b>3:45 PM</b> <b>M4-D.2</b> Resilient Production Cost Modeling: Can our Electric Grid Better Weather the Storm? <i>Staid A, Knueven B, Castillo A, Watson JP Sandia National Labs</i></p>	<p><b>3:45 PM</b> <b>M4-E.3</b> Benefit cost ratio of vaccination to control paratuberculosis in Canadian dairy cattle <i>Hall DC, Rasmussen P University of Calgary</i></p>	<p><b>3:45 PM</b> <b>M4-F.2</b> Resilience of Small Teams – Theory, Methods, and Applications <i>Galaitsi SE, Trump BD, Wells EM, Linkov I US Army Corps of Engineers, Risk and Decision Science</i></p>	<p><b>3:45 PM</b> <b>M4-G.2</b> Preparedness for natural hazards on coastal communities of Chile and its main predictors <i>Cisternas PC, Cifuentes LA, Bronfman NC, Repetto PB Pontifical Catholic University of Chile</i></p>	<p><b>3:45 PM</b> <b>M4-H.2</b> Transferring Knowledge from the Field of Nanomaterial Risk Analysis for Other Emerging Technologies <i>Grieger KD North Carolina State University</i></p>
<p><b>4:00 PM</b> <b>M4-D.3</b> Improving emergency management services in coastal communities prone to repetitive flooding <i>Y. Jasour Z, Reilly A University of Maryland College Park</i></p>	<p><b>4:00 PM</b> <b>M4-E.4</b> Benefit-Cost Problem Formulation - The Case of Cell-Based Meat <i>Williams RA Author</i></p>	<p><b>4:00 PM</b> <b>M4-F.3</b> Regulatory Responses to Resilience in UK Financial Services <i>Hall IS University of Northampton</i></p>	<p><b>4:00 PM</b> <b>M4-G.3</b> Risk assessment of an underground pipeline carrying methane crossing vertically the Magdalena River <i>Alarcón M, Torres ES, Munoz-Giraldo F Universidad de los Andes</i></p>	<p><b>4:00 PM</b> <b>M4-H.3</b> Risk Assessment and Governance of Synthetic Biology - Lessons Learned From Emerging Technology Scholarship <i>Trump BD, Linkov I US Army Corps of Engineers</i></p>
<p><b>4:15 PM</b> <b>M4-D.4</b> Flood risk reduction benefits of coastal restoration and green infrastructure projects <i>Johnson DR Purdue University</i></p>	<p><b>4:15 PM</b> <b>M4-E.5</b> Public Judgments about National-Level Tradeoffs between Life-Prolonging Regulatory Benefits and Their Costs <i>Johnson BB, Finkel AM Decision Research, University of Michigan</i></p>	<p><b>4:15 PM</b> <b>M4-F.4</b> Understanding personal concern for climate change related extreme events in the context of geographic risks and community resilience <i>Shao W, Gardezi M University of Alabama and South Dakota State University</i></p>	<p><b>Sponsored by:</b> <i>Applied Risk Management Specialty Group</i></p>	<p><b>4:15 PM</b> <b>M4-H.4</b> Exposure and Risk Assessment Approaches for Emerging Consumer Technologies and Materials <i>Thomas T US Consumer Product Safety Commission</i></p>
<p><b>4:30 PM</b> <b>M4-D.5</b> Regarding Enhanced Residential Construction and Community Resiliency Subject to Extreme Events <i>Lester HD University of South Alabama</i></p>	<p><b>Sponsored by:</b> <i>Society for Benefit Cost Analysis and EBASG</i></p>	<p><b>4:30 PM</b> <b>M4-F.5</b> AI and Indicator-based Assessment of Societal &amp; Social Acceptability of Aystemic Impacts Caused by Multi-hazard Threats to Critical Infrastructures <i>Jovanovic AS Steinbeis R-Tech / EU-VRI</i></p>	<p><b>Sponsored by:</b> <i>Applied Risk Management Specialty Group</i></p>	<p><b>4:30 PM</b> <b>M4-H.5</b> Nano/Synbio Techno Revolutions: Different names, same missed opportunities for risk governance? <i>Kuiken T North Carolina State University</i></p>
<p><b>Sponsored by:</b> <i>Engineering and Infrastructure Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Resilience Analysis Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Resilience Analysis Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Applied Risk Management Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Advanced Materials and Technologies Specialty Group</i></p>

3:30 PM – 5:00 PM

Salon 2

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

Chair: Patrick Gurian

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|---|--|
| <p><b>3:30 PM</b><br/>Water quality simulation to inform design of a disinfectant-free floating pool in New York City<br/><i>Dale AL, Lemay JC, Lynch HN, Bowers TS</i><br/><i>Gradient Corporation</i></p> <p><b>3:30 PM</b><br/>Challenges in estimating health risks of simultaneous exposures of pathogens, antibiotics and antibiotics-resistant genes during water reuse: A case study of Delhi, India<br/><i>Tyagi N, Jain H, Lila K, Gurian PL, Munir M, Kumar A</i><br/><i>Indian Institute of Technology Delhi</i></p> <p><b>3:30 PM</b><br/>Quantitative Microbial Risk Assessment for Microbiological Specification Setting for <i>Listeria monocytogenes</i> Contamination in Wastewater Reuse in Pasteurized Fluid Milk Processing<br/><i>Dogan OB, Meneses YE, Flores RA, Wang B</i><br/><i>University of Nebraska-Lincoln, New Mexico State University</i></p> <p><b>3:30 PM</b><br/>Understanding challenges in conducting QMRA of pathogen exposure from Yamuna river water using sensor based data<br/><i>Tyagi N, Kumar A, Jha S, Perumal V, Rose JB, Mulchandani A</i><br/><i>Indian Institute of Technology Delhi</i></p> | <p><b>M4-J.1</b></p> <p><b>3:30 PM</b><br/>Inferring hidden exposure parameters based on dose–response information for <i>Naegleria Fowleri</i><br/><i>Rasheduzzaman M, Bartrand T, Haas CN, Singh R, Gurian PL</i><br/><i>Drexel University, ESPRI</i></p> <p><b>M4-J.2</b></p> <p><b>3:30 PM</b><br/>Identifying public health risk factors associated with water use and water quality in a green home<br/><i>Julien R, Mitchell J*</i><br/><i>Michigan State University</i></p> <p><b>M4-J.3</b></p> <p><b>3:30 PM</b><br/>A quantitative model for evaluating risk trade-offs in Legionnaires' Disease risk, energy cost, and scalding risk for hot water systems<br/><i>Heida AJ, Mraz A, Weir M, Hamilton KA</i><br/><i>Arizona State University</i></p> <p><b>M4-J.4</b></p> <p><b>3:30 PM</b><br/>Development of a Microcystin Drinking Water Risk Model Using an Adaptation of the QMRA Framework<br/><i>Weir MH, Wood T</i><br/><i>The Ohio State University</i></p> <p><b>M4-J.5</b></p> <p><b>3:30 PM</b><br/>M4-J.6</p> <p><b>M4-J.7</b></p> <p><b>M4-J.8</b></p> <p><b>M4-J.9</b></p> |
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**Sponsored by:***Microbial Risk Analysis Specialty Group*

## 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, Haase 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

*Toyohiko 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

*Huang Y, Forshee RA, Keire D, Lee S, Gregori L, Asher DM, Bett C, Niland B, Brubaker SA, Anderson SA, Yang H  
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, Reichle 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.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, Kanney 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, Fanaselle W  
Food and Drug Administration, University of Maryland*

**P.24**

Assessing ISA Tree Risk Assessment Approach Using Econometrics Analysis

*Kabir E, Guikema SD, Koeser A, Martinez J, Hyun Kim J  
University of Michigan, University of Florida*

**P.26**

Mitigating the Limits of Expert Judgement through Alternative Tools and Methods

*Marinelli J  
Global Risk Intel*

**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**

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, Rak A, Scanlon KA, Underwood P, Graham MR  
Noblis, Inc., IPC - Association Connecting Electronics Industries®, Department of Defense*

**P.29**

Identifying Knowledge Gaps in Building Water Quality Management: Experts' Perspective and Review of Existing Guidance Documents

*Singh R, Rasheduzzaman 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  
*Bottigliengo D, Gallo E, Lanera C, Lorenzoni G, Hocagli H, Zagolin L, Marson G, Berchiolla P, Baldi I, Gregori D*  
*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  
*Ameh T, Sharp B, Varzeas T, Sayes C, Braswell E*  
*Baylor University, USDA APHIS PPQ CPHST*

**Applied Risk Management**

**P.32**  
 Assessing Bias in Disease Incidence Rates for Repeat Blood Donors in the United States: A Simulation-based Approach  
*Belov A, Yang H, Williams AE, Berger JJ, Custer B, Stramer SL, Dodd RY, Notari E, Steele WR, Anderson SA, Forshee RA*  
*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.  
*Cakmak S, Hebborn 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, Badding M, Barraj L, Williams A, Scrafford C*  
*Exponent*

**P.37**  
 Updates to a concentration-response function for lead and cardiovascular mortality  
*Lynch MTK, Brown L*  
*Abt Associates*

**P.38**  
 Incidence estimates of varicella zoster: a machine learning approach for routinely collected ambulatory records  
*Lanera C, Berchiolla P, Baldi I, Lorenzoni G, Tramontan L, Scamarcia A, Cantarutti L, Giaquinto C, Gregori D*  
*University Of Padova and University of Torino and Società Servizi Telematici Pedianet*

**P.39**  
 Not all components are equal: which haloacetic acids drive the toxicity of haloacetic acid mixtures?  
*Simmons JE, Triplett CA, Plewa MJ, Wagner ED, Aume 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*  
*ToxStrategies, Inc.*

**P.41**  
 Development of a Data Simulation Method to Optimize A Mechanistic Dose-Response Model for Viral Loads of Hepatitis-A  
*Weir MH*  
*The Ohio State University*

**Engineering and Infrastructure**

**P.42**  
 Risk analysis of PFAS contamination in private water wells: a Bayesian network model  
*Roostaei J, Mulhern R, MacDonald Gibson J*  
*University of North Carolina, Chapel Hill*

**Engineering Infrastructure Specialty Group**

**P.43**  
 A network-of-networks approach for cyber-based contingency analysis of interdependent infrastructure networks under uncertainty  
*Chatterjee S, Ganguly A, Sathanur A, Halappanavar M, Bhatia U, Subasi O, Clark K, Gao J, Brigantic R*  
*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  
*Pennetti C*  
*University of Virginia*

**P.45**  
 The link between expertise and risk in context: A Fuzzy Trace Theory Approach to NASA's Engineering Decisions  
*Marti 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 SU, 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  
*Gallo E, Folino F, Bottigliengo D, Lanera C, Gregori D, Zagolin L, Marson G, Iliceto S*  
*University of Padova*

**P.55**  
 Estimating acute and chronic exposure of children and adults to Carbendazim in fruits and vegetables in China  
*Li J, Wang W\*, Wang YH, Wang XQ, Yang GL*  
*Zhejiang Acedemy of Agricultural Sciences*

**P.56**

Risk assessment of chronic exposure to organophosphorus pesticides in fruits and vegetables between Taiwan and United State

*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

*Bottigliengo D, Gallo E, Lanera C, Lorenzoni G, Hocagli H, Zagolin L, Marson G, Berchiolla P, Baldi I, Gregori D  
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 lifestages

*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, Olympio 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  
Ramboll*

**P.66**

Use of Machine Learning techniques for case-detection of Varicella Zoster using routinely collected textual ambulatory records

*Lanera C, Berchiolla P, Baldi I, Lorenzoni G, Tramontan L, Scamarcia A, Cantarutti L, Giaquinto C, Gregori D  
University of Padova, University of Torino and Società Servizi Telematici Pedianet*

**P.67**

Application of Bayesian networks to access hurricane risks to households

*Abuabara A, Medina-Cetina Z, Peacock KW  
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

*Zhou Z, Shao K, Kang Y, Li H, Cao S, Xu J, Duan X  
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, Kawamoto 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*

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Glyphosate and Cancer: Risk Analysis of the Data in the Times of Controversy

*Korchevskiy A  
Chemistry & Industrial Hygiene, Inc.*

**Resilience Analysis**

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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, Nakakubo T, Tokai A  
Osaka University*

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Estimating Readiness Transition Junction for Built Environment System Disaster Recovery

*Lester HD  
University of South Alabama*

**Risk and Development**

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Influencing Factors of Street-level Bureaucrats' Decision-making in Risk Events with Small Probability

*Shuang N, Bo F, Chuanshen Q  
Shanghai Jiao Tong University*

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Review of environmental impacts of plastic ban and risks hindering plastic recycling in Japan

*Suresh PP, Maeda Y  
Shizuoka University*

**Risk Communication**

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Making of a risk communication picture book

*Oiso S  
Institute of Nuclear Safety System, Incorporated*

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Comparison of risk perception among 13 physical risk factors in Japan

*Ohkubo C  
The Japan EMF Information Center*

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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*

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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.*

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Effects of e-cigarette health warnings and advertisements on risk perception, quitting intention and purchasing intention

*Chen Y  
Sam Houston State University*

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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*



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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*
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*Herovic E, Bensi M, Solano C, Patterson E, Newmier S*  
*University of Maryland*
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*Lindell MK, Bostrom A, Goltz J, Prater C*  
*University of Washington*
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*Fan SW, Xu JH*  
*Central University of Finance and Economics, Peking University*
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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*
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*Liu Z, Yang JZ*  
*State University of New York, Buffalo*
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*Qian S*  
*University of Utah*
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*Henry HGW, St Clair AE, Haegeli P, Gregory R, Klassen K*  
*Simon Fraser University, ChoiceWorks Ltd. Avalanche Canada*
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How do we integrate scientific evidences and victims' viewpoints: Case of asbestos contamination in a nursery school  
*Murayama TM*  
*Tokyo Institute of Technology*
- P.95**  
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*Liu S, Yang JZ*  
*University at Buffalo, SUNY*
- P.96**  
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*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*
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*Lundgren ML*  
*Mid Sweden University*
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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*
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Air Pollution - Invisible threat  
*Williams B*  
*King's College London*
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Out of sight, out of mind: towards a strategic approach to ocean health communication  
*Balog-Way DHP, McComas K, Harvell D*  
*Cornell University*
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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, Esmaili B*  
*George Mason University*
- P.105**  
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*Kim SC, Malterud A, Olugbemi A, Esmaili B*  
*George Mason University*
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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**  
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*Cohen AA*  
*Duke University*
- P.110**  
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*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  
*Tallapragada M, Hardy BW, Lybrand E, Hallman WK*  
*Temple University*
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*Jung JW, Kim UJ, Yu WJ, Park JW, Jeong EJ\**  
*Korea Institute of Toxicology*
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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*
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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.116**  
Factors modifying children's inhalation risk assessment  
*Saadeh RA, Klaunig JE*  
*Jordan University of Science and Technology, Indiana University*
- P.117**  
Assessing and Mitigating the Biological Risk from Space Return Missions  
*Locke J, Lal B*  
*IDA Science and Technology Policy Institute*



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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, Kurimoto M,*

*Yamamoto 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*

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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*

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Environmental monitoring and application of a chemical fate prediction model for risk assessment of human pharmaceuticals in Japanese river water

*Kobayashi N, Tsuchiya Y, Tabata M,*

*Komatsubara Y, Eriguchi T, Ikarashi Y*

*National Institute of Health Sciences*

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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,*

*Manson 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*

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Disaster Risk Analysis of Cellular Coverage

*Feeny N, Guikema S, White A*

*University of Michigan*

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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

*Ganin AA, Kurth MH, Kitsak M, Kozlowski*

*W, Leung B, Linkov I*

*University of Virginia, U.S. Army Engineer*

*Research and Development Center,*

*Northeastern University, Regional*

*Economic Models Inc.*

10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM
<p><i>Salon A</i></p>	<p><i>Salon B</i></p>	<p><i>Salon C</i></p>	<p><i>Salons DE</i></p>	<p><i>Salons FG</i></p>
<p><b>T2-A Energy Perceptions and Narratives</b> <i>Chair: Nick Pidgeon</i></p>	<p><b>T2-B Symposium: Systemic Risks, Uncertainty, and Governance</b> <i>Chair: Pia-Johanna Schweizer</i></p>	<p><b>T2-C Symposium: Applying the Key Characteristics Approach for Hazard Identification and Risk Assessment of Chemical Induced Cancer and Non-Cancer Effects</b> <i>Chair: Xabier Arzuaga</i></p>	<p><b>T2-D Symposium: Improving Infrastructure Operability After Disasters Through Better Quantification of Uncertainty</b> <i>Chair: Allison Reilly</i></p>	<p><b>T2-E Symposium: Risk Assessment, Economic Evaluation, and Decisions, Part 2</b> <i>Chair: James K. Hammitt</i></p>
<p><b>10:30 AM T2-A.1</b> Narratives and Discourse Networks: Understanding Elite Construction of Risk and Benefit Attributes About Nuclear Energy <i>Jenkins-Smith H, Silva C, Ripberger J, Gupta K, Fox A*</i> <i>University of Oklahoma</i></p>	<p><b>10:30 AM T2-B.1</b> Modeling risk and decision-making in an information-rich social environment: the CHIME project <i>Barton CM, Demuth J, Morss RE, Bergin SM</i> <i>Arizona State University</i></p>	<p><b>10:30 AM T2-C.1</b> Examples of using key characteristics of carcinogens in cancer hazard identification by National Toxicology Program <i>Wang A</i> <i>National Institute of Environmental Health Sciences (NIEHS)</i></p>	<p><b>10:30 AM T2-D.1</b> Leveraging co-benefits from interdependent infrastructure on DOD installations to improve post-disaster operational readiness <i>Magoulick PF, Reilly AC</i> <i>University of Maryland</i></p>	<p><b>10:30 AM T2-E.1</b> Cross Validation and the Random Expert Hypothesis; validating expert judgment <i>Cooke RM, Marti HD, Mazzuchi TA</i> <i>Resources for the Future, TU Delft</i></p>
<p><b>10:50 AM T2-A.2</b> The role of fairness in early characterization of new technologies: Effects on risk beliefs and selective exposure <i>Song H, Lu H, McComas KA</i> <i>Purdue University, Annenberg Public Policy Center, Cornell University</i></p>	<p><b>10:50 AM T2-B.2</b> Making sense of science for policy making: What does the SAPEA report mean for risk analysis <i>Renn O</i> <i>Institute for Advanced Sustainability Studies (IASS)</i></p>	<p><b>10:50 AM T2-C.2</b> A key characteristics approach to organizing and assessing upstream toxicity information <i>Zeise L, Sandy MS, Elmore S, LaMerrill MA, Smith MT</i> <i>CalEPA Office of Environmental Health Hazard Assessment, University of California Berkeley, University of California David</i></p>	<p><b>10:50 AM T2-D.2</b> Modeling Uncertain and Dynamic Interdependencies of Infrastructure Systems Using Stochastic Block Models <i>Yu JZ, Baroud H</i> <i>Vanderbilt University</i></p>	<p><b>10:50 AM T2-E.2</b> Developing Estimates of the Social Costs of Air Pollutants and Their Uncertainty Using Reduced Complexity Models <i>Gilmore EA, Heo J, Muller N, Tessum C, Hill J, Marshall J, Adams P</i> <i>Clark University</i></p>
<p><b>11:10 AM T2-A.3</b> 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 <i>Pidgeon NF, Henwood KL, Groves C, Cherry C, Thomas G, Roberts E</i> <i>Cardiff University</i></p>	<p><b>11:10 AM T2-B.3</b> Layers of probability. Applications and theoretical problems <i>Sahlin NE</i> <i>Lund University</i></p>	<p><b>11:10 AM T2-C.3</b> Demonstrations of The Utility, Feasibility, and Challenges Using the Key Characteristics in Systematic Assessments of Carcinogenicity <i>Chappell GA, Borghoff SJ, Wikoff DS</i> <i>ToxStrategies, Inc.</i></p>	<p><b>11:10 AM T2-D.3</b> Risk assessment of ship allision in extreme fjord crossings - A systematic review. <i>Askeland T, Dorum C, Johansen IL, Randrup-Thomsen S, Terndrup Pedersen P, Eidem M</i> <i>Norwegian Public Roads Administration</i></p>	<p><b>11:10 AM T2-E.3</b> Potential Influences of Income and Food Price Trends on Global Patterns of Foodborne Disease <i>Hoffmann SA, Muhammad A, Meade B</i> <i>USDA Economic Research Service</i></p>
<p><b>11:30 AM T2-A.4</b> Understanding risk perception and trust in risk communication from a Social Identity Approach <i>Elgueta HE</i> <i>Universidad de Magallanes</i></p>	<p><b>11:30 AM T2-B.4</b> Governance of systemic risks <i>Schweizer PJ</i> <i>Institute for Advanced Sustainability Studies Potsdam</i></p> <p><b>Sponsored by:</b> <i>Foundational Issues in Risk Analysis Specialty Group</i></p>	<p><b>11:30 AM T2-C.4</b> Evaluation of the Mechanistic and Toxicological Evidence on Benzo[a] Pyrene-Induced Male Reproductive Effects Using the Key Characteristics Approach <i>Arzuaga X, Newhouse K, Yost E, Gibbons C, Beverly B, Congleton J</i> <i>US Environmental Protection Agency</i></p>	<p><b>11:30 AM T2-D.4</b> Sources of uncertainty in interdependent infrastructure and their implications <i>Reilly A, Baroud H, Flage R</i> <i>University of Maryland</i></p>	<p><b>11:30 AM T2-E.4</b> Co-Benefits, Countervailing Risks, and Cost-Benefit Analysis <i>Wiener JB, Graham JD</i> <i>Duke University, Indiana University</i></p>
<p><b>Sponsored by:</b> <i>Risk Communication Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Engineering and Infrastructure Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Dose Response Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Society for Benefit-Cost Analysis, and Economics and Benefits Analysis Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Society for Benefit-Cost Analysis, and Economics and Benefits Analysis Specialty Group</i></p>

10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM
<p align="center"><i>Salon H</i></p> <p align="center"><b>T2-F Symposium: Advances in Antibiotic Resistance Risk Assessment</b> <i>Chair: Jade Michelle</i></p>	<p align="center"><i>Salon J</i></p> <p align="center"><b>T2-G Cattle to Kids: Applied Risk Analysis</b> <i>Chair: Julia Coxen</i></p>	<p align="center"><i>Salon K</i></p> <p align="center"><b>T2-H Symposium: Risk Assessment and Communication Approaches for Emerging Products and Materials</b> <i>Chair: Treye Thomas</i></p>	<p align="center"><i>Salon 1</i></p> <p align="center"><b>T2-I Data-Driven Decision-Making: Implications for Policy and the Law</b> <i>Chair: Sweta Chakraborty</i></p>	<p align="center"><i>Salon 2</i></p> <p align="center"><b>T2-J Ecological Risk, Resilience, and Adaptive Management in a Changing World</b> <i>Chair: Amanda Bailey</i></p>
<p><b>10:30 AM</b> <b>T2-F.1</b> Approaches to Address Spread and Risk Characterization for Antibiotic Resistance <i>Chabrelie A, Mitchell J*</i> <i>Michigan State University</i></p>	<p><b>10:30 AM</b> <b>T2-G.1</b> Disease spread risk assessment of the German cattle trade network: static and temporal network analysis <i>Bassett J, Koher A, Steinbach I, Hoevel P, Valdano E, Darbon A, Poletto C, Colizza V, Lentz HHK</i> <i>TU Berlin</i></p>	<p><b>10:30 AM</b> <b>T2-H.2</b> Responsible Innovation of Nanotechnology in Food and Agriculture Sectors <i>Grieger K, Kuzma J</i> <i>North Carolina State University</i></p>	<p><b>10:30 AM</b> <b>T2-I.2</b> Data science 'for good'? Intelligence-led policing <i>Schweizer VJ</i> <i>University of Waterloo</i></p>	<p><b>10:30 AM</b> <b>T2-J.1</b> Community as an equal partner for region-based climate change vulnerability, risk, and resilience assessments <i>Cains M, Henshel D</i> <i>Indiana University</i></p>
<p><b>10:50 AM</b> <b>T2-F.2</b> A systematic review and meta-analysis of antimicrobial resistance in the water and wastewater environments: Key research needs for risk assessment <i>Hamilton KA, Joshi SM, Garner E, Ashbolt N, Pruden A</i> <i>Arizona State University</i></p>	<p><b>10:50 AM</b> <b>T2-G.2</b> Recommendations for (medical) guidelines' setting process (meta-guidelines) <i>Eisinger F</i> <i>Aix-Marseille Univ, Inserm, Institut Paoli-Calmettes</i></p>	<p><b>10:50 AM</b> <b>T2-H.3</b> Responsible innovation for biofriendly plastics <i>Negri C, MacDonell M, Bower B, Picel K, Pozan T, Rose C, Tapia A, Nutter G, Williams S, Davis T</i> <i>Argonne National Laboratory</i></p>	<p><b>10:50 AM</b> <b>T2-I.3</b> FRCaSTing chemical risks: developing and implementing new national priorities to review existing chemicals <i>Bailey L, Allen M, Carter C, Holmes G</i> <i>Environmental Protection Authority te Mana Rauhi Taiao</i></p>	<p><b>10:50 AM</b> <b>T2-J.2</b> Ecological Risk Assessment as the planning tool for Adaptive Management and Sustainability Planning <i>Landis WG</i> <i>Western Washington University</i></p>
<p><b>11:10 AM</b> <b>T2-F.3</b> Metagenomic Approaches to Advancing Relative Resistome Risk Assessment <i>Pruden A, Oh M, Garner ED, Zhang L</i> <i>Virginia Tech</i></p>	<p><b>11:10 AM</b> <b>T2-G.3</b> The SusySafe Enhanced Model for Assessing Choking Risk in Children: an update after one year of implementation <i>Gregori D, Lorenzoni G, French M, Berchiolla P</i> <i>University of Padova, Italy</i></p>	<p><b>Sponsored by:</b> <i>Advanced Materials and Technologies Specialty Group</i></p>	<p><b>11:10 AM</b> <b>T2-I.4</b> Environmental Governance of the High Plains Aquifer: What irrigation policy looks like on, or below, the ground <i>Zwickle A, Feltman B</i> <i>Michigan State University</i></p>	<p><b>11:10 AM</b> <b>T2-J.3</b> Addressing the need for the quantitative risk assessment of gene drives <i>Eikenbary SR, Brown EA, Landis WG</i> <i>Western Washington University</i></p>
<p><b>11:30 AM</b> <b>T2-F.4</b> Spatial and temporal dispersion of antibiotic resistance genes through bioaerosol emissions from municipal sewage <i>Seong D, Al Saif A, Norman RS, Hoque S*</i> <i>University of South Carolina</i></p>	<p><b>11:30 AM</b> <b>T2-G.4</b> Adopting a Cumulative Risk Assessment Perspective to Support Decision-Making in the Work Environment <i>Williams PRD, Rossner A, Clougherty J, Rice G, Niemeier RT</i> <i>E Risk Sciences, LLP, Clarkson University, Drexel University, U.S. EPA, CDC/NIOSH</i></p>	<p><b>Sponsored by:</b> <i>Risk, Policy &amp; Law Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Risk, Policy &amp; Law Specialty Group</i></p>	<p><b>11:30 AM</b> <b>T2-J.4</b> Combined toxic effects of beta-cypermethrin and thiacloprid on zebrafish (<i>Danio rerio</i>) <i>Wang YH, Li XF, Wang XQ*, Wang Q, Yang GL</i> <i>Zhejiang Academy of Agricultural Sciences</i></p>
<p><b>Sponsored by:</b> <i>Microbial Risk Analysis Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Applied Risk Management Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Risk, Policy &amp; Law Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Risk, Policy &amp; Law Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Ecological Risk Assessment Specialty Group</i></p>

1:30 PM – 3:00 PM

Salon A

**T3-A Natural Hazard Perception and Communication**

Chair: Steve Ackerlund

**1:30 PM T3-A.1**  
Probability vs. consequences in public perceptions of tornado risk  
*Allan JN, Ripberger JT, Ramasubramanian M, Krocak MJ, Cho J, Cokely ET, Silva CL, Jenkins-Smith HC University of Oklahoma*

**1:45 PM 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 JL, Smith D, Vickery J, Lazrus H, Henderson J, Morss R, Ash K National Center for Atmospheric Research*

**2:00 PM T3-A.4**  
Community-level climate risk perceptions: linking social capital, self-efficacy and the intention to act  
*Jensen O National University of Singapore*

**2:15 PM T3-A.5**  
Communicating risk for a safer society- A survey of risk information disclosure regarding potential Natech accidents in Japan  
*Lin L, Cruz A Kyoto University*

**Sponsored by:**  
*Risk Communication Specialty Group*

1:30 PM – 3:00 PM

Salon B

**T3-B Roundtable: How Can We Bridge the Gap Between Safety Culture Research and Risk Science?**

Chair: Marja Ylonen

The safety culture concept is widely acknowledged and used in high-risk and safety critical industries. However, risk analysts and scientists rarely discuss the safety culture concept. Conversely, safety culture experts seldom relate the concept to risk, risk assessment and management. But is not a good safety culture dependent on having the “right” shared safety norms, beliefs, values and practices, founded on the “best” principles and knowledge, including those of risk analysis and management? And is not the risk experts reliant on insights on organisational issues to adequately assess and manage risk? Why then this separation between these fields? This roundtable discusses these issues. The main aims are to increase our understanding of what creates this separation, and discuss what we can do to improve the current situation.

- Panelists:**
- Kathleen Sutcliffe (USA)
  - Nick Pidgeon (UK)
  - Sonja Haber (USA)

**Sponsored by:**  
*Foundational Issues in Risk Analysis Specialty Group*

1:30 PM – 3:00 PM

Salon C

**T3-C Symposium: Cyber Risk as an Experimental Discipline**

Chair: Fabio Massacci

**1:30 PM T3-C.1**  
Iterative learning for dynamic cyber-system vulnerability analysis  
*Chatterjee S, Thekdi S Pacific Northwest National Laboratory and University of Richmond-Virginia*

**1:45 PM T3-C.2**  
Estimating cyber risk from experiments with cyber ranges and CTFs  
*Di Tizio G, Massacci F University of Trento*

**2:00 PM T3-C.3**  
Improving Decision-Support for Cybersecurity and Other Information-Poor Risk Management Environments  
*Evenhaugen ST, Stevens SI\* Cybersecurity and Infrastructure Security Agency*

**2:15 PM T3-C.4**  
Cyber risk and resilience: challenges and opportunities  
*Linkov I US Army Engineer Research and Development Center*

**2:30 PM T3-C.5**  
The Work-Averse Cyber Attacker Model: Theory and Evidence From Two Million Attack Signatures  
*Allodi L, Massacci F\*, Williams JM University of Trento*

**Sponsored by:**  
*Security and Defense Specialty Group*

1:30 PM – 3:00 PM

Salons DE

**T3-D Symposium: Social Media, Big Data, Risk Analysis, and Disasters**

Chair: Benjamin Rachunok

**1:30 PM T3-D.1**  
Urban disruption propagation through the lenses of public alerts and social media information  
*Garcia Tapia AGT, Ramirez Marquez JRM Stevens Institute of Technology*

**1:45 PM T3-D.2**  
Understanding population recovery patterns after disasters from mobile phone data  
*Yabe T, Tsubouchi K, Fujiwara N, Sekimoto Y, Ukkusuri SV Purdue University*

**2:00 PM T3-D.3**  
Methods for using Twitter to understand community resilience  
*Rachunok BA, Bennett JB, Nateghi R Purdue University*

**2:15 PM T3-D.4**  
An agent-based model of subsidized flooding insurance  
*Washington VN, Guikema SD, Tonn GL, Mondisa JL University of Michigan, Delaware Department of Natural Resources and Environmental Control*

**2:30 PM T3-D.5**  
A data-driven framework for user, provider, and community behavior toward infrastructure services risks  
*Zimmerman R New York University*

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

1:30 PM – 3:00 PM

Salons FG

**T3-E Economic Analysis of Extreme or Rare Events**

Chair: Ali Gungor

**1:30 PM T3-E.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*

**1:45 PM T3-E.2**  
A Dynamic Model of Cybersecurity Investment  
*Krutilla K, Alexeev A, Jardine E, Good D School of Public and Environmental Affairs, Indiana University*

**2:00 PM T3-E.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*

**2:15 PM T3-E.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*

**Sponsored by:**  
*Society for Benefit Cost Analysis and EBASG*

1:30 PM – 3:00 PM

Salon H

**T3-F Roundtable: Food safety – An Integrated Approach to Risk for Resilient and Sustainable Management**

Chair: Myriam Merad

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:

1. Food safety in France and Europe: Strengths, weaknesses, prospects
2. General presentation of the Pralim working group (Anses)
3. Discussion around the microbiological part
4. Societal aspect

**The panelists:**

- Moez Sanaaa (ANSES)
- Frédérique Audiat-Perrin (ANSES)
- Jean-Christophe Augustin (Expert)
- Myriam Merad (CNRS)

**Sponsored by:**

Resilience Analysis Specialty Group

1:30 PM – 3:00 PM

Salon J

**T3-G Symposium: Disasters, Governance, Conflict, and Risk**

Chair: Elisabeth Gilmore

**1:30 PM T3-G.1**

Natural disasters, armed conflict and institutions

Tennant E, Gilmore EA  
Clark University

**1:45 PM T3-G.2**

Supply Chain Resilience in the Context of Natural Disasters

Kurth MK, Linkov I  
Risk and Decision Science Team, US Army Research and Development Center

**2:00 PM T3-G.3**

Quantification of a game-theoretic model of pre-disaster relocation for two U.S. coastal cities

Zhou Y, Bier VM, Hecht J  
University of Wisconsin-Madison, University of Vermont

**2:15 PM T3-G.4**

Strategic entry points for implementation of renewables to improve sustainability and peace outcomes

Michener SR, Olson MS  
Drexel University

**2:30 PM T3-G.5**

Stress Testing for Electric Grid Resilience

DeMenno MB, Broderick RJ, Jeffers RF, Jones KA  
Bosque Advisors

**Sponsored by:**

Resilience Analysis Specialty Group, and Risk and Development Specialty Group

1:30 PM – 3:00 PM

Salon K

**T3-H Symposium: Decision Making in Managing Risk: The Prickly and Paradoxical Hard Part**

Chair: Charles Redinger

**1:30 PM T3-H.1**

Influencing the C-Suite and Board of Directors

Barbi GJ  
Becton Dickenson, Emeritus

**1:45 PM T3-H.2**

The human and the system in Organizational Decision Making

O'Reilly MV, Barbi G, Boelter FW, Redinger CF  
State University of New York (SUNY) School of Public Health

**2:00 PM T3-H.3**

Latent Dirichlet Allocation and the Evolving Language of Risk

Redinger CF  
Institute for Advanced Risk Management

**2:15 PM T3-H.4**

Total health and navigating the risk decision triangle

Redinger CF, Barbi G, O'Reilly M, Boelter FW\*  
RHP Risk Management Inc.

**2:30 PM T3-H.5**

Warnings of Cyber Threats And Active Risk Management

Faber I, Pate-Cornell E  
CA

**Sponsored by:**

Occupational Health and Safety Specialty Group

1:30 PM – 3:00 PM

Salon I

**T3-I Symposium: Derivation of Human Health Based Water Guidance for Noncarcinogens: Is it time to Change the Standard Default Approach?**

Chair: Patrick Levallois

**1:30 PM T3-I.1**

Current default exposure values in setting drinking water guidance: present status and main issues

Levallois P, Goeden HM  
Institut National de Santé Publique du Québec, Université Laval, Minnesota Department of Health

**1:45 PM T3-I.2**

Impact of incorporating high water intake rates during early life on water guidance derivation

Greene CW, Goeden HM  
Minnesota Department of Health

**2:00 PM T3-I.3**

Determination of data-derived exposure values and uncertainty factors for the derivation of health protective drinking water guideline for manganese

Valcke M, Bourgault MH, Gauvin D, Barbeau B, Rodriguez MJ, Vaillancourt C, Haddad S, Bouchard M, Levallois P  
Institut National de Santé Publique du Québec, University of Montréal, École Polytechnique de Montréal, University Laval, Institut Armand-Frappier

**2:15 PM T3-I.4**

Use of CalTOX as a standardized exposure model to account for oral, inhalation and dermal intake from drinking water

Soshilov A  
CalEPA

**2:30 PM T3-I.5**

Embracing the elephant in the room: the critical role of breastmilk transfer as a major driver of PFOA, PFOS, and PFHxS water guidance.

Goeden HM, Greene CW, Jacobus JA  
Minnesota Department of Health

**Sponsored by:**

Exposure Assessment Specialty Group



1:30 PM – 3:00 PM	3:30 PM – 5:00 PM	3:30 PM – 5:00 PM	3:30 PM – 5:00 PM	3:30 PM – 5:00 PM
<p><i>Salon 2</i></p> <p><b>T3-J Emerging Challenges in Risk and Decision Making</b>  <i>Chair: Doug Bessette</i></p>	<p><i>Salon A</i></p> <p><b>T4-A Risk Communication Best Practices, Part 1</b>  <i>Chair: Laura Rickard</i></p>	<p><i>Salon B</i></p> <p><b>T4-B Foundational Issues in Risk Analysis, Part 1 – Big Data and Data Analytics</b>  <i>Chair: Hiba Baroud</i></p>	<p><i>Salon C</i></p> <p><b>T4-C Critical Infrastructure, Cyber, and Information Risks</b>  <i>Chair: Travis Trammell</i></p>	<p><i>Salons DE</i></p> <p><b>T4-D Symposium: Data-Driven Decision Making and Risk Analysis</b>  <i>Chair: Elnaz Kabir</i></p>
<p><b>1:30 PM T3-J.1</b>                      The intriguing link between religion and vaccination: the role of religious affiliation and philosophical and moral beliefs in vaccine evaluations  <i>Kuru OK, Lu HL, Stecula DS, Chan SC, Jamieson KHJ, Albarracin DA, University of Pennsylvania, University of Illinois Urbana Champaign</i></p>	<p><b>3:30 PM T4-A.1</b>                      Strength-Based Risk Communication  <i>Jardine CG, Lines LA, University of the Fraser Valley, University of Alberta</i></p>	<p><b>3:30 PM T4-B.1</b>                      Rethinking Resilience Analytics  <i>Eisenberg DA, Seager TP, Alderson DL, Naval Postgraduate School and Arizona State University</i></p>	<p><b>3:30 PM T4-C.1</b>                      National Critical Functions: a Necessary Evolution in Critical Infrastructure Risk Management  <i>Evenhaugen ST, Cybersecurity and Infrastructure Security Agency</i></p>	<p><b>3:30 PM T4-D.1</b>                      Comparative Assessment of the Risk Factors Leading to Suicide Attempts among Male and Female Youths: A Predictive Analytics Approach  <i>Wei Z, Dave SM, Mukherjee S*, University at Buffalo, The State University of New York</i></p>
<p><b>1:45 PM T3-J.2</b>                      Decision Analysis and Risk &amp; the Regulation of Bitcoin  <i>Gokhale S, Sejong University</i></p>	<p><b>3:45 PM T4-A.2</b>                      Telling stories about sustainable seafood: Using narrative persuasion in aquaculture risk communication  <i>Rickard LN, Yang JZ, Liu V, Boze T, University of Maine, SUNY Buffalo</i></p>	<p><b>3:45 PM T4-B.2</b>                      Data-Driven Risk Analysis with Small Data: A Bayesian Approach  <i>Yu JZ, Baroud H, Vanderbilt University</i></p>	<p><b>3:45 PM T4-C.2</b>                      Proactive Identification of Infrastructure of Concern in the Crisis-Action Decision Environment  <i>Grace T, Cybersecurity and Infrastructure Security Agency</i></p>	<p><b>3:45 PM T4-D.2</b>                      A multiple decision-maker approach to allocating resources to prepare and respond to disruptions  <i>Landowski B, MacKenzie CA*, Iowa State University</i></p>
<p><b>2:00 PM T3-J.3</b>                      The Risk of the Inhumane Algorithm  <i>Gray NG, Ferson S, University of Liverpool</i></p>	<p><b>4:00 PM T4-A.3</b>                      Scientists' goals for risk communication  <i>Besley J, Dudo A, Michigan State University</i></p>	<p><b>4:00 PM T4-B.3</b>                      Artificial intelligence in environmental health science and decision making: insights from the 11th Annual Research Triangle Environmental Health Collaborative Summit  <i>Colley SK, MacDonald Gibson J, University of North Carolina-Chapel Hill</i></p>	<p><b>4:00 PM T4-C.3</b>                      Experts and Executives – Exploring the Differences in the Perceptions of Cyber Risk  <i>Fister A, University of Oklahoma</i></p>	<p><b>4:00 PM T4-D.3</b>                      Socio-spatial vulnerability analysis of interdependent water-transportation infrastructures  <i>Soltanisehat LS, Mohebbi SM*, University of Oklahoma</i></p>
<p><b>2:15 PM T3-J.4</b>                      Legal Frameworks and Governance Options to Promote Arctic Cyber Resilience  <i>Klasa KA, Trump BD, Linkov I, University of Michigan School of Public Health, US Army Corps of Engineers</i></p>	<p><b>4:15 PM T4-A.4</b>                      Measuring and Explaining Public Goals for Public Participation  <i>Bidwell D, Schweizer PJ, University of Rhode Island</i></p>	<p><b>4:15 PM T4-B.4</b>                      The human side of systemic risks can inform the use of big data and new analytic methods  <i>Goble R, Clark University</i></p>	<p><b>4:15 PM T4-C.4</b>                      Risky Business: Framing Risk Assessment for IoT Inclusive Networks  <i>Henshel DH, Alexeev A, Cains MG, Dobias K, Indiana University</i></p>	<p><b>4:15 PM T4-D.4</b>                      Hotspot identification in spatial systems by the use of local Moran's  <i>Stødle K, Flage R, Guikema SD, University of Stavanger</i></p>
<p><b>2:30 PM T3-J.5</b>                      Perceived risk of oil spills under ice  <i>Bessette DL, Gunn GE, Ruddy M, Tarabara W, Richardson RB, Michigan State University</i></p>	<p><b>4:30 PM T4-A.5</b>                      Anticipating or Accommodating to Public Concern? Risk Amplification and the Politics of Precaution Re-examined  <i>Wardman JK, Lofstedt R, University of Nottingham, King's College London</i></p>	<p><b>4:30 PM T4-B.5</b>                      Performance weighting- what's a relevant question? A novel approach to the question of out-of-sample performance.  <i>Hemming V, The University of British Columbia</i></p>	<p><b>4:30 PM T4-C.5</b>                      A Quantitative Risk Analysis Of Nation State Supported Computational Propaganda  <i>Trammell T, Stanford University Management, Science &amp; Engineering</i></p>	<p><b>4:30 PM T4-D.5</b>                      Predicting Daily Power Outages Using a Bayesian Model Averaging Approach  <i>Kabir E, Guikema SD, University of Michigan</i></p>
<p><b>Sponsored by:</b>  <i>Decision Analysis and Risk Specialty Group</i></p>	<p><b>Sponsored by:</b>  <i>Risk Communication Specialty Group</i></p>	<p><b>Sponsored by:</b>  <i>The University of British Columbia</i></p>	<p><b>Sponsored by:</b>  <i>Security and Defense Specialty Group</i></p>	<p><b>Sponsored by:</b>  <i>Engineering and Infrastructure Specialty Group</i></p>



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, Shaw 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, Wong-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, Verhougstraete 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 in Nsukka 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  
*Sanaa M, Duret S, Kooh P, Boni M, Maignien T, Caron Z, Bougeard S, Arnich N, Cerf O, Membre J*  
*ANSES*

**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  
*Zhang Y, Arthur TM, Schmidt JW, Wheeler TL, Wang B*  
*University of Nebraska-Lincoln and Roman L. Hruska U.S. Meat Animal Research Center*

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 Røed*

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:

*Resilience 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

*Stenson 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*

8:30 AM – 10:00 AM

Salon A

**W1-A Risk Communication Best Practices, Part 2**

Chair: Ragnar Lofstedt

**8:30 AM W1-A.1**  
Transparency at the Swedish Forest Agency: What does the evidence show?  
*Lofstedt RE*  
*King's College London*

**8:50 AM W1-A.2**  
Conflit and the mining industry: how psychosocial monitoring can enlighten risk communication  
*Palma-Oliveira J, Cristino N*  
*University of Lisbon*

**9:10 AM W1-A.4**  
What can they learn? Using learning outcomes to improve the link between risk communication and intended response  
*St Clair A, Finn H, Haegeli P, Gregory R, Klassen K*  
*Simon Fraser University, ChoiceWorks Ltd. Halfmoon Bay*

**Sponsored by:**  
*Risk Communication Specialty Group*

8:00 AM – 9:00 AM

Salon B

**W1-B Special Session: Emergence of Emerging Risks at DHS Panel Discussion**

Chair: Benjamin Trump

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

8:30 AM – 10:00 AM

Salon H

**W1-F Organizations, Systems and Resilience**

Chair: Aleksandar Jovanovic

**8:50 AM W1-F.2**  
Business Disruption Associated with Extreme Events and Pathways to Planning for more Robust Recovery  
*Helgeson J, Nierenberg C*  
*National Institute of Standards and Technology, National Oceanic and Atmospheric Administration*

**9:10 AM W1-F.3**  
Learning Lessons about Risk and Resilience: Reflections from NATO Advanced Research Workshops  
*Hall JR, Hall IS*  
*Cardiff University*

**Sponsored by:**  
*Resilience Analysis Specialty Group*

8:30 AM – 10:00 AM

Salon J

**W1-G Managing Risks of Nanomaterials, Radionuclides, Natech, & Through Inspections**

Chair: Deniz Marti

**8:30 AM W1-G.1**  
Engineered nanomaterials and water reuse: Lessons learned from seven-year research activities at IIT Delhi India and identified issues ahead  
*Kumar A, Singh D, Parsai T*  
*Indian Institute of Technology Delhi, India*

**8:50 AM W1-G.2**  
Management of Risk from Hard-to-Detect Radionuclides in Low-Level Radioactive Waste  
*Pinkston KE, Esh DW, Ridge AC, Desotell LT*  
*US Nuclear Regulatory Commission*

**9:10 AM W1-G.3**  
Practical framework for Natech risk and option evaluation for chemical management under the disaster scenario in Kansai region of Japan  
*Ito L, Tokai A, Nakakubo T, Nguyen H, Kojima N*  
*Osaka University*

**9:30 AM W1-G.4**  
Third party inspections and certifications as a risk management mechanism  
*Farber G*  
*U.S. Environmental Protection Agency*

**Sponsored by:**  
*Applied Risk Management Specialty Group*

8:30 AM – 10:00 AM

Salon K

**W1-H Symposium: Recent Advances in the Occupational Health and Safety of Advanced Materials and Technologies**

Chair: James Ede

**8:30 AM W1-H.1**  
Occupational safety and health challenges of emerging technologies  
*Geraci CL*  
*National Institute for Occupational Safety and Health (NIOSH)*

**8:50 AM W1-H.2**  
NIOSH work in advanced materials and manufacturing: applying traditional techniques to new technologies  
*Dunn KL*  
*CDC/NIOSH*

**9:10 AM W1-H.3**  
Practical Handling Strategies for Advanced Materials and Technologies: Teasing Out Specifics from General Recommendations  
*Shatkin JA, Ede JD*  
*Vireo Advisors, LLC*

**9:30 AM W1-H.4**  
Occupational Safety of Nanomaterials: Strategies for a Future with Emerging Technologies  
*Elder A*  
*University of Rochester*

**Sponsored by:**  
*Advanced Materials and Technologies Specialty Group, and Occupational Health and Safety Specialty Group*

8:30 AM – 10:00 AM	8:30 AM – 10:00 AM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM
<p><i>Salon 1</i></p>	<p><i>Salon 2</i></p>	<p><i>Salon A</i></p>	<p><i>Salon B</i></p>	<p><i>Salon C</i></p>
<p><b>W1-I Symposium: Standards of Certainty in Scientific Risk Decision-Making</b> <i>Chair: Patricia Larkin</i></p>	<p><b>W1-J Symposium: Visual Cues and Perceptions of Risk: Modern Agriculture in the Era of Social Media</b> <i>Chair: Camille Ryan</i></p>	<p><b>W2-A Symposium: Addressing Human Trafficking Risk</b> <i>Chair: Seth Guikema</i></p>	<p><b>W2-B Symposium: Cultural Property Risk Analysis</b> <i>Chair: Robert Waller</i></p>	<p><b>W2-C Symposium: Identification, Assessment, and Management of the Risks Associated with Chemicals and Materials in the Department of Defense</b> <i>Chair: Andrew Rak</i></p>
<p><b>8:30 AM</b> <b>W1-I.1</b> Evidentiary reliability of alternative methodologies in support of class certification for product liability, mislabeling, and failure to warn litigation <i>Cantor RA</i> <i>Berkeley Research Group LLC</i></p>	<p><b>8:30 AM</b> <b>W1-J.1</b> Risk Perception and Attitudes Predict Brain Response to Food Technology Infographics <i>Davis T, LaCour M, Beyer E, Finck J, Miller M</i> <i>Texas Tech University and Merck Animal Health</i></p>	<p><b>10:30 AM</b> <b>W2-A.1</b> Risk Analysis as a Critical Tool for Human Trafficking <i>Coxen J, Guikema S</i> <i>University of Michigan</i></p>	<p><b>10:30 AM</b> <b>W2-B.1</b> Applying social discounting to cultural property risk analysis <i>Waller R</i> <i>Protect Heritage Corp., Canadian Museum of Nature, Queen's University</i></p>	<p><b>10:30 AM</b> <b>W2-C.1</b> Department of Defense Chemical and Material Risk Management Program <i>Underwood PM, Rak A, Vogel CM, Paley M*</i> <i>Department of Defense and Noblis</i></p>
<p><b>8:50 AM</b> <b>W1-I.2</b> Perceptions of bias: does the standard of certainty change when politics comes into play? <i>Dourson M</i> <i>Toxicology Excellence for Risk Assessment</i></p>	<p><b>8:50 AM</b> <b>W1-J.2</b> The Framing and Agenda-Setting Effects of the Mass Media on the Farm-Level Impacts of GM Crops <i>Galata Bickell E, Kalaitzandonakes MH</i> <i>University of Missouri</i></p>	<p><b>10:45 AM</b> <b>W2-A.2</b> Using System Dynamics to Set Strategic Priorities to Address Human Trafficking <i>Caddell JD</i> <i>United States Military Academy</i></p>	<p><b>10:50 AM</b> <b>W2-B.2</b> Characterizing multi-hazard risks for lands, assets, resources, and people associated with the U.S. Department of the Interior <i>Wood NJ, Pennaz AB, Ludwig KA, Jones JM, Sherba JT, Henry KD, Ng P</i> <i>United States Geological Survey</i></p>	<p><b>10:50 AM</b> <b>W2-C.2</b> Assessing Supply Chain Risks of Critical Chemicals and Materials for National Defense <i>Escola SA, Rak A*, Bruckner M</i> <i>Department of Defense and Noblis</i></p>
<p><b>9:10 AM</b> <b>W1-I.3</b> Standards of Certainty in Interpreting, Assessing and Managing Risk <i>Guidotti TL</i> <i>Occupational + Environmental Health &amp; Medicine</i></p>	<p><b>9:10 AM</b> <b>W1-J.3</b> How Can Behavioral Science Help with Critical Thinking About Risk? <i>McFadden BR, Riis J</i> <i>University of Delaware, Behavioralize</i></p>	<p><b>11:00 AM</b> <b>W2-A.3</b> Risk factors for the existence of illicit massage parlors <i>White AG, Guikema SD</i> <i>University of Michigan</i></p>	<p><b>11:10 AM</b> <b>W2-B.3</b> Challenges to integrated risk management from a collection care perspective <i>Snell S, Tompkins W*</i> <i>Smithsonian Institution</i></p>	<p><b>11:10 AM</b> <b>W2-C.3</b> Using Dates of Historical Site Operations to Determine Possible PFAS Use at Former Military Sites <i>Meyer AK</i> <i>Army Corps of Engineers</i></p>
<p><b>9:30 AM</b> <b>W1-I.4</b> Managing uncertainties in controversial policy environments: a reflection on the low-dose radiation debate <i>Lindberg JCH</i> <i>King's College London, Imperial College London</i></p>	<p><b>9:30 AM</b> <b>W1-J.4</b> Monetizing Disinformation in the Attention Economy: media signals and the case of GMOs <i>Ryan CD, Schaul A, Butner R, Swarhout J</i> <i>Bayer Crop Science</i></p>	<p><b>11:15 AM</b> <b>W2-A.4</b> Homeland Security Investigations Law Enforcement <i>Renken D</i> <i>National Intelligence University</i></p>	<p><b>11:30 AM</b> <b>W2-B.4</b> Challenges to integrated risk management from a provider (OPS, Risk Management) perspective. <i>Hall D, Tkac K*</i> <i>Smithsonian Institution</i></p>	<p><b>11:30 AM</b> <b>W2-C.4</b> Possible Impacts to National Defense from Changes in Occupational Standards for Chromium <i>Bruckner M, Rak D, Bryant S</i> <i>Noblis</i></p>
<p><b>Sponsored by:</b> <i>Risk, Policy &amp; Law Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Decision Analysis and Risk Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Applied Risk Management Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Applied Risk Management Specialty Group</i></p>	<p><b>Sponsored by:</b> <i>Security and Defense Specialty Group</i></p>

10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	10:30 AM – 12:00 PM
<p style="text-align: center;"><i>Salons DE</i></p> <p style="text-align: center;"><b>W2-D Symposium: Assessing the Resilience of Urban Systems Under Climate Change</b> <i>Chair: Renee Obringer</i></p> <p><b>10:30 AM</b> <span style="float: right;"><b>W2-D.1</b></span> Improving Operational Resilience of Municipal Water Treatment Under A Changing Climate <i>Hoover PA, Camp JV, Vanderbilt University</i></p> <p><b>10:50 AM</b> <span style="float: right;"><b>W2-D.2</b></span> The Missing Piece in Climate–Demand Nexus Models: A comprehensive exploration of the measures of heat stress <i>Maia D, Kumar R, Nateghi R, Purdue University</i></p> <p><b>11:10 AM</b> <span style="float: right;"><b>W2-D.3</b></span> Understanding natural and human initiation and transmission of cascading hazards <i>Robinson C, Borsuk M, Duke University</i></p> <p><b>11:30 AM</b> <span style="float: right;"><b>W2-D.4</b></span> Projecting the interdependent water and electricity use into the future under different climate change scenarios <i>Obringer R, Kumar R, Nateghi R, Purdue University</i></p> <p><b>Sponsored by:</b> <i>Engineering and Infrastructure Specialty Group</i></p>	<p style="text-align: center;"><i>Salon H</i></p> <p style="text-align: center;"><b>W2-F Integrating Data Sources into QMRA: From Pathogen Survival Data to Whole Genome Sequencing</b> <i>Chair: Ainsley Otten</i></p> <p><b>10:30 AM</b> <span style="float: right;"><b>W2-F.1</b></span> Home style frying of steak and meat products: survival of Escherichia coli related to dynamic temperature profiles <i>Pesciaroli M, Chardon JE, Delfgou EHM, Kuijpers AFA, Wijrnands LM, Evers EG*, National Institute for Public Health and the Environment</i></p> <p><b>10:50 AM</b> <span style="float: right;"><b>W2-F.2</b></span> Integrating Whole Genome Sequences into a microbial risk assessment model for Salmonella spp. in ground chicken <i>Tanui CK, Karanth S, Pradhan AK, University of Maryland</i></p> <p><b>11:10 AM</b> <span style="float: right;"><b>W2-F.3</b></span> Incorporation of whole genome sequencing data into the exposure assessment module of risk assessment: a case study for Salmonella in chicken <i>Karanth S, Tanui CK, Pradhan AK, University of Maryland, Center for Food Safety and Security Systems</i></p> <p><b>11:30 AM</b> <span style="float: right;"><b>W2-F.4</b></span> Development of a transmission dynamics model for Toxoplasma gondii infection in humans <i>Rani S, Dubey JP, Pradhan AK, University of Maryland, United States Department of Agriculture</i></p> <p><b>Sponsored by:</b> <i>Microbial Risk Analysis Specialty Group</i></p>	<p style="text-align: center;"><i>Salon J</i></p> <p style="text-align: center;"><b>W2-G Urban Resilience and Social Equity</b> <i>Chair: Hanne van den Berg</i></p> <p><b>10:30 AM</b> <span style="float: right;"><b>W2-G.1</b></span> Bringing (social) equity into the equation: decision-making for more resilient cities <i>van den Berg HJ, Harvard University</i></p> <p><b>10:50 AM</b> <span style="float: right;"><b>W2-G.2</b></span> A framework for analyzing urban pathological reaction to disasters <i>Huang T, Kung YH, National Cheng Kung University</i></p> <p><b>11:10 AM</b> <span style="float: right;"><b>W2-G.3</b></span> Modelling and predicting drinking water contamination risk in North Carolina using Bayesian belief networks to enhance community resilience <i>Mulhern RE, Roostaei J, MacDonald Gibson J, University of North Carolina at Chapel Hill</i></p> <p><b>11:30 AM</b> <span style="float: right;"><b>W2-G.4</b></span> Incintivized Forests and Capacity Building for Resilience <i>Smachylo J, Harvard University</i></p> <p><b>Sponsored by:</b> <i>Resilience Analysis Specialty Group and Risk and Development Specialty Group</i></p>	<p style="text-align: center;"><i>Salon K</i></p> <p style="text-align: center;"><b>W2-H Symposium: State-of-the-Art Exposure Models and Data Quality for Evaluating Environmental, Community, Consumer Product, and Workplace Exposures: Part 1</b> <i>Chair: Pamela Williams</i></p> <p><b>10:30 AM</b> <span style="float: right;"><b>W2-H.1</b></span> Environmental and community exposure models used to evaluate human exposure under EPA's TSCA program <i>Fehrenbacher MC, Wong EM*, US EPA</i></p> <p><b>10:50 AM</b> <span style="float: right;"><b>W2-H.2</b></span> Consumer Product and Occupational Exposure Models Used to Evaluate Human Health Risks under TSCA Chemical Evaluation Program <i>Wong E, Tiwari R*, EPA</i></p> <p><b>11:10 AM</b> <span style="float: right;"><b>W2-H.3</b></span> Hierarchy of Consumer Product and Occupational Exposure Modeling Tools to Support Health Risk Assessments under REACH program <i>Qian HQ, Zaleski RZ, ExxonMobil Biomedical Sciences, Inc.</i></p> <p><b>11:30 AM</b> <span style="float: right;"><b>W2-H.4</b></span> Exposure Modeling for Integrated Human Health and Ecological Risk Assessment <i>von Stackelberg KE, NEK Associates LTD</i></p> <p><b>Sponsored by:</b> <i>Exposure Assessment Specialty Group and Occupational Health and Safety Specialty Group</i></p>	<p style="text-align: center;"><i>Salon I</i></p> <p style="text-align: center;"><b>W2-I Exposure Assessment: Innovations, Models, and Methods</b> <i>Chair: Chris Greene</i></p> <p><b>10:30 AM</b> <span style="float: right;"><b>W2-I.1</b></span> Assessing Exposure Using an Image-based Land Cover Classification Model <i>Mayo MJ, Marsh CM, Gradient</i></p> <p><b>10:50 AM</b> <span style="float: right;"><b>W2-I.2</b></span> Contaminated site segregation approaches for reasonable exposure point concentrations for a human health risk assessment; a case study <i>Rodriguez RR, Lindenwood University</i></p> <p><b>11:10 AM</b> <span style="float: right;"><b>W2-I.3</b></span> Estimating Sustainable Fish Productivity: Effect on Remediation Goals at Contaminated <i>Pfeiffer D, Anderson P, Arcadis</i></p> <p><b>11:30 AM</b> <span style="float: right;"><b>W2-I.4</b></span> Vapor Intrusion of 1,4-Dioxane: Does it Pose a Risk? <i>Sager SL, Offenberger S, Forsberg N, Bell C, Arcadis U.S., Inc.</i></p> <p><b>Sponsored by:</b> <i>Exposure Assessment Specialty Group</i></p>



10:30 AM – 12:00 PM	1:30 PM – 3:00 PM	1:30 PM – 3:00 PM	1:30 PM – 3:00 PM	1:30 PM – 3:00 PM
<p align="center"><i>Salon 2</i></p> <p><b>W2-J Conflict and Collaboration</b> <i>Chair: Zachary Collier</i></p>	<p align="center"><i>Salon A</i></p> <p><b>W3-A Media Representations of Risk</b> <i>Chair: Hang Lu</i></p>	<p align="center"><i>Salon B</i></p> <p><b>W3-B Foundational Issues in Risk Analysis, Part 2 – Uncertainty and Risk Conceptualizations</b> <i>Chair: Tony Cox</i></p>	<p align="center"><i>Salon C</i></p> <p><b>W3-C Symposium: Decision and Risk Analysis in a Digital Era</b> <i>Chair: Jun Zhuang</i></p>	<p align="center"><i>Salons DE</i></p> <p><b>W3-D Symposium: Risk Analysis of Cybersecurity in Critical Infrastructure Systems</b> <i>Chair: Unal Tatar</i></p>
<p><b>10:30 AM</b> <span style="float:right"><b>W2-J.1</b></span></p>	<p><b>1:30 PM</b> <span style="float:right"><b>W3-A.1</b></span></p>	<p><b>1:30 PM</b> <span style="float:right"><b>W3-B.1</b></span></p>	<p><b>1:30 PM</b> <span style="float:right"><b>W3-C.1</b></span></p>	<p><b>1:30 PM</b> <span style="float:right"><b>W3-D.1</b></span></p>
<p>Signals, metrics, and modeling for identifying emerging partnerships for innovation <i>Thorisson H, Linkov I, Trump BD, Keisler JM, Collier ZA, Polmateer TL, Lambert JH, Keyrus USA</i></p>	<p>Decipher social construction of risks: Comparing hydropower, GMOs and nuclear power controversies in China <i>Jia H, Deng L, Department of Communication, Cornell University</i></p>	<p>Causal possibility for risk analysis with limited causal knowledge <i>Cox T, Cox Associates, University of Colorado</i></p>	<p>Interplay of online and offline social networks for rumor spreading and debunking during natural disasters <i>Agarwal P, Hunt K, Zhuang J, University at Buffalo</i></p>	<p>Is it a Natural Disaster or a Cyber Security Attack? The US Electric Power Grid and Critical Infrastructure Protection <i>Baggott S, Santos JR, George Washington University</i></p>
<p><b>10:50 AM</b> <span style="float:right"><b>W2-J.2</b></span></p>	<p><b>1:45 PM</b> <span style="float:right"><b>W3-A.2</b></span></p>	<p><b>1:45 PM</b> <span style="float:right"><b>W3-B.2</b></span></p>	<p><b>1:45 PM</b> <span style="float:right"><b>W3-C.2</b></span></p>	<p><b>1:45 PM</b> <span style="float:right"><b>W3-D.2</b></span></p>
<p>The influence of membership on the perceived legitimacy of risk management recommendations made by the EPA's science advisory board <i>Gray SG, Drummond C, Arvai J, University of Michigan, Ross School of Business, and Erb Institute for Global Sustainable Enterprise</i></p>	<p>CRISPR benefit, risk, and ambivalence: The impact of the documentary Human Nature on scientists' views of human gene editing <i>Howell EL, Scheufele DA, University of Wisconsin-Madison</i></p>	<p>Automatic uncertainty analysis: a compiler that lets legacy software handle uncertain inputs <i>Gray N, De Angelis M, Ferson S*, Institute for Risk and Uncertainty</i></p>	<p>Tweet Diffusion Life-cycle: A Twitter Tale of Hurricanes <i>Aziz RA, Zhuang J, State University of New York at Buffalo</i></p>	<p>Overview of uncertainty-tolerant decision support modeling for cybersecurity <i>Chatterjee S, Bhattacharya A*, Pacific Northwest National Laboratory</i></p>
<p><b>11:10 AM</b> <span style="float:right"><b>W2-J.3</b></span></p>	<p><b>2:00 PM</b> <span style="float:right"><b>W3-A.3</b></span></p>	<p><b>2:00 PM</b> <span style="float:right"><b>W3-B.3</b></span></p>	<p><b>2:00 PM</b> <span style="float:right"><b>W3-C.3</b></span></p>	<p><b>2:00 PM</b> <span style="float:right"><b>W3-D.3</b></span></p>
<p>Assessing the Effectiveness of Collaborative Projects at R1 Universities: A Mixed-Methods Approach. <i>Bogomoletc E, Eng N, Berube D, North Carolina State University, Pennsylvania State University</i></p>	<p>Climate Salience Across Partisan News Media <i>Forde SL, The State University of New York at Buffalo</i></p>	<p>Risk: A holistic framework for resilience <i>Logan TM, Williams TG, Guikema SD, University of Michigan</i></p>	<p>Harnessing Social Media Data to Understand Regional Climate Change Attitudes <i>Bennett JB, Rachunok BA, Flage R, Nateghi R, Purdue University</i></p>	<p>Attack graph based probabilistic cyber risk analysis <i>Keskin OF, Tatar U, Poyraz OI, Pinto CA, Old Dominion University and University at Albany, State University of New York</i></p>
<p><b>11:30 AM</b> <span style="float:right"><b>W2-J.4</b></span></p>	<p><b>2:15 PM</b> <span style="float:right"><b>W3-A.4</b></span></p>	<p><b>2:15 PM</b> <span style="float:right"><b>W3-B.4</b></span></p>	<p><b>2:15 PM</b> <span style="float:right"><b>W3-C.4</b></span></p>	<p><b>2:15 PM</b> <span style="float:right"><b>W3-D.4</b></span></p>
<p>Plan for the worst, negotiate for the best: value of risk information in negotiation with evolving preferences <i>Collier ZA, Lambert JH, Collier Research Systems</i></p>	<p>The effects of exposure to fake news about climate change <i>Drummond C, Siegrist M, Arvai J, University of Michigan, ETH Zurich</i></p>	<p>Risk Aggregation in Dependency Networks <i>Helenius L, Keisler J, Linkov I, US Army Engineering Research and Development Center</i></p>	<p>Pitfalls of big data for risk analysis <i>Bier VM, University of Wisconsin-Madison</i></p>	<p>Implications of COTS Technologies for Critical Infrastructure Cyber Risk <i>Nussbaum B, University at Albany</i></p>
<p><b>Sponsored by:</b></p>	<p><b>2:30 PM</b> <span style="float:right"><b>W3-A.5</b></span></p>	<p><b>2:30 PM</b> <span style="float:right"><b>W3-B.5</b></span></p>	<p><b>2:30 PM</b> <span style="float:right"><b>W3-C.5</b></span></p>	<p><b>2:30 PM</b> <span style="float:right"><b>W3-D.5</b></span></p>
<p><i>Decision Analysis and Risk Specialty Group</i></p>	<p>Media coverage of gene editing in China: A comparative study of legacy media and science blogs <i>Bao L, UW-Madison</i></p>	<p>Fitting the false and stating knowledge of the unknowable: Structural non-identifiability and the consequences of modelling that ignores it <i>Schmidt PJ, Emelko MB, Thompson ME, University of Waterloo</i></p>	<p>Feedback learning and confirmation bias in detection of false information in social media following Extreme Events <i>John R, Byrd K, University of Southern California</i></p>	<p>Cyber Resilience Analysis: A Functional Dependency Approach <i>Tatar U, University at Albany</i></p>
<p><b>Sponsored by:</b></p>	<p><b>Sponsored by:</b></p>	<p><b>Sponsored by:</b></p>	<p><b>Sponsored by:</b></p>	<p><b>Sponsored by:</b></p>
<p><i>Risk Communication Specialty Group</i></p>	<p><i>Risk Communication Specialty Group</i></p>	<p><i>Foundational Issues in Risk Analysis Specialty Group</i></p>	<p><i>Security and Defense Specialty Group</i></p>	<p><i>Engineering and Infrastructure Specialty Group</i></p>



1:30 PM – 3:00 PM	1:30 PM – 3:00 PM	1:30 PM – 3:00 PM	1:30 PM – 3:00 PM	3:30 PM – 5:00 PM
<p align="center"><i>Salon H</i></p> <p align="center"><b>W3-F Natural Hazard and Urban Resilience</b></p> <p align="center"><i>Chair: Huang</i></p>	<p align="center"><i>Salon K</i></p> <p align="center"><b>W3-H Symposium: State-of-the-Art Exposure Models and Data Quality for Evaluating Environmental, Community, Consumer Product, and Workplace Exposures: Part 2</b></p> <p align="center"><i>Chair: Pamela Williams</i></p>	<p align="center"><i>Salon 1</i></p> <p align="center"><b>W3-I Roundtable: Combating Human Trafficking</b></p> <p align="center"><i>Chair: Seth Guikema</i></p>	<p align="center"><i>Salon 2</i></p> <p align="center"><b>W3-J Symposium: Risk and Resilience: At a Crossroads</b></p> <p align="center"><i>Chair: Benjamin D. Trump</i></p>	<p align="center"><i>Salon A</i></p> <p align="center"><b>W4-A Symposium: The Perception of Scientific Uncertainty and Risk/Technology Acceptance</b></p> <p align="center"><i>Chair: Angela Bearth</i></p>
<p><b>3:45 PM</b> <span style="float:right"><b>W3-F.1</b></span></p> <p>Influence of Severe Storms on Power System Resilience</p> <p><i>Silveira A, Lester HD</i> <i>University of South Alabama</i></p>	<p><b>1:30 PM</b> <span style="float:right"><b>W3-H.1</b></span></p> <p>Community-Based Exposure Modeling for Climate-Related Disasters and Other Applications</p> <p><i>Chaisson CF, Chari R, Osorio JC, Madrigano J, Diskin K</i> <i>The LifeLine Group, RAND Corp, NYC-Environmental Justice Alliance</i></p>	<p>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 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 will 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 knowledge in the human sex and labor trafficking domain.</p>	<p><b>1:30 PM</b> <span style="float:right"><b>W3-J.1</b></span></p> <p>The Science and Practice of Resilience</p> <p><i>Linkov I, Trump B, Keisler J</i> <i>US Army Engineer Research and Development Center</i></p>	<p><b>3:30 PM</b> <span style="float:right"><b>W4-A.1</b></span></p> <p>Communication of uncertainties: Challenges and some unwanted effects</p> <p><i>Siegrist M</i> <i>ETH Zurich</i></p>
<p><b>4:00 PM</b> <span style="float:right"><b>W3-F.2</b></span></p> <p>Natural variability of best-estimate coastal flood depth return periods</p> <p><i>Meyer MR, Johnson DR*</i> <i>Purdue University</i></p>	<p><b>1:45 PM</b> <span style="float:right"><b>W3-H.2</b></span></p> <p>Task-Based Worker and Consumer Exposure Modeling Using Probabilistic Approach</p> <p><i>Armstrong T, Williams PRD, Drolet D</i> <i>TWA&amp;HR Occupational Hygiene Consulting, E Risk Sciences, Retired</i></p>	<p><b>Participants:</b></p> <ul style="list-style-type: none"> <li>• Seth Guikema - University of Michigan</li> <li>• Kayse Maass - Northeastern University</li> <li>• Bridgette Carr - University of Michigan</li> <li>• Ray Renken - DHS Homeland Security Investigations</li> </ul>	<p><b>1:45 PM</b> <span style="float:right"><b>W3-J.2</b></span></p> <p>Resilience for Better Risk Governance: Towards an Inclusive Approach</p> <p><i>Renn O</i> <i>Institute for Advanced Sustainability Studies (IASS)</i></p>	<p><b>3:45 PM</b> <span style="float:right"><b>W4-A.2</b></span></p> <p>Citizen Science: People's risk and benefit perceptions when sharing genomic data for research</p> <p><i>Bearth A, Siegrist M</i> <i>Consumer Behavior, Institute for Environmental Decisions (IED), ETH Zurich</i></p>
<p><b>4:15 PM</b> <span style="float:right"><b>W3-F.3</b></span></p> <p>Assessing resilience of coastal systems to natural disasters: a scenario-informed methodology for the case study of Venice (Italy)</p> <p><i>Sperotto A, Bonato M, Torresan S, Critto A, Lambert JH, Linkov I, Marcomini A</i> <i>Ca Foscari University</i></p>	<p><b>2:00 PM</b> <span style="float:right"><b>W3-H.3</b></span></p> <p>Modeling aggregate and cumulative chemical exposures from near and far field sources</p> <p><i>Price P, Isaacs K, Dionisio K, Cohen Hubal E</i> <i>US Environmental Protection Agency</i></p>	<p><b>Sponsored by:</b></p> <p><i>Risk, Policy &amp; Law Specialty Group</i></p>	<p><b>2:00 PM</b> <span style="float:right"><b>W3-J.3</b></span></p> <p>Some reflections on the nexus between risk and resilience</p> <p><i>Aven T</i> <i>University of Stavanger</i></p>	<p><b>4:00 PM</b> <span style="float:right"><b>W4-A.3</b></span></p> <p>Risk perceptions, disgust, and consumer preferences regarding the use of human urine-derived fertilizers for domestic agriculture</p> <p><i>Segrè Cohen A, Love N, Arvai J</i> <i>University of Michigan</i></p>
<p><b>4:30 PM</b> <span style="float:right"><b>W3-F.4</b></span></p> <p>Risk and Resilience in Building Design</p> <p><i>Joyner MD, Kurth M, Linkov I</i> <i>Northeastern University, United States Army Corps of Engineers</i></p>	<p><b>2:15 PM</b> <span style="float:right"><b>W3-H.4</b></span></p> <p>Approaches to modeling infectious agent transmission in workplaces</p> <p><i>Ramachandran G</i> <i>Bloomberg School of Public Health, Johns Hopkins University</i></p>	<p><b>Sponsored by:</b></p> <p><i>Decision Analysis and Risk Specialty Group</i></p>	<p><b>2:15 PM</b> <span style="float:right"><b>W3-J.4</b></span></p> <p>Disruption of Priorities in Large-Scale Systems</p> <p><i>Lambert JH</i> <i>University of Virginia</i></p>	<p><b>4:15 PM</b> <span style="float:right"><b>W4-A.4</b></span></p> <p>Paging Dr. Jarvis: Evaluating the acceptance of advice from an "A.I." vs. a human expert</p> <p><i>Larkin C, Drummond C, Arvai J</i> <i>University of Michigan</i></p>
<p><b>Sponsored by:</b></p> <p><i>Resilience Analysis Specialty Group</i></p>	<p><b>2:30 PM</b> <span style="float:right"><b>W3-H.5</b></span></p> <p>Exposure modeling: Let's not forget data quality</p> <p><i>LaKind J</i> <i>LaKind Associates, LLC</i></p>	<p><b>Sponsored by:</b></p> <p><i>Exposure Assessment Specialty Group and Occupational Health and Safety Specialty Group</i></p>	<p><b>2:30 PM</b> <span style="float:right"><b>W3-J.5</b></span></p> <p>Cyber aspects of fake news</p> <p><i>Trammell T, Pate-Cornell E</i> <i>Stanford University</i></p>	<p><b>4:30 PM</b> <span style="float:right"><b>W4-A.5</b></span></p> <p>Public skepticism of autonomous vehicles: Complex messaging effects</p> <p><i>Dixon GN</i> <i>Ohio State University</i></p>
	<p><b>Sponsored by:</b></p> <p><i>Exposure Assessment Specialty Group and Occupational Health and Safety Specialty Group</i></p>			<p><b>Sponsored by:</b></p> <p><i>Risk Communication Specialty Group</i></p>

3:30 PM – 5:00 PM

Salon B

**W4-B Symposium: Foundational Issues in Risk Analysis, Part 3**

Chair: Roger Flage

**3:30 PM W4-B.1**  
 Probabilistic failure analysis of complex systems using Bayesian networks  
*El-Awady A, Ponnambalam K, University of Waterloo*

**3:45 PM W4-B.2**  
 Economic risk index for pipeline vandalization in the niger delta region of nigeria  
*Ekiugbo A, Amiolemhen P, Ariavie GO, University of Benin*

**4:00 PM W4-B.3**  
 Climate change attribution during and following Hurricane Irma: The role of experience and vulnerability  
*Wong-Parodi G, Garfin DR, Silver RC, Stanford University, University of California, Irvine*

**4:15 PM W4-B.4**  
 Constructing an area-based socioeconomic status index in the context of environmental justice assessment across Canada: A Principal Components Analysis Approach  
*Chakraborty L, Scott D, Thistlethwaite J, Henstra D, Rus H, University of Waterloo*

**Sponsored by:**  
*Foundational Issues in Risk Analysis Specialty Group*

3:30 PM – 5:00 PM

Salon C

**W4-C Symposium: Early Warning Systems for Emerging or Disruptive Technologies in Countering Weapons of Mass Destruction**

Chair: Anthony Barrett

**3:30 PM W4-C.1**  
 Integrated System for Discovery of Emerging Technologies in Countering Weapons of Mass Destruction  
*Sin S, Ackerman G, Barrett T, Maxwell M, University of Maryland*

**3:45 PM W4-C.2**  
 Elicitation of expert judgment for technology identification and characterization  
*Ackerman GA, Barrett A, University at Albany, ABS Group*

**4:00 PM W4-C.3**  
 Machine Learning Models for Technology Identification and Characterization  
*Maxwell MB, Bills A, Schmidt B, Barrett T, University of Maryland, ABS Group*

**4:15 PM W4-C.4**  
 Risk-Based Prioritization of Technologies in Countering Weapons of Mass Destruction  
*Barrett AM, Ackerman GA, ABS Consulting / ABS Group*

**4:30 PM W4-C.5**  
 Perspectives on Technology Discovery for Countering Weapons of Mass Destruction  
*Grabowski RH, Sin SS, Ackerman GA, Barrett AM, Defense Threat Reduction Agency*

**Sponsored by:**  
*Security and Defense Specialty Group*

3:30 PM – 5:00 PM

Salons DE

**W4-D Symposium: Data-Driven Risk Modeling Using Predictive Analytics Approach**

Chair: Sayanti Mukherjee

**3:30 PM W4-D.1**  
 A Spatial and Temporal Analysis of Impact of Climatic and Physical Factors on Bridge Health  
*Aziz RA, Mahbub N, Paul HK, Mukherjee S\*, Zhuang J, State University of New York at Buffalo*

**3:45 PM W4-D.2**  
 Prediction and Evaluation of Sediment- and Infrastructure-related Failure Risks on Bogotá's Sewer System: A spatiotemporal analysis  
*Fontecha JE, Agarwal P, Torres MN, Rodriguez JP, Mukherjee S, University at Buffalo*

**4:00 PM W4-D.3**  
 Investigating the risk factors causing widespread wildfires: a county level study applied to the state of California  
*Masoudvaziri N, Sabbaghtorkan M, Mukherjee S, State University of New York at Buffalo*

**4:15 PM W4-D.4**  
 Power outage prediction for natural disasters using synthetic power network generation and simulation  
*Zhai C, Guikema SD, Chen T, White A, University of Michigan*

**4:30 PM W4-D.5**  
 Evaluating factors affecting crime rates in the state of New York: A county-level analysis  
*Ganguly P, Mukherjee S, University at Buffalo, The State University of New York*

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*Engineering and Infrastructure Specialty Group*

3:30 PM – 5:00 PM

Salon H

**W4-F Risk Characterization of Microbiological Hazards**

Chair: Moez Sanaa

**3:30 PM W4-F.1**  
 Using farm practice variables as predictors of Listeria spp. prevalence in pastured poultry farms  
*Golden CG, Rothrock Jr. MJ, Mishra A, University of Georgia, United States Department of Agriculture*

**3:45 PM W4-F.2**  
 Exploring the relationship between product testing of fresh produce and consumer risk  
*Hartnett E, Wilson M, Paoli G, Risk Sciences International*

**4:00 PM W4-F.3**  
 Risk categorization of federally regulated fish establishments in Canada using the Canadian Food Inspection Agency's Establishment-based Risk Assessment Model  
*Savoie S, Racicot M, Leroux A, Plante R, Shi H, Mackay A, Quessy S, Canadian Food Inspection Agency*

**4:30 PM W4-F.5**  
 Evidence and Analysis Debunk Speculations about Raw Milk Risks  
*Azzolina N, Coleman M\*, Onusic S, Smith S, Heckman J, McAfee M, Coleman Scientific Consulting*

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

3:30 PM – 5:00 PM

Salon J

**W4-G Symposium: Systems Thinking and Interdisciplinary Approaches for Building Resilience**

Chair: Tom Logan

**3:30 PM W4-G.1**  
 Building Community Resilience: A Framework and Approach for Measuring People's Access to Essential Services  
*Logan TM, Guikema SD, University of Canterbury*

**3:45 PM W4-G.2**  
 Decision maker driven multi-infrastructure recovery modeling for disaster risk reduction modeling  
*Bristow DN, University of Victoria*

**4:00 PM W4-G.3**  
 A Social-Ecological Approach to Risk: Managing Overheating in Senior, Low-Income Residences  
*Tsoulou I, He R, Andrews CJ, Mainelis G, Senick J, Rutgers University*

**4:15 PM W4-G.4**  
 Integrating big data analytics into predictive models for the societal impact of natural hazards  
*Boakye J, Gardoni P, Murphy C, University of Illinois at Urbana-Champaign*

**4:30 PM W4-G.5**  
 Resilience quantification of complex infrastructure systems  
*Hackl JH, ETH Zurich*

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

3:30 PM – 5:00 PM

Salon K

**W4-H Roundtable: State-of-the-Art Exposure Models and Data Quality for Evaluating Environmental, Community, Consumer Product, and Workplace Exposures: Part 3**

Chair: Pamela Williams

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 state-of-the-art exposure models for evaluating environmental, community, consumer product, and workplace exposures and to discuss issues related to data quality and model validation to improve future modeling efforts. Part 3 will include a more in-depth discussion and audience participation and Q/A with the symposia presenters to further explore the similarities and differences among the various exposure models, current and future challenges for exposure modeling, and a path forward for advancing the quality and predictive capability of human exposure models. A key theme of this discussion will be: What can the risk analysis community do to help?

**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 (TWA8HR Occupational Hygiene Consulting)
- Paul Price (U.S. EPA)
- Gurumurthy Ramachandran (Johns Hopkins University)
- Judy LaKind (LaKind Associates)

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3:30 PM – 5:00 PM

Salon 1

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

Chair: Christopher Greene

3:30 PM

W4-I.1

Insights from simple sensors for air quality and children's health  
*MacDonell M, Chang YS, Zvolanek E, Hummel J, Sankaran R, Tapia A, Pozan T, Nutter G, Rose C*  
*Argonne National Laboratory*

3:45 PM

W4-I.2

Measurement and Modeling of Urban Personal Air Pollution Exposure in Hong Kong  
*Lau AKH, Che W, Frey HC\**  
*Hong Kong University of Science and Technology, North Carolina State University*

4:00 PM

W4-I.3

Increasing risk of emergency room admissions for bronchiolitis in infants exposed to air pollution  
*Gallo E, Bottigliengo D, Bressan S, Geremia S, Lanera C, Zagolin L, Marson G, Gregori D*  
*University of Padova*

4:15 PM

W4-I.4

Particulate matter exposure of teaching professionals during a typical chalk and talk class  
*Sekar A, Varghese GK, Varma MKV*  
*National Institute of Technology Calicut*

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3:30 PM – 5:00 PM

Salon 2

**W4-J Decision Making Under Uncertainty: Theories and Methods**

Chair: Jalal Ali

3:30 PM

W4-J.1

A quantitative development cycle model with risk analysis features  
*Denard S, Mengel S, Ertas A, Ekwaro-Osire S*  
*Texas Tech University*

3:45 PM

W4-J.2

Do off-the-shelf decision support tools for strategic risk management do what they promise?  
*Haffar M, Bessette D, Gregory R, Arvai J*  
*University of Michigan, Michigan State University, Decision Research*

4:00 PM

W4-J.3

What to do when the data is not sufficient? Performance weighting and an IDEA for eliciting improved quantitative judgements.  
*Hemming V*  
*The University of British Columbia*

4:15 PM

W4-J.4

Measuring the consequences of incomplete objective sets using a Monte Carlo approach in selected applications of multiattribute models and simulated datasets  
*Kusumastuti SA*  
*University of Southern California*

4:30 PM

W4-J.5

Stochastic Input-Output Analysis: Comparison of methods to evaluate US Information Technology Infrastructure Disruptions  
*Ali J, Santos JR*  
*George Washington University*

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*Decision Analysis and Risk Specialty Group*

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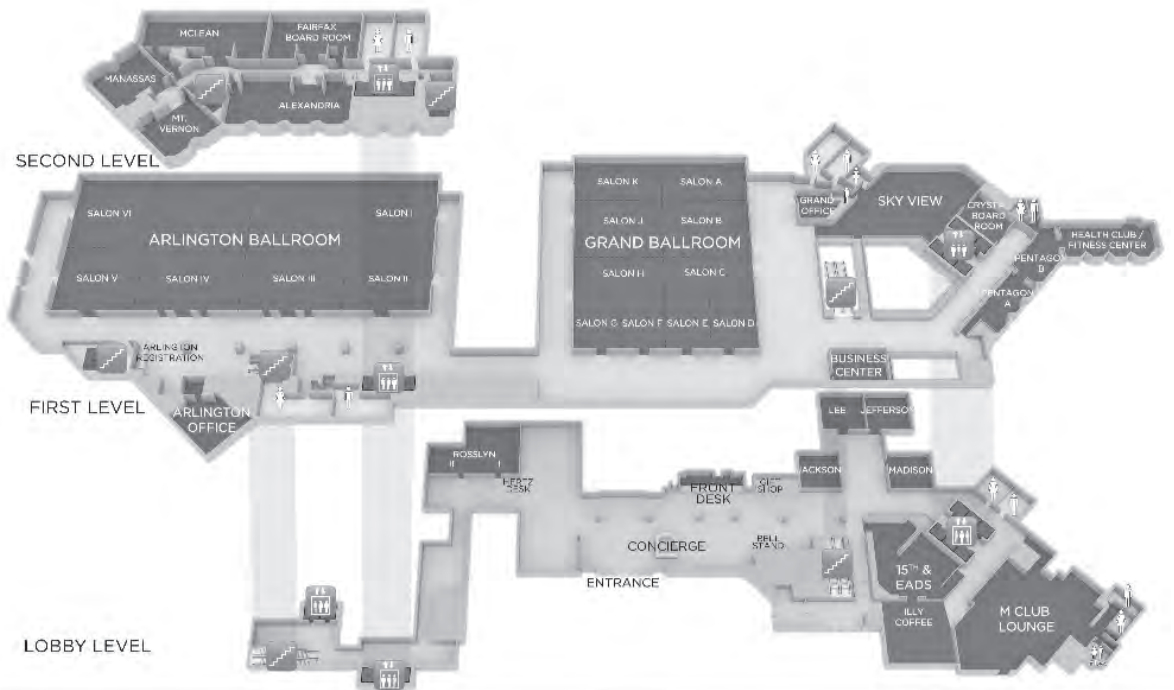
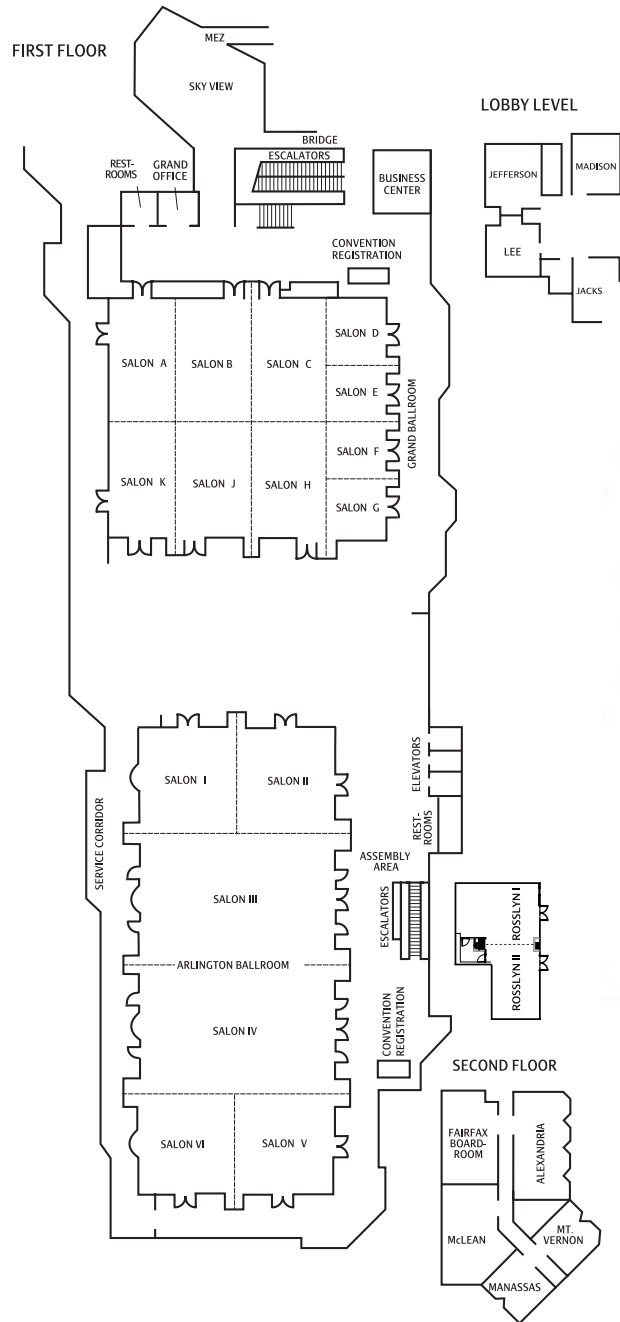








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# Microbial Risk Analysis

Editor-in-Chief

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