FINAL PROGRAM
New Orleans, LA • December 2 - 6, 2018

SRA 2018
RISK ANALYSIS • The Many Faces of Risk
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Meeting Highlights

Meeting Events! Most events take place at the New Orleans Marriott. Start with the opening reception on Sunday, December 2, 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 2019 Annual Meeting), Wednesday, December 5, 5:00 PM. The meeting includes three plenary sessions, and complimentary box lunch on Monday, Awards Banquet lunch on Tuesday (comes with your registration), and a Plenary Luncheon on Wednesday (included also in your registration fee). Don’t forget workshops on Sunday and Thursday—there is still room!

Meeting Theme – “Risk Analysis – The Many Faces of Risk” 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 to 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!

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 (Rhythm Office, 4th Floor) 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.

Plenary session on Monday begins at 8:30 AM so plan to arrive early!

Looking for WiFi?
Network: Society for Risk Analysis
Access Code: sra2018no
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www.SRA.org, SRA@BurkInc.com

Conference Hotel
New Orleans Marriott
555 Canal Street, New Orleans, LA 70130
Phone: 504.581.1000 • www.marriott.com
Sunday, December 2

2019 World Congress
Program Committee Meeting
9:00 AM–5:00 PM - Studio 10, Second Floor

SRA Council Meeting
12:00 PM–5:00 PM - Galerie 5, 2nd Floor

Editorial Staff Meeting
3:00 PM–5:00 PM - Galerie 4, 2nd Floor

Editorial Board Meeting
5:00 PM–6:00 PM - Galerie 4, 2nd Floor

SRA Welcome Reception
6:00 PM–7:30 PM - Arcadia, 3rd Floor

Monday, December 3

New Member, Student/Young Professionals Breakfast
7:00 AM–8:00 AM - Bissonet, 3rd Floor
All SRA Students, Young Professionals, and 2017 and 2018 New Members (badges with a New Member ribbon) are welcome to attend.

Publications Committee Meeting
7:00 AM–8:00 AM - Beauregard, 5th Floor

Finance Committee
7:00 AM–8:30 AM - Galvez, 5th Floor

Conferences & Workshops Committee Meeting
7:30 AM–8:30 AM - Audubon, 5th Floor

Opening Plenary Session
8:30 AM–10:00 AM - Acadia, 3rd Floor

Specialty Group Meetings
12:10 PM–1:25 PM - See page 5

SRA Fifth World Congress on Risk, Cape Town, 2019
5:00 PM–6:00 PM - Audubon, 5th Floor

Poster Reception
6:00 PM–8:00 PM - Preservation Hall, 2nd Floor

SRA Student and Young Professionals Social
8:30 PM–10:00 PM
Offsite: Sneaky Pete’s - 135 Chartres Street

Tuesday, December 4

Grad Student Breakfast
7:00 AM–8:00 AM - Napoleon, 41st Floor River Tower

Audit Committee Meeting
7:00 AM–8:00 AM - Audubon, 5th Floor

Communications Committee Meeting
7:30 AM–8:30 AM - Beauregard, 5th Floor

Regions Committee Meeting
7:30 AM–8:30 AM - Galvez, 5th Floor

Plenary Session
8:30 AM–10:00 AM - Acadia, 3rd Floor

SRA Awards Luncheon and Business Meeting
12:00 PM–1:30 PM - Acadia, 3rd Floor

Specialty Group Mixers
6:00 PM–8:00 PM - See page 5

SRA Council Meeting
6:30 PM–10:00 PM - Riverview 2, 41st Floor River Tower

Wednesday, December 5

Environment, Systems, Decisions
Editorial Board Meeting
7:00 AM–8:00 AM - Beauregard, 5th Floor

Specialty Group Chair Breakfast
7:30 AM–8:30 AM - Audubon, 5th Floor

Education Committee Meeting
7:30 AM–8:30 AM - Galvez, 5th Floor

Plenary Luncheon
12:00 PM–1:25 PM - Acadia, 3rd Floor
Included in registration fee

T-shirt Giveaway and Raffle
5:00 PM–5:30 PM - Galerie Booth, 2nd Floor
Possibility of winning registration to the 2019 Annual Meeting

*** 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.
## 2018 Specialty Group Winners

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Winner(s)</th>
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<tbody>
<tr>
<td>Applied Risk Management</td>
<td>Rahim Ali</td>
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<tr>
<td>Decision Analysis and Risk</td>
<td>Jorge Gonzalez Ortega</td>
</tr>
<tr>
<td>Dose-Response</td>
<td>Zheng Zhou</td>
</tr>
<tr>
<td>Ecological Risk Assessment</td>
<td>Mariana Cains</td>
</tr>
<tr>
<td>Economics and Benefits Analysis</td>
<td>Marwan Alsultan</td>
</tr>
<tr>
<td>Emerging Nanoscale Materials</td>
<td>Sarah Davidson</td>
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<tr>
<td>Engineering and Infrastructure</td>
<td>Huiling Hu</td>
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<td>Renee Obringer</td>
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<tr>
<td>Exposure Assessment</td>
<td>Zheng Zhou</td>
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<tr>
<td>Foundational Issues in Risk Analysis</td>
<td>Greg Heon</td>
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<tr>
<td>Microbial Risk Analysis</td>
<td>Shraddha Karanth</td>
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<td>Onay Burak Dogan</td>
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<tr>
<td>Resilience Analysis</td>
<td>Rahim Ali</td>
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<tr>
<td>Risk and Development</td>
<td>Alexa Wood</td>
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<td>Risk Policy &amp; Law</td>
<td>John Lindberg</td>
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<tr>
<td>Security &amp; Defense</td>
<td>Rohit Suresh</td>
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<tr>
<td>Ecology and Environmental Policy</td>
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## Student and International Travel Award Winners

<table>
<thead>
<tr>
<th>Category</th>
<th>Winner(s)</th>
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<tbody>
<tr>
<td>Applied Risk Management</td>
<td>Lauren Lutzke</td>
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<tr>
<td>Decision Analysis and Risk</td>
<td>Deniz Marti</td>
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<tr>
<td>Dose-Response</td>
<td>Robyn Miranda</td>
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<tr>
<td>Economics and Benefits Analysis</td>
<td>Ramin Moradi</td>
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<tr>
<td>Emerging Nanoscale Materials</td>
<td>Alexis Mraz</td>
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<tr>
<td>Engineering and Infrastructure</td>
<td>Renee Obringer</td>
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<tr>
<td>Exposure Assessment</td>
<td>Benjamin Rachunok</td>
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<tr>
<td>Foundational Issues in Risk Analysis</td>
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<tr>
<td>Microbial Risk Analysis</td>
<td>Javor Saha Turna</td>
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<tr>
<td>Risk and Development</td>
<td>Onay Burak Dogan</td>
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<tr>
<td>Risk Policy &amp; Law</td>
<td>Onal Tatar</td>
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<tr>
<td>Security &amp; Defense</td>
<td>George Waren</td>
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<td>Ecology and Environmental Policy</td>
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## Other Winners

- Yu-Ting Chin
- Ting-Hsuan Chou
- Chris Elemuwa
- Larissa Ferentz
- Kieran Findlater
- Sabina Halappanavar
- Scott Hanson-Easey
- Feng-Chih Kang
- Ali Khamesipour
- Ruth Kutalek
- Po Han Lin
- Wolfgang Maurer
- Edison Arwanire Mworozi
- Apurva Narayan
- Murilo Noli Da Fonseca
- Md Rasheduzzaman
- Jose Serrano
- Danyelle Stringari
- Kousuke Takahashi
- Lai Ting-Ju
- Dominique A. Vuitton
- Wan Mohd Zulhafiz Bin Wan
- Zahari
- Pei-Wen Wu
- Xingning Xiao
- Hwq-Lung Yu
Committee Meetings and Events

Specialty Group Meetings
Monday, December 3 - 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), Galerie 5, 2nd Floor
Economics & Benefits Analysis (EBASG), Galerie 2, 2nd Floor
Occupational Health & Safety (OHSSG), Galerie 3, 2nd Floor
Risk Communication (RCASG), Galerie 6, 2nd Floor
Security & Defense (SDSG), Salon A-C, Third Floor
Ecological Risk Assessment (ERASG), Salon D, Third Floor
Foundational Issues in Risk Analysis (FRASG), Salon E, Third Floor
Risk, Policy & Law (RPLSG), Salon F-H, Third Floor

12:50-1:25 PM
Exposure Assessment (EASG), Galerie 5, 2nd Floor
Risk & Development (RDSG), Galerie 2, 2nd Floor
Applied Risk Management (ARMASG), Galerie 3, 2nd Floor
Decision Analysis & Risk (DARSG), Galerie 5, 2nd Floor
Emerging Nanoscale Materials (ENMSG), Salon A-C, Third Floor
Engineering & Infrastructure (EISG), Salon D, Third Floor
Microbial Risk Analysis (MRASG), Salon E, Third Floor
Resilience Analysis Specialty Group Meeting (RASG), Salon F-H, Third Floor

Specialty Group Mixers
Tuesday, December 4 - 6:00-8:00 PM
Mixer 1 - DRSG, MRASG, EASG, ARMSG
Barcadia - Back Bar, 601 Tchoupitoulas Street, New Orleans, LA 70130
Mixer 2 - SDSG, DARSG, EISG, FRASG
Ohm Lounge - Barcadia, 601 Tchoupitoulas Street, New Orleans, LA 70130
Mixer 3 - RCSG, OHSSG, ERASG, RASG
Gravier Social, 523 Gravier Street, New Orleans, LA 70130
Mixer 4 - EBASG, ENMSG, RPLSG, RDSG
Acme Oyster Company, 724 Iberville Street, New Orleans, LA 70130

Key to Specialty Group Designations

ARMASG = Applied Risk Management
DARSG = Decision Analysis and Risk
DRSG = Dose-Response
EASG = Exposure Assessment
EBASG = Economics & Benefits Analysis
EISG = Engineering and Infrastructure
ENMSG = Emerging Nanoscale Materials
ERASG = Ecological Risk Assessment
FRASG = Foundational Issues in Risk Analysis
MRASG = Microbial Risk Analysis
OHSSG = Occupational Health & Safety
RASG = Resilience Analysis
RCASG = Risk Communication
RDSG = Risk & Development
RPLSG = Risk, Policy and Law
SDSG = Security and Defense

Speaker Ready Room Hours
Rhythm Office, 4th Floor
Sunday, December 2 ............................ 3:00 PM – 7:00 PM
Monday, December 3 ............................ 7:00 AM – 5:00 PM
Tuesday, December 4 ............................ 7:00 AM – 5:00 PM
Wednesday, December 5 ............................ 7:00 AM – Noon

Registration Desk Hours
Galerie Booth, 2nd Floor
Sunday, December 2 ............................ 4:00 PM – 6:30 PM
Monday, December 3 ............................ 7:00 AM – 5:00 PM
Tuesday, December 4 ............................ 8:00 AM – 5:00 PM
Wednesday, December 5 ............................ 8:00 AM – 5:00 PM
Special Issue on the Implementation in Europe of the WHO Recommendations on Food Marketing to Children

Edited by: Amandine Garde
Contributors: Gerard Hastings, Amandine Garde, Godfrey Xuereb, Emma Boyland, Mimi Tatlow-Golden, Bill Jeffery, Neville Rigby, Oliver Bartlett, Sue Davies, Jane Landon, Katharina O'Cathaoir, Marie Vaale-Halberg, Hedda Bjøralt Roald, Marine Friant-Perrot, Anaëlle Chansay, Seamus Byrne, Nikhil Gokani and Ben Murphy

Articles

The ‘Likeness’ of E-Cigarettes and Cigarettes in the WTO
Marina Foltea and Anna Markitanova

The Regulatory Framing of Nanotechnology as ‘Incremental’ or ‘Radical’ Innovation
Stijn Smismans and Elen Stokes

Can ‘Better Regulation’ in the European Union really Be a Servant of Technocracy?
Morten Jarlbaek Pedersen
Exhibitors

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Exhibition – Galerie Foyer, 2nd Floor
Monday, December 3 .............................. 10:00 AM - 3:30 PM
Poster Reception .................................. 6:00 PM - 8:00 PM
Preservation Hall, 2nd Floor
Tuesday, December 4 ............................ 9:30 AM - 4:00 PM
Wednesday, December 5 ........................ 9:30 AM - 4:00 PM

Crude Life Portable Museum

Artist and biologist, Dr. Brandon Ballengée, will be onsite to share his Crude Life project. Stop by the Crude Life exhibit to interact with and learn more about this interdisciplinary art, science and outreach project, which is focused on raising public awareness of Gulf of Mexico species, ecosystems, and regional environmental challenges through community “citizen science” surveys and a portable Gulf art-science museum.
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.

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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 6,000 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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U.S. Environmental Protection Agency conducts research that provides the underpinning of science and technology for policies and decisions made at federal, state, and local levels. EPA’s research office has locations in 14 facilities which identify pressing science needs.
### Continuing Education Workshops

Workshops are offered Sunday and Thursday, either Full Day, AM Half Day, or PM Half Day. Full descriptions of each workshop are provided below.

#### AM WORKSHOPS

**SUNDAY December 2nd, 8:00AM—12:00PM**

**WK1AMS: An Overview of Cyber Risk Topics**

**Cost:** $100  
**Location:** Studio 2, 2nd Floor  
**Instructor:** Aaron Fister, University of Oklahoma

This half-day workshop provides an overview of Cyber Risk topics. How has cyber risk evolved? What influences the complexity of cyber risk? How is cyber risk similar to other risk domains? What is the current (threat) landscape of cyber risk? The workshop then turns to understanding how organizations manage cyber risk. Examples of well-known Cyber Risk events are presented. The intent is to link direct and indirect causal factors that affect cyber risk. Then the discussion changes to understanding what attributes influence individual perceptions of cyber risk. Final results of a recent study are reviewed. The workshop will conclude with a discussion of potential research and collaboration opportunities. The workshop's audience is anyone interested in learning the current state of cyber risk topics. Researchers, students, and cyber risk professionals are encouraged to attend. You do not need to have a background in cyber risk to attend this workshop.

**WK2AMS: Introduction to APEX: Estimating Population-based Air Pollutant Exposure, Dose, and Health Risk**

**Cost:** $200  
**Location:** Studio 4, 2nd Floor  
**Instructor:** Stephen Graham, U.S. EPA

This workshop will provide an introduction to EPA's Air Pollutants Exposure Model (APEX) version 5, a new publicly available computer program that estimates population-based human inhalation exposures, intake doses, and adverse health responses associated with exposure to air pollutants. The model employs a flexible construct that allows users to estimate short- or long-term exposures to one or more pollutants, for study groups of any age,
sex, race, ethnicity, country, or disease status. APEX uses several databases to estimate exposures and potential health risks including those containing data on time-location-activity patterns, population demographics and commuting patterns, ambient concentrations, meteorological parameters, and anthropometric and physiologic attributes. Participants will be instructed in the basic principles of human inhalation exposure assessment considering a probabilistic exposure-modeling approach, how to use the core features of the program, how to define the study area and develop key model inputs, and how to generate basic exposure and risk output tables.

Students need to provide their own laptops running Microsoft Windows 7, Windows 8, or Windows 10 (currently the program does not run on Apple products), on which they have installed APEX and loaded all training files. Participants also need to have administrative access to their laptop. The APEX installation package, including the model executable, data input files, and technical documentation, is available at: www.epa.gov/sites/production/files/2017-10/apex5_installer_0.exe.

This workshop is targeted at beginner to novice modelers interested in probabilistic, population-based health risk assessments that emphasize the importance of representing variability in air pollutant concentrations, personal attributes, and other influential factors that can greatly affect exposure and risk estimates.

**WK3AMS: Quantitative Dose-Response Modeling Methods and Tools – Part I (Basic): Bayesian BMD Analysis**

**Cost:** $200  
**Location:** Studio 7, 2nd Floor  
**Instructor:** Kan Shao, Indiana University

This half-day workshop (the first one in a series of two) 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) with hands-on experience on the recently developed web-based Bayesian BMD (BBMD) estimation system and its application to chemical risk assessment. The Bayesian BMD modeling and analysis involves using Markov Chain Monte Carlo (MCMC) algorithm to fit mathematical dose-response models to toxicity data (mainly dichotomous and continuous data) and estimating the distributions of model parameters and quantities of interest (e.g., BMD) by using posterior samples. This important feature makes the Bayesian BMD method particularly useful for probabilistic dose-response assessment, which has been strongly advocated by the WHO/IPCS expert panel. Another extremely useful feature of this workshop is the introduction on the model averaging techniques for BMD estimation, which has been suggested as a preferred approach to address model uncertainty in dose-response assessment by the European Food Safety Authority (2017). Additionally, how the distributional estimates of BMD can support the WHO/IPCS probabilistic dose-response assessment framework will be briefly discussed. This workshop will also provide participants with necessary knowledge for the second part of the workshop. Participants should bring their own laptop with recent internet browser installed (the latest version of Google Chrome is preferred).

This workshop is targeted at professionals from industry and government who conduct quantitative dose-response analysis for chemical risk assessment, and students who are interested in Bayesian doseresponse modeling.

**PM WORKSHOPS**

**SUNDAY December 2nd, 1:00PM—5:00PM**

**WK4PMS: Cyber Risk Analysis – Working in the Trenches**

**Cost:** $100  
**Location:** Studio 2, 2nd Floor  
**Instructor:** Aaron Fister, University of Oklahoma

This workshop provides an overview of probabilistic cyber risk analysis techniques. Probabilistic risk analysis is a relatively new and underutilized tool for most organizations managing cyber risk. Currently, many organizations rely on qualitative or ad hoc processes to identify and prioritize cyber risks. The workshop introduces probabilistic cyber risk analysis based on expert estimation and subjective probability. Examples will be provided utilizing the R software package. This workshop is directed at those unfamiliar with probabilistic risk analysis (or other quantitative methods). It will provide a venue for researchers and risk professionals to connect. Research and collaboration is needed to further develop theory, applications, education, and awareness of risk analysis and management methods for the Cyber Risk community.

This workshop is targeted at risk professionals, researchers, and students interested in the cyber risk analysis process.

**WK5PMS: Eliciting Judgments from Experts and Non-experts to Inform Decision-making**

**Cost:** $250  
**Location:** Studio 4, 2nd Floor  
**Instructors:** Cristina McLaughlin, U.S. FDA; Aylin Sertkaya, Eastern Research Group, Inc. (ERG)

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.

This workshop is targeted at Policy Analysts, Decision makers, Risk Assessors, Economists, and Decision Analysts.

**WK6PMS: Regulatory Impact Analysis for Risk-Reduction Policies**  
**Cost:** $275  
**Location:** Studio 6, 2nd Floor  
**Instructor:** Deborah Aiken, U.S. Department of Transportation

A major avenue for risk analysis to feed into the decision-making process is through the benefit-cost analysis in Regulatory Impact Analysis (RIA). Understanding RIAs will aid risk assessors in ensuring that their work effectively supports regulatory initiatives. This workshop will provide an overview of the practice of conducting Regulatory Impact Analysis (RIA) in the United States. The half-day course will cover the essential aspects of the (RIA) process, including the roles of various Executive Orders and OMB oversight, as well as its foundations in economic principles. The focus is on the U.S. approach to RIA, with its emphasis on integration with risk analysis, information quality, public engagement, and transparency. While some background in economics will facilitate understanding of the topics covered, formal training in economics is not necessary. The materials are intended to be accessible to participants from a wide range of backgrounds, and the workshop should be of interest to general SRA membership, particularly those working in a public policy setting and those seeking to learn more about how federal agencies evaluate risk reduction policies.

The workshop should be of interest to general SRA membership, particularly those working in a public policy setting and those seeking to learn more about how federal agencies evaluate risk reduction policies.

**WK7PMS: Quantitative Dose-Response Modeling Methods and Tools – Part II (Advanced): BMDS 3.0 and CatReg**  
**Cost:** $200  
**Location:** Studio 7, 2nd Floor  
**Instructor:** J. Allen Davis, U.S. EPA

This half-day workshop (the second in a series of two) will build upon the first to provide participants with interactive training on the use of the U.S. Environmental Protection Agency’s (EPA) Benchmark Dose software (BMDS, version 3.0, released fall 2018) and Categorical Regression software (CatReg, version 3.1, released summer 2017) and their application to risk assessment. BMDS 3.0 builds upon previous versions of BMDS and the BMDS Wizard by simplifying the workflow for modeling, fully implementing all BMDS analyses in Microsoft Excel. New to BMDS 3.0 are Bayesian model averaging and the ability to assume response lognormality as alternative modeling approaches for analyzing dichotomous and continuous response data, respectively. The focus of the BMDS training will center on how to use the new interface and the theory and application of the new models, particularly the new model averaging methods. CatReg is a powerful modeling tool for the analysis of concentration-time response data and can be used for the meta-analysis of toxicological data. Categorical regression modeling involves fitting mathematical models to toxicity data that has been assigned ordinal severity categories (i.e., minimal, mild, or marked effects) and can be associated with up to two explanatory variables corresponding to exposure conditions, usually concentration and duration. The categorization of observed responses allows the expression of dichotomous, continuous, and descriptive data in terms of response severity and supports the analysis of data from single studies or multiple studies.

Additionally, the meta-analytical capability of CatReg allows for the filtering and stratification of data to determine statistically significant different responses between sexes, strains, and/or species. CatReg training will focus on the theory of categorical regression and the application of the method to animal toxicity data.

Participants need to bring their own laptops, with BMDS and CatReg installed, to the workshop. The latest version of the software programs can be found at: www.epa.gov/bmds

The target audience for this workshop is risk assessors and others that are interested in learning 1) how to apply EPA’s Categorical Regression software in dose-response of toxicity data and 2) the new features of BMDS 3.0, including Bayesian model averaging.
WK9ALLS: Monte Carlo Simulation and Probability Bounds Analysis in R with Hardly Any Data

Cost: $290
Location: Studio 9, 2nd Floor
Instructors: Scott Ferson, Institute for Risk and Uncertainty, University of Liverpool, UK

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.

The target audience for this workshop is novices to Monte Carlo simulation, and anyone interested in probability bounds analysis.

WK11ALLS: Quantitative Dose-Response Modeling Methods and Tools – Part I and II

Cost: $300 (discounted)
Location: Studio 7, 2nd Floor
Instructor: Kan Shao, Indiana University; J. Allen Davis, U.S. EPA

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) with hands-on experience on the recently developed web-based Bayesian BMD (BBMD) estimation system and its application to chemical risk assessment. The Bayesian BMD modeling and analysis involves using Markov Chain Monte Carlo (MCMC) algorithm to fit mathematical dose-response models to toxicity data (mainly dichotomous and continuous data) and estimating the distributions of model parameters and quantities of interest (e.g., BMD) by using posterior samples. This important feature makes the Bayesian BMD method particularly useful for probabilistic dose-response assessment, which has been strongly advocated by the WHO/IPCS expert panel. Another extremely useful feature of this workshop is the introduction on the model averaging techniques for BMD estimation, which has been suggested as a preferred approach to address model uncertainty in dose-response assessment by the European Food Safety Authority (2017). Additionally, how the distributional estimates of BMD can support the WHO/IPCS probabilistic dose-response assessment framework will be briefly discussed. This workshop will also provide participants with necessary knowledge for the second part of the workshop.

The second part of the workshop will build upon the first to provide participants with interactive training on the use of the U.S. Environmental Protection Agency’s (EPA) Benchmark Dose software (BMDS, version 3.0, released fall 2018) and Categorical Regression software (CatReg, version 3.1, released summer 2017) and their application to risk assessment. BMDS 3.0 builds upon previous versions of BMDS and the BMDS Wizard by simplifying the workflow for modeling, fully implementing all BMDS analyses in Microsoft Excel. New to BMDS 3.0 are Bayesian model averaging and the ability to assume response lognormality as alternative modeling approaches for analyzing dichotomous and continuous response data, respectively. The focus of the BMDS training will center on how to use the new interface and the theory and application of the new models, particularly the new model averaging methods. CatReg is a powerful modeling tool for the analysis of concentration-time-response data.
and can be used for the meta-analysis of toxicological data. Categorical regression modeling involves fitting mathematical models to toxicity data that has been assigned ordinal severity categories (i.e., minimal, mild, or marked effects) and can be associated with up to two explanatory variables corresponding to exposure conditions, usually concentration and duration. The categorization of observed responses allows the expression of dichotomous, continuous, and descriptive data in terms of response severity and supports the analysis of data from single studies or multiple studies. Additionally, the metaanalytical capability of CatReg allows for the filtering and stratification of data to determine statistically significant different responses between sexes, strains, and/or species. CatReg training will focus on the theory of categorical regression and the application of the method to animal toxicity data.

Participants should bring their own laptop with recent internet browser installed (the latest version of Google Chrome is preferred). Laptops also need BMDS and CatReg installed for this workshop. The latest version of the software programs can be found at: https://www.epa.gov/bmds.

The target audience for this workshop is risk assessors and others that are interested in learning 1) how to apply EPA’s Categorical Regression software in dose-response of toxicity data and 2) the new features of BMDS 3.0, including Bayesian model averaging.

**AM WORKSHOPS**

**WK13AMTH: Health Risk Assessment of Environmental Chemical Mixtures: Concepts, Methods, Applications**

**Cost:** $250

**Location:** Bacchus, 4th Floor

**Instructor:** Linda K Teuschler, LK Teuschler & Associates

This problems-based, half-day, introductory workshop focuses on methods to assess health risks posed by exposures to chemical mixtures in the environment. Chemical mixtures health risk assessment methods continue to be developed and evolve to address concerns over health risks from multichemical exposures. This workshop presents key concepts and terminology used in chemical mixtures risk assessment and discusses both whole mixture and component-based methods. Response addition and dose addition will be described and will include the following methods: the hazard index, interaction-based hazard index, relative potency factors, toxicity equivalence factors and integrated additivity. The risk assessment examples developed in the workshop are adapted from real-world mixture analyses, e.g., waste site contaminants, pesticide applications, and drinking water disinfection by-product exposures. 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. (We ask participants to bring a calculator or laptop). The views expressed in this abstract are those of the authors and do not necessarily reflect the views or policies of the U.S. EPA.

This workshop targets students and other individuals who are interested in developing knowledge of risk assessment methods for environmental chemical mixtures, including component methods that rely on dose addition and response addition. Teaching methods include lectures and hands-on exercises.

**ALL-DAY WORKSHOPS**

**WK14ALLTH: Integrating Strategic Risk Communication and Stakeholder Engagement with Risk Management to Enhance Organizational Change and Resilience**

**Cost:** $450

**Location:** Regent, 4th Floor

**Instructors:** Steve Ackerlund, Ecology & Environment, Inc.; Sarah Thorne, Decision • Partners

The workshop will include brief introductory lectures but will focus more on application of the approach though presentation of case studies, exercises, and interactive discussions of practical experiences of the lecturers and of workshop participants. Lectures will present a brief introduction to Risk Communication and Stakeholder Engagement principles and practices. Case studies will demonstrate real-world applications of the lecturers. Small group exercises will allow application of learned practices to provide deeper appreciation of key fundamentals, such as issue framing and design of Risk Communication and Stakeholder Engagement Plans. Interactive discussions will allow lecturers and participants to discuss solutions to Participants’ current real-world problems. Workbooks will provide course content, step-by-step worksheets to help students adapt the Strategic Risk Communications process to their own risk communication challenge and will include a bibliography of additional resources. Some case studies and discussion may be supported via videoconference with remote presenters.
This workshop is designed for anyone responsible for management, analysis or communication of risk, or planning and coordination of resilience and risk response, within an organization with internal and/or external stakeholders, including the general public. The workshop is appropriate for policy makers, regulators, industry or NGO managers, communicators, scientists, engineers, and planners. At the conclusion of the course, participants will be able to incorporate state-of-the-science concepts and practices of Strategic Risk Communications and stakeholder engagement into an integrated risk management and resilience approach that is appropriate to the nature of the risks to be addressed.

WK17ALLTH: Monte Carlo Simulation and Probability Bounds Analysis in R with Hardly Any Data
Cost: $290
Location: Balcony M, 4th Floor
Instructor: Scott Ferson, Institute for Risk and Uncertainty, University of Liverpool, UK
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.

The target audience for this workshop is novices to Monte Carlo simulation, and anyone interested in probability bounds analysis.

Mark your calendar!
Dates for the 2019 - 2021 Annual Meetings:

2019
December 8-12
Crystal Gateway Marriott
Arlington, Virginia

2020
December 13-17
JW Marriott Austin
Austin, Texas

2021
December 5-9
Wardman Park Marriott
Washington, DC

Resumes and Job Opportunities
The Annual Meeting offers an opportunity to connect jobs with job seekers. Please send your available job postings via email to Jennifer Rosenberg at jrosenberg@BurkInc.com. Job postings and blind resumes are posted at the meeting and will be held at SRA headquarters for six months after the meeting.
**Plenary Sessions**

All plenary sessions are held in the New Orleans Marriott, Acadia, 3rd Floor

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**Monday, December 3, Morning Plenary**

**Conducting Risk Research with Underrepresented Populations: Dispatches from the Field?**

Minority and low-income populations are disproportionately vulnerable to a variety of environmental and health risks, and risk scholars have called for more research involving individuals with diverse backgrounds and experiences. Plenary speakers will share experiences conducting risk research with underrepresented populations, focusing on challenges as well as opportunities for contemporary risk scholarship. Speakers will draw on recent examples from their own research, including academic-NGO collaborations, to highlight key insights for risk scholars amid shifting demographics and rising socioeconomic inequalities in the U.S. and abroad.

**Organizer:**
Jonathon Schuldt, Cornell University

**Panel:**
Grace Lewis, Environmental Defense Fund
Neil Lewis, Jr., Cornell University
Jeff Niederdeppe, Cornell University
Adam Pearson, Pomona College & Claremont Graduate University
Susana Ramirez, University of California Merced
Rainer Romero-Canyas, Environmental Defense Fund
Robin Dillon-Merrill, NSF Program Director

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**Tuesday, December 4, Morning Plenary**

**Risk Perceptions and Resilience among Coastal Gulf Coast Communities?**

Presented by members of the Consortium for Resilient Gulf Communities. The Consortium for Resilient Gulf Communities (CRGC) was established in 2015 through a three-year grant from the Gulf of Mexico Research Initiative to assess and address the social, economic, and public health impacts of the 2010 Deepwater Horizon oil spill in the Gulf of Mexico region. CRGC’s research, outreach, and education goals are aimed at helping communities across the Gulf Coast to more effectively understand, withstand, and overcome the multiple stressors brought on by such disasters.

**Panel:**
Melissa Finucane, Consortium Director
Rajeev Ramchand, co-lead of the CRGC Health Team
Andrew Parker, co-lead of the CRGC Self-Evaluation Team
Vanessa Parks, doctoral student at Louisiana State University

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**Lunch Wednesday**

**Crude Life: A Citizen Art and Science Investigation of Gulf of Mexico Biodiversity after the Deepwater Horizon Oil Spill**

Join artist and biologist, Dr. Brandon Ballengée for a discussion on the Crude Life project. Crude Life is an interdisciplinary art, science and outreach project focused on raising public awareness of Gulf of Mexico species, ecosystems, and regional environmental challenges through community "citizen science" surveys and a portable Gulf art-science museum. For this project, antique sea chests were retrofitted into a movable natural history museum or Gulf wunderkammer (Cabinet of Wonders)! Each chest contains natural history artifacts, (preserved specimens, fossils, dried alga, etc.), art (natural history drawings or videos) and tells a different part of the story within our complex Gulf ecosystems. The scientific research of Crude Life has focused on looking for 14 missing species of endemic Gulf fishes that have not been found following the 2010 oil spill.

Brandon Ballengée, Ph.D., Ballengée Studio LLC and LSU Museum of Natural Science
### Monday

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<tr>
<th>Time</th>
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<tr>
<td>7:00 AM-8:00 AM</td>
<td><strong>New Member, Students/Young Professionals Breakfast</strong> - Bissonet, 3rd Floor</td>
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<tr>
<td>8:30 AM-10:00 AM</td>
<td><strong>Plenary Session</strong>, Conducting Risk Research with Underrepresented Populations: Dispatches from the Field - Acadia, 3rd Floor Participants: Grace Lewis, Neil Lewis, Jr., Jeff Niederdeppe, Adam Pearson, Susana Ramirez, Rainer Romero-Canyas, Robin Dillon-Merrill</td>
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<td>10:00 AM-10:30 AM</td>
<td><strong>Coffee Break</strong> sponsored by Evidence Partners</td>
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<td>Galerie 3, 2nd Floor: M2-C Symposium: Vaccine Communication I</td>
<td>Galerie 4, 2nd Floor: M2-D Energy Systems</td>
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<td>Galerie 5, 2nd Floor: M2-E Symposium: Alternative Testing Strategies to Advance the Risk Analysis of Nanomaterials</td>
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<td>10:30 AM-Noon</td>
<td>Pick up your box lunch near the registration desk and attend the specialty group meeting(s) of your choice.</td>
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<td>noon-12:10 PM</td>
<td>12:10 PM-12:45 PM - Dose Response (DRSG), Economics &amp; Benefits Analysis (EBASG), Occupational Health &amp; Safety (OHSSG), Risk Communication (RCSG), Security &amp; Defense (SDSG), Ecological Risk Assessment (ERASG), Foundational Issues in Risk Analysis (FRASG), Risk, Policy &amp; Law (RPLSG)</td>
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<td>Noon-12:50 PM</td>
<td>12:50 PM-1:25 PM - Exposure Assessment (EASG), Risk &amp; Development (RDSG), Applied Risk Management (ARMSG), Decision Analysis &amp; Risk (DARSG), Emerging Nanoscale Materials (ENMSG), Engineering &amp; Infrastructure (EISG), Microbial Risk Analysis (MRASG), Resilience Analysis Specialty Group Meeting (RASG)</td>
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<td>1:30 PM-3:00 PM</td>
<td><strong>M3-A Symposium: Benzene: Low Doses Issues</strong></td>
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<td><strong>M3-B Roundtable: Prudent Risk Analysis</strong></td>
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<td><strong>M3-C Symposium: Vaccine Communication II</strong></td>
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<td><strong>M3-D Sustainability and Infrastructure</strong></td>
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<td><strong>Coffee Break</strong></td>
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<td>3:30 PM-5:00 PM</td>
<td><strong>M4-A Symposium: Dose-Responses for Environmental Carcinogens: The Emerging Role of Threshold, Biphasic and other Risk Models</strong></td>
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<td><strong>M4-B Roundtable: Success Stories of Women in Risk Analysis</strong></td>
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<td><strong>M4-C Roundtable: Periodic Review</strong></td>
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<td><strong>M4-D Riding out the Storm</strong></td>
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<td><strong>M4-E Roundtable: The Battle of the Guidelines: Four Competing Ideas for Domain-Specific Risk Management Guidelines</strong></td>
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<td>6:00 PM-8:00 PM</td>
<td><strong>Poster Reception</strong>, Preservation Hall, 2nd Floor</td>
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Participants: Grace Lewis, Neil Lewis, Jr., Jeff Niederdeppe, Adam Pearson, Susana Ramirez, Rainer Romero-Canyas, Robin Dillon-Merrill |
| 10:00 AM-10:30 AM     | **Coffee Break** sponsored by Evidence Partners                                            |

### 10:00 AM-10:30 AM

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<tr>
<td>Galerie 6, 2nd Floor</td>
<td>M2-F Symposium: Climate Change Adaptation Planning for Coastal Areas: Risk Assessment, Mitigation, and Evaluation, Part I</td>
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<tr>
<td>Mardi Gras Ballroom ABC, 3rd Floor</td>
<td>M2-G Inhalation Exposure and Risk</td>
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<td>Mardi Gras Ballroom E, 3rd Floor</td>
<td>M2-I Poster Platform: Risk Perceptions, National Hazards &amp; Extreme Weather</td>
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Pick up your box lunch near the registration desk and attend the specialty group meeting(s) of your choice.

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- 12:50 PM-1:25 PM - **Exposure Assessment (EASG)**, **Risk & Development (RDSG)**, **Applied Risk Management (ARMSSG)**, **Decision Analysis & Risk (DARSG)**, **Emerging Nanoscale Materials (ENMSG)**, **Engineering & Infrastructure (EISG)**, **Microbial Risk Analysis (MRASG)**, **Resilience Analysis Specialty Group Meeting (RASG)**

### 1:30 PM-3:00 PM

- **M3-F Symposium: Climate Change Adaptation Planning for Coastal Areas: Risk Assessment, Mitigation, and Evaluation, Part II**
- **M3-G Does Exposure Equal Dose?**
- **M3-H Communicating Novel Emergent Risk**
- **M3-I Poster Platform: Managing & Measuring Cyber Security Risk**
- **M3-J Symposium: Climate Change Risk Perceptions and Communications**

### 3:00 PM-3:30 PM

**Coffee Break**

### 3:30 PM-5:00 PM

- **M4-F Symposium: Greener Choices: Improving the Safety of Consumer Products through Chemical Alternatives Analysis**
- **M4-G Playing with Nature: The Challenges of Synthetic Biology**
- **M4-H Novel Approaches & Their Applications in Microbial Risk Assessment**
- **M4-I Symposium: Game Theory, Decision Analysis for Homeland Security and Disaster Management**
- **M4-J Navigating Fear & Crisis: Implications for Health & Safety Communication**

### 6:00 PM-8:00 PM

**Poster Reception**, Preservation Hall, 2nd Floor
### Tuesday

#### 8:30 AM-10:00 AM

**Plenary Session**, Risk Perceptions and Resilience among Coastal Gulf Coast Communities - *Acadia, 3rd Floor*
Participants: Melissa Finucane, Rajeev Ramchand, Andrew Parker, Vanessa Parks

#### 10:00 AM-10:30 AM

**Coffee Break**

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#### 10:30 AM-Noon

- **T2-B Symposium: Foundational Issues in Risk Analysis II – Time Dynamics and Multigenerational Issues**
- **T2-C Symposium: Risk and Precision Medicine**
- **T2-D Roundtable: Diversity in the Risk Analysis Profession**
- **T2-E Infrastructure Risk Management**

#### Noon-1:30 PM

**SRA Awards Luncheon and Business Meeting** - *Acadia, 3rd Floor*
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 Roundtable: Today’s Boost for Resilience – Does it Conflict with the Risk Field?**
- **T3-B Symposium: Foundational Issues in Risk Analysis III – From Data to Systemic Hazards**
- **T3-C Societal Issues and Risk**
- **T3-D Symposium: Modeling of Infrastructure and Community Resilience**
- **T3-E Symposium: ENAVI: The German Energy Transition Navigated**

#### 3:00 PM-3:30 PM

**Coffee Break**

#### 3:30 PM-5:00 PM

- **T4-A Symposium: Development of Metrics to Assess Critical Infrastructure Resilience**
- **T4-B Roundtable: Risk Analysis vs Safety Management: Two Ships Passing in the Night? - How Closely Integrated Could and Should these two Approaches be for Improving the Joint Management of Safety and Risk?**
- **T4-C Symposium: Decision-Making Algorithms: Governing Risks and Opportunities**
- **T4-D Symposium: Predictive Risk Modeling for Resilient Infrastructure Systems**
- **T4-E Risk Governance and Risk Management in Complex Systems**

#### 6:00 PM-7:30 PM

**Specialty Group Mixers**
### Tuesday

| 8:30 AM-10:00 AM | **Plenary Session**, Risk Perceptions and Resilience among Coastal Gulf Coast Communities - *Acadia, 3rd Floor*  
Participants: Melissa Finucane, Rajeev Ramchand, Andrew Parker, Vanessa Parks |
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| T3-F Symposium: Geoengineering Risks, Decisions, and Governance, Part II | T3-G Dietary and Drinking Water Exposures | T3-H Economics of Food Risk-Benefit Analysis | T3-I Modeling &amp; Simulation for Security, Safety and Risk Monitoring | T3-J From AI to Fake News: Media &amp; Emerging Risks |
| 3:00 PM-3:30 PM | <strong>Coffee Break</strong> |
| <strong>Galerie 6, 2nd Floor</strong> | <strong>Mardi Gras Ballroom ABC, 3rd Floor</strong> | <strong>Mardi Gras Ballroom D, 3rd Floor</strong> | <strong>Mardi Gras Ballroom E, 3rd Floor</strong> | <strong>Mardi Gras Ballroom FGH, 3rd Floor</strong> |
| 6:00 PM-7:30 PM | <strong>Specialty Group Mixers</strong> |</p>
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<td><strong>Speaker:</strong> Brandon Ballengée</td>
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<td>W4-E Roundtable: Risk Analysis and Management in Finance</td>
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<td>5:00 PM-5:30 PM</td>
<td><strong>T-Shirt Giveaway and Raffle. Possibility of winning registration to the 2019 Annual Meeting - Registration Area, Galerie Booth, 2nd Floor</strong></td>
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<td>8:30 AM-10:00 AM</td>
<td>Galerie 6, 2nd Floor</td>
<td>W1-F Symposium: Risk Analysis for Uncertain Futures</td>
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<td>Mardi Gras Ballroom ABC, 3rd Floor</td>
<td>W1-G Ecosystem Services and Management</td>
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<td>Mardi Gras Ballroom D, 3rd Floor</td>
<td>W1-H Presence and Survival of Microbial Pathogens in Environment and Supply Chain</td>
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<td>Mardi Gras Ballroom E, 3rd Floor</td>
<td>W1-I Symposium: The Security and Resilience Nexus</td>
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<td>Mardi Gras Ballroom FGH, 3rd Floor</td>
<td>W1-J Roundtable: Risky Conversations: Examining the Dual Impacts of the SRA Annual Meeting on Thinking and Practice in Risk Science</td>
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<td>Mardi Gras Ballroom D, 3rd Floor</td>
<td>W2-H Improving Risk-Benefit Estimates for Regulatory Analysis</td>
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<td>Mardi Gras Ballroom E, 3rd Floor</td>
<td>W2-I Risk Modeling for Prevention</td>
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<td></td>
<td>Mardi Gras Ballroom FGH, 3rd Floor</td>
<td>W2-J From Flint to Fracking: Media &amp; Environmental Risk</td>
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<td>Noon-1:30 PM</td>
<td>Plenary Luncheon, Crude Life: A Citizen Art and Science Investigation of Gulf of Mexico Biodiversity after the Deepwater Horizon Oil Spill - Acadia, 3rd Floor</td>
<td>Plenary Luncheon, Crude Life: A Citizen Art and Science Investigation of Gulf of Mexico Biodiversity after the Deepwater Horizon Oil Spill - Acadia, 3rd Floor (Included in Registration Fee)</td>
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<td>Speaker: Brandon Ballengée</td>
<td>Speaker: Brandon Ballengée</td>
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<td>1:30 PM-3:00 PM</td>
<td>Galerie 6, 2nd Floor</td>
<td>W3-F Decision Analysis Applications and Case Studies</td>
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<td></td>
<td>Mardi Gras Ballroom ABC, 3rd Floor</td>
<td>W3-G Symposium: Potential Exposure and Health Effects Related to the Development of Oil and Natural Gas from Unconventional Resources in the United States</td>
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<td>Mardi Gras Ballroom D, 3rd Floor</td>
<td>W3-H Economics of Environmental Policy</td>
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<td>Mardi Gras Ballroom E, 3rd Floor</td>
<td>W3-I Symposium: What Risk Assessors Should Know This Year about Occupational Risk Analysis: From Chemical Exposure to Traumatic Brain Injury to Cumulative Risk Assessment</td>
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<td>Mardi Gras Ballroom FGH, 3rd Floor</td>
<td>W3-J Symposium: Low-Carbon Energy Transitions: Linking Stakeholder Exchanges &amp; Risk Communication</td>
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<td>3:00 PM-3:30 PM</td>
<td>Coffee Break</td>
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<tr>
<td>3:30 PM-5:00 PM</td>
<td>Galerie 6, 2nd Floor</td>
<td>W4-F Roundtable: Navigating the Risk Landscape: Facilitating Critical Thought in an Information Rich World</td>
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<td>Mardi Gras Ballroom ABC, 3rd Floor</td>
<td>W4-G Symposium: Understanding the Ecological and Health Risks Associated with Trace Organics in the Environment</td>
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<td>Mardi Gras Ballroom D, 3rd Floor</td>
<td>W4-H Economics of Low Probability / High Impact Events</td>
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<td></td>
<td>Mardi Gras Ballroom E, 3rd Floor</td>
<td>W4-I Communicating Health &amp; Environmental Risks</td>
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<td>Mardi Gras Ballroom FGH, 3rd Floor</td>
<td>W4-J Climate Change Communication: Implications for Messaging</td>
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<tr>
<td>5:00 PM-5:30 PM</td>
<td>T-Shirt Giveaway and Raffle. Possibility of winning registration to the 2019 Annual Meeting - Registration Area, Galerie Booth, 2nd Floor</td>
<td>T-Shirt Giveaway and Raffle. Possibility of winning registration to the 2019 Annual Meeting - Registration Area, Galerie Booth, 2nd Floor</td>
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### Technical Program

**Monday**

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

<table>
<thead>
<tr>
<th>Time</th>
<th>Venue</th>
<th>Symposium</th>
<th>Chair/Co-chairs</th>
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<tbody>
<tr>
<td>10:30 AM – 12:00 PM</td>
<td>Galerie 1, 2nd Floor</td>
<td>M2-A Symposium: When Risks Collide - Making Sense of Hybrid Risks in Today’s Information Rich Society</td>
<td>Co-chairs: Ian Hall, Igor Linkov</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>Galerie 2, 2nd Floor</td>
<td>M2-B Symposium: Foundational Issues in Risk Analysis I</td>
<td>Chair: Terje Aven</td>
</tr>
<tr>
<td>10:30 AM – 11:30 AM</td>
<td>Galerie 2, 2nd Floor</td>
<td>M2-C Symposium: Vaccine Communication I</td>
<td>Co-chairs: Frederic Boudier, Barbara Rath</td>
</tr>
<tr>
<td>10:30 AM – 12:00 PM</td>
<td>Galerie 3, 2nd Floor</td>
<td>M2-D Energy Systems</td>
<td>Chair: Stanley Levinson</td>
</tr>
<tr>
<td>10:30 AM – 11:30 AM</td>
<td>Galerie 4, 2nd Floor</td>
<td>M2-E Symposium: Alternative Testing Strategies to Advance the Risk Analysis of Nanomaterials</td>
<td>Co-chairs: James Ede, Jo Anne Shatkin</td>
</tr>
</tbody>
</table>

- **10:30 AM** M2-A.1
  Security and Resilience of Information Systems
  Linkov I
  US Army Engineer Research and Development Center

- **10:50 AM** M2-A.2
  Joining Up the Dots – Improving the Understanding and Communication of Risks to End-users
  Hall IS
  University of Northampton

- **11:10 AM** M2-A.3
  A Canadian Tool for Prioritization of Vector-Borne Diseases and the Contribution of Climate Change
  Ng V, Otten A*, Chemeris A, Breadner P, Fazil A
  Public Health Agency of Canada

- **11:30 AM** M2-A.5
  Considering Hybrid Threats in Critical Infrastructure Resilience Assessments
  Verner D
  Argonne National Laboratory

**Sponsored by:**
- Resilience Analysis SG

#### M2-B Symposium: Foundational Issues in Risk Analysis I
- **10:30 AM** M2-B.1
  Defining Risk Analysis: Audiences, Intents, and Meta-level Concepts
  Walker RR
  Protect Heritage Corp

- **10:50 AM** M2-B.2
  An Alternative Understanding of Risk – Implications for Risk Attenuation and Risk Amplification
  Fjaeran L, Aven T
  University of Stavanger

- **11:10 AM** M2-B.4
  A Sufficient Similarity Framework for Use in Whole Mixtures Hazard Assessment: Botanical Dietary Supplement Case Studies
  Rider CV
  NIEHS/NTP

**Sponsored by:**
- Foundational Issues in Risk Analysis SG

#### M2-C Symposium: Vaccine Communication I
- **10:30 AM** M2-C.1
  Strategic Assessment of Future Energy Needs and Emerging Technologies (SAFE-NET)
  Macal CM, Trail JB, Murphy JT, Boland N, Suter J, MacDonell MM, Wall TA
  Argonne National Laboratory

- **10:50 AM** M2-C.2
  Building Trust in Polio Surveillance and Eradication Policy in Nigeria
  Elemuwa CO, Bassey E, Elemuwa UG, Isibor JO, Omeregie R, Abdullahi H
  NPHCDA, WHO Office, National Agency for Food and Drugs Administration (NAFDAC), Ambrose Alli University, University of Benin Teaching Hospital

- **11:10 AM** M2-C.3
  Conspiracy Theories and Online Scares – Implications on Human Rights
  Maurer A
  Vienna Vaccine Safety Initiative

**Sponsored by:**
- Emerging Nanoscale Materials SG

#### M2-D Energy Systems
- **10:30 AM** M2-D.1
  Risk and Regulatory Considerations for SMR Emergency Planning Zones Based on Passive Decontamination Potential
  Carless T S, Fischbeck PS, Talabi MS
  Carnegie Mellon University, Pittsburgh Technical

**Sponsored by:**
- Engineering and Infrastructure SG

#### M2-E Symposium: Alternative Testing Strategies to Advance the Risk Analysis of Nanomaterials
- **10:30 AM** M2-E.1
  Gene Expression in Risk Assessment of Nanomaterials: Evaluating Current Data and Methods
  Davidson SE, Medvedovic M, Kuempel ED
  University of Cincinnati, National Institute for Occupational Safety and Health (NIOSH), Oak Ridge Associated Universities (ORAU) Fellow at NIOSH

- **10:50 AM** M2-E.2
  Optimizing a Test Bed System to Assess Human Respiratory Safety after Exposure to Chemical and Particle Aerosolization
  Sayes CM
  Baylor University

- **11:10 AM** M2-E.4
  Evaluating Adverse Outcome Pathways as Tools for the Risk Assessment of Nanomaterials
  Shatkin JA
  Vireo Advisors

**Sponsored by:**
- Risk, Policy and Law SG
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>10:30 AM</td>
<td>M2-F Symposium: Climate Change Adaptation Planning for Coastal Areas: Risk Assessment, Mitigation, and Evaluation, Part I</td>
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<tr>
<td>10:30 AM</td>
<td>A Sea-Level Rise Adaptation Planning Framework for Vancouver, British Columbia</td>
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<td></td>
<td>Beaudrie CEH, Lyle T, Murdock H, Harstone M, Danyluk A Compass Resource Management Ltd.</td>
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<tr>
<td>10:50 AM</td>
<td>Risk Communication was Hard Enough when Climate was Stationary Lyle TS, Beaudrie CB Ebbwater Consulting Inc.</td>
</tr>
<tr>
<td>11:10 AM</td>
<td>Neglecting Behavioral Feedbacks in Quantitative Risk Assessment Can Lead to Maladaptation to Natural Hazards Logan TM, Bricker JD, Guikema SD University of Michigan</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>Quantifying Regional Climate Change Resilience: Adaptive Management in Charleston, SC Cains MG, Henshel D, Landis W Indiana University, Western Washington University</td>
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</table>

Sponsored by: Decision Analysis and Risk SG
10:30 AM – 12:00 PM
Mardi Gras Ballroom E, 3rd Floor
M2-I Poster Platform: Risk Perceptions, National Hazards & Extreme Weather
Chair: Gina Eosco

10:30 AM
M2-I.2
The Geographic Distribution of Extreme Weather and Climate Risk Perceptions in the United States
Ripberger J, Silva C, Jenkins-Smith H
University of Oklahoma

10:30 AM
M2-I.3
Earthquakes, Flooding, Landslides, and Typhoons: Multi-hazard Risk Perceptions and Management Priorities in Kyushu, Japan
Tanner A, Fujimi T, Chang S
University of British Columbia, Kumamoto University

10:30 AM
M2-I.4
A Yardstick for Danger: Developing a Sensitive and Flexible Measure of Perceived Risk
Walpole HW, Wilson RS
The Ohio State University

10:30 AM
M2-I.6
Effects of Experiencing Heat-Related Illness on Perceptions of Summertime Heat Risks and Protective Behaviors in Phoenix, AZ and Detroit, MI
Chakalian PM, Harlan SL, Honduras DM, Larsen LS, Granlund CJ, O’Neill MS
Arizona State University

10:30 AM
M2-I.7
A 30% Chance of a Tornado?: Assessing Public Understanding, Risk Perception, and Responses to Probabilistic Tornado Warnings
Demuth JL, Joslyn S, Savelli S, Qin C, Morss RE, Ash K
National Center for Atmospheric Research

10:30 AM – 11:30 AM
Mardi Gras Ballroom FGH, 3rd Floor
Chair: Angela Bearth

10:30 AM
M2-J.1
Intuitive Toxicology Revisited: People’s Understanding of Toxicological Principles and Implications for the Risk Perception of Chemicals
Bearth A, Saleh R, Siegrist M
Consumer Behavior, Institute for Environmental Decisions (IED), ETH Zurich

10:30 AM
M2-J.2
The Impact of Disgust on Risk Perception and Acceptance of Novel Food Technologies
Siegrist M, Egolf A, Hartmann C
ETH Zurich

10:30 AM
M2-J.3
How Different Types of Trust May Shape Support of Genetically Engineered Food
Icahn School of Medicine at Mount Sinai

1:30 PM – 3:00 PM
Galerie 1, 2nd Floor
M3-A Symposium: Benzene: Low Doses Issues
Chair: Debra Kaden

1:30 PM
M3-A.1
Meta-analysis of Epidemiology Studies of Risk of Acute Myeloid Leukemia and Low-level Exposure to Benzene
Boffetta P, Mundt KA
Icahn School of Medicine at Mount Sinai

1:30 PM
M3-A.2
Reconstruction Historical Exposures to Benzene Associated with the Use of Benzene-Containing Solvents
Holton MW
Ramboll

2:10 PM
M3-A.3
Is Low-dose Metabolism of Benzene by Workers More Efficient at Very Low Exposure Concentrations?
Cox T
Cox Associates

2:30 PM
M3-A.4
Experimental Population-based Genetics Model and Benchmark Dose Response Concentration Estimates in Diversity Outbred Mice Based on in Vivo Genotoxicity to Low Level Benzene Exposure
French JE
University of North Carolina at Chapel Hill

Sponsored by:
Dose Response SG
# Monday

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<tr>
<th>1:30 PM – 3:00 PM</th>
<th>Galerie 3, 2nd Floor</th>
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<tbody>
<tr>
<td><strong>M3-C Symposium: Vaccine Communication II</strong></td>
<td>Co-chairs: Barbara Rath, Frederic Bouder</td>
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<tr>
<td>1:30 PM M3-C.1</td>
<td>Infectious Disease and Vaccination Management Among Internally Displaced People Living in Camp-like Settings in Nigeria: A Mixed Method Study</td>
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<tr>
<td>Ekezie W, Timmons S, Myles P, Pritchard C, Siebert P, Bains M, Murray R</td>
<td>University of Nottingham</td>
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<tr>
<td>1:50 PM M3-C.3</td>
<td>Measles Vaccination and Vaccine Hesitancy in Austria – Anthropological Perspectives</td>
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<tr>
<td>Kutalek R, Gutkas K, Gribi J, Kössler P, Moser M</td>
<td>Medical University of Vienna, Vienna Vaccine Safety initiative</td>
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<tr>
<th>1:30 PM – 2:30 PM</th>
<th>Galerie 4, 2nd Floor</th>
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<tbody>
<tr>
<td><strong>M3-D Sustainability and Infrastructure</strong></td>
<td>Chair: Roshanak Nateghi</td>
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<tr>
<td>1:30 PM M3-D.1</td>
<td>Network Connectivity and Inland Waterways Sustainability: A Case Study of the Ganges-Brahmaputra-Meghna Delta</td>
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<tr>
<td>Baroud H, Karmanshah A</td>
<td>Vanderbilt University</td>
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<tr>
<td>1:50 PM M3-D.2</td>
<td>Repeated Disasters and the Increasing Costs to FEMA: Insights from Public Assistance Data</td>
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<td>Reilly AC, Ghodzi H</td>
<td>University of Maryland</td>
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<tr>
<td>2:10 PM M3-D.3</td>
<td>Distributed Energy Resources and Challenges for a Sustainable Power System</td>
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<td>Staid A, Castillo A, Watson JP</td>
<td>Sando National Labs</td>
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<th>1:30 PM – 3:00 PM</th>
<th>Galerie 5, 2nd Floor</th>
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<tbody>
<tr>
<td><strong>M3-E Symposium: Risk Perception, Risk Controversies and Risk Management: Can Public Engagement with Values Strengthen Risk Management Practices?</strong></td>
<td>Chair: Patricia Larkin</td>
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<tr>
<td>1:30 PM M3-E.1</td>
<td>@Risk - Strengthening Canada’s Ability to Manage Risk</td>
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<tr>
<td>Gattinger M, Bratt D, Driedger M, Kuzma J, Lachapelle E, Nicholls S, O’Doherty K, Larkin P</td>
<td>University of Ottawa</td>
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<tr>
<td>1:50 PM M3-E.2</td>
<td>Risky Business: The Site Selection Process for Hosting Canada’s Nuclear Waste Facility</td>
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<tr>
<td>Bratt D, Philion X</td>
<td>Mount Royal University</td>
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<tr>
<td>2:10 PM M3-E.3</td>
<td>Risk Perception and the Interpretation of Uncertainty in Regulatory Assessments for Genetically Engineered Animals</td>
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<tr>
<td>Kuzma J, Williams T</td>
<td>North Carolina State University</td>
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<tr>
<td>2:30 PM M3-E.4</td>
<td>To Engage, or not, the Public in the Management of Health Risk Issues: An Examination of Breast Cancer Screening and Childhood Vaccinations</td>
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<td>Driedger SM, O’Doherty KC, Cooper E, Rotella A</td>
<td>University of Manitoba</td>
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<th>1:30 PM – 2:30 PM</th>
<th>Galerie 6, 2nd Floor</th>
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<tr>
<td><strong>M3-F Symposium: Climate Change Adaptation Planning for Coastal Areas: Risk Assessment, Mitigation, and Evaluation, Part II</strong></td>
<td>Chair: Christian Beaudrie</td>
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<tr>
<td>1:30 PM M3-F.1</td>
<td>Robust Funding Allocations for Nonstructural Flood Risk Mitigation in Louisiana’s Coastal Zone</td>
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<tr>
<td>Johnson DR, Gomez Sierra S, Richardson Z, Chen Z</td>
<td>Purdue University</td>
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<tr>
<td>1:50 PM M3-F.2</td>
<td>Homeowner-Level Decision Support System for Mitigating Coastal Flood Risk in Louisiana</td>
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<tr>
<td>Saham ZT, Chen FC, Jahanshahi MR, Delp EJ, Johnson DR</td>
<td>Purdue University</td>
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<tr>
<td>2:10 PM M3-F.3</td>
<td>Past Patterns and Trends in Simultaneity of Very Large Wildfires: Implications for Risk Management</td>
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<tr>
<td>Cullen AC, Podschwit H</td>
<td>University of Washington</td>
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<th>1:30 PM – 2:30 PM</th>
<th>Mardi Gras Ballroom ABC, 3rd Floor</th>
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<tbody>
<tr>
<td><strong>M3-G Does Exposure Equal Dose?</strong></td>
<td>Chair: Amina Wilkins</td>
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<tr>
<td>1:30 PM M3-G.2</td>
<td>Does the Exposure of Glyphosate Real in Human Pregnancies?</td>
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<tr>
<td>Parvez S, Gerona R, Proctor C, Friesen M, Reiter J, Lui Z, Winchester P</td>
<td>Indiana University Fairbanks School of Public Health</td>
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<tr>
<td>1:50 PM M3-G.3</td>
<td>Aggregate Exposure of the Adult French Population to Pyrethroids</td>
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<tr>
<td>2:10 PM M3-G.4</td>
<td>Traffic Density and Mortality Risk in the 1991 Canadian Census Health and Environment Cohort (CanCHEC)</td>
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<td>Cakmak S, Hebbern C</td>
<td>Health Canada</td>
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**Sponsored by:** Exposure Assessment SG
### Monday

#### 1:30 PM – 3:10 PM
**Mardi Gras Ballroom D, 3rd Floor**

**M3-H Communicating Novel Emergent Risk**  
Chair: Jose Palma-Oliveira

1:30 PM  
**M3-H.1**  
Quantifying the Product Security Risks to the Producer Across the Products Lifecycle  
Crowther KG  
General Electric

1:50 PM  
**M3-H.2**  
A Generic Tree of Cybersecurity Objectives  
Couce-Vieira A, Rios Insua D  
CMAT-CSIC

2:10 PM  
**M3-H.3**  
Application of Bayesian Network Analysis for Evaluation and Prediction of Network Vulnerabilities  
Indiana University, University of California Davis, Army Research Laboratory

2:30 PM  
**M3-H.4**  
Global Systemic Risk and Cyber Security  
Larcey P, Cheng A, Nell A  
University of Cambridge

#### 1:30 PM – 3:00 PM
**Mardi Gras Ballroom E, 3rd Floor**

**M3-I Poster Platform: Managing & Measuring Cyber Security Risk**  
Co-chairs: Kenneth Crowther, Ben Trump

1:30 PM  
**M3-I.1**  
Quantification of Vulnerability Risk by Big Data Analysis from the Security Infrastructure  
Allodi L, Massacci F*  
University of Trento

1:50 PM  
**M3-I.2**  
Measuring Systemic Cyber Risk  
Welburn JW, Strong A, Romanosky S  
RAND Corporation

2:10 PM  
**M3-I.3**  
Cryptocurrency: Governance for What was Meant to be Ungovernable  
Trump BD, Wells E, Trump J, Linkov I  
US Army Corps of Engineers

Sponsored by:  
Risk Communication SG

#### 1:30 PM – 3:10 PM
**Mardi Gras Ballroom FGH, 3rd Floor**

**M3-J Symposium: Climate Change Risk Perceptions and Communications**  
Chair: Bob O’Connor

1:30 PM  
**M3-J.1**  
Climate Change Risk Perceptions and Communications  
Yang JZ  
University at Buffalo

1:50 PM  
**M3-J.2**  
Public Perceptions of Climate Attribution  
Dryden R, Morgan MG, Bostrom A, Bruine de Bruin W  
Carnegie Mellon University, University of Pennsylvania, University of Leeds

2:10 PM  
**M3-J.3**  
Motivated Reconstruction of Memory: How Worldviews Shape the Recollection and Communication of Climate Change Narratives  
Böhm, Pfister, Solway, Flattum University of Bergen, Norway, Leuphana University, University of Sussex

2:30 PM  
**M3-J.4**  
Climate Change Risk Perceptions and Feelings: Results from a Construal Experiment  
Bostrom A, Crossan K, Joslyn S  
University of Washington

2:50 PM  
**M3-J.5**  
Discussant  
O’Connor RE  
National Science Foundation

Sponsored by:  
Security and Defense SG and Decision Analysis and Risk SG

#### 3:30 PM – 5:10 PM
**Galerie 1, 2nd Floor**

**M4-A Symposium: Dose-Responses for Environmental Carcinogens: The Emerging Role of Threshold, Biphasic and other Risk Models**  
Chair: Kenneth Mundt

3:30 PM  
**M4-A.1**  
The Historical Foundations of LNT and Non-Linearity in Radiation Biology  
Thome C  
Northern Ontario School of Medicine

3:50 PM  
**M4-A.2**  
Thayer KA  
US EPA

4:10 PM  
**M4-A.3**  
Carcinogen Dose-response and Lessons (to be learned) from Systems Biology  
Andersen ME  
ScitoVation LLC

4:30 PM  
**M4-A.4**  
Epidemiological Evidence of Non-linear Risks of Exposure to Some Known Occupational Carcinogens  
Mundt KA, Boffetta P  
Ramboll, University of Massachusetts, University of South Carolina, Icahn School of Medicine at Mount Sinai

4:50 PM  
**M4-A.5**  
A Risk Assessment Approach for Inorganic Arsenic That Considers Its Nonlinear Mode of Action  
Clewell HJ, Gentry PR, Yager JA  
Ramboll

Sponsored by:  
Dose Response SG
The stated purpose of this year's annual meeting theme, "The Many Faces of Risk," is that "it means to champion the need for diversity in our profession, including race, gender, and abilities, to ensure we are doing enough as a Society to cultivate and ensure a pathway for future leaders that reflect the diversity of our planet."

The interdisciplinary nature of SRA provides a unique opportunity for professionals of diverse educational backgrounds ranging from scientists – including social scientists – to engineers, to communication, medical, and legal professionals to network with other researchers and policymakers, to learn new ideas and present their results. This rich interdisciplinary environment lead to the formation of 17 specialty groups within the society providing members a community within their own disciplines to support a collective voice and promote their contributions to the field of risk analysis. Recognizing that community can extend beyond disciplines, the purpose of this roundtable is to bring together women in various fields of risk analysis as a community to share their personal experiences such as strategies they have developed to ensure their professional success, and reflect on the role SRA played in facilitating their success.

Success is both a destination and a journey; it can be measured by an individual's accomplishments, and reflect on the role SRA played in facilitating their success.

Participants will share some of their personal stories of successes and failures, struggles and accomplishments. Topics will include balancing work and personal life, combining motherhood and professional career, somewhere at a mid-point, big and small. Whether one is just starting her career, has been in the profession several years, or has encountered in developing guidelines, then confront the problem of how much transparency? (5) What kinds of policy revisions should be made based on such reviews, and how does this affect their strategies? (3) How frequent should the optimal time period of review be (e.g., every 5 years, 10 years, when new information has arisen, etc.)? (4) Which data should be collected and analyzed, by whom, on which types of impacts, with how much transparency? (5) What kinds of policy revisions should be made based on such reviews, on what criteria? (6) Should policy revisions be discretionary choices (by whom), or automatic adjustments based on pre-set thresholds? (7) How can periodic review be better designed or implemented to foster better regulatory learning and outcomes? Participants will include: Jonathan Wiener (Duke U.), introduction and key questions; Chris Frey (NCU), the 5-year reviews of the national ambient air quality standards (NAAQS) by CASAC and EPR; Jay Turner (Wash. U. in St. Louis), the 8-year reviews of air toxics standards (NESHAPs) by EPA; Deborah Aiken (DOT), the periodic reviews at DOT, including NAAQS and NHTSA; John Graham (Indiana U., former OIRA), the mid-term review of the 2002-2025 CAFE/GHG standards by NHTSA/EPA/CARB; Clark Nardinelli (FDA), retrospective review at FDA, and FDA should conduct regular periodic reviews.

The Many Meanings of "Safer": Toward a Clarifying Framework Without Consensus

3:30 PM
TuC M4-F.3

Title: The Many Meanings of "Safer": Toward a Clarifying Framework Without Consensus

Author(s): Polly GM, Risk Sciences International

Note: This roundtable will discuss periodic review and lessons learned from agencies' experience with requirements to review risk regulatory policies every X years. Some agencies engage in such periodic reviews, others do not; what can we learn about how well it works in practice and how it could work better? Such periodic review can be one instrument for planned adaptive regulation – a process of monitoring, data collection, analysis, review and potential revision, thus shifting risk regulation from a one-time decision to an ongoing series of multiple sequential decisions with learning and updating. In this roundtable, key questions will include: (1) How do agencies view periodic reviews (e.g., as a burden or as an opportunity), and what can we learn from their experience? (2) How do stakeholders (e.g., industry, advocacy groups) view periodic reviews, and how does this affect their strategies? (3) How frequent should the optimal time period of review be (e.g., every 5 years, 10 years, when new information has arisen, etc.)? (4) Which data should be collected and analyzed, by whom, on which types of impacts, with how much transparency? (5) What kinds of policy revisions should be made based on such reviews, on what criteria? (6) Should policy revisions be discretionary choices (by whom), or automatic adjustments based on pre-set thresholds? (7) How can periodic review be better designed or implemented to foster better regulatory learning and outcomes? Participants will include: Jonathan Wiener (Duke U.), introduction and key questions; Chris Frey (NCU), the 5-year reviews of the national ambient air quality standards (NAAQS) by CASAC and EPR; Jay Turner (Wash. U. in St. Louis), the 8-year reviews of air toxics standards (NESHAPs) by EPA; Deborah Aiken (DOT), the periodic reviews at DOT, including NAAQS and NHTSA; John Graham (Indiana U., former OIRA), the mid-term review of the 2002-2025 CAFE/GHG standards by NHTSA/EPA/CARB; Clark Nardinelli (FDA), retrospective review at FDA, and FDA should conduct regular periodic reviews.

Panelists:
Frey, HC
Turner, J
Aiken, D
Graham, JD
Nardinelli, C

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3:30 PM
M4-D.1

Title: Benefit-cost Analysis of Flood Risk Reduction Measures in Louisiana’s 2017 Coastal Master Plan

Author(s): Johnson DR, Fischbach JR, Groves DG

Note: The Applied Risk Management Specialty Group is writing a family of documents: Principles and Guidelines for Analytic Support of Risk Management. We’ve been developing ideas on those documents over two webinars and roundtables, each time advancing our thinking. With that background, we have written three example guidelines, one in each of three domains, and will compare them, and compare them with key reference documents such as the IRGC Risk Governance Framework. The three domains are as different as we could make them: terrorism risk management, oil & gas production risk management, and cultural heritage risk management. We will summarize the topics addressed in each of the Guidelines, marvel at how different they are, then confront the problem of how much urgency we strive for in Guidelines, across domains, and what uniformity that should be. The four panelists are outspoken and rude, so the discussion should have entertainment value. We have identified 21 challenges to be addressed in Guidelines in each domain. Some of these challenges: Capturing the risk generating process; characterizing the risk event space; reducing data down to effective decision guidance in a valid and verifiable way; assessing the uncertainties and validity taking them into account in risk management; considering scenarios “not on the list”; developing robust and resilient strategies; setting an adequate budget; validly choosing among alternative analyses; adversary modeling where it applies; data availability and collection; data validation; data management; data QA/QC; model validation; model documentation; and effective communication/advice/into the actual risk management decision process. The panelists will each pose key dilemmas and challenges we have encountered in developing guidelines, then call for ideas and arguments from everyone in the room. One of our underlying agendas is to enlist others in our writing effort, in particular SRA members outside of our Specialty Group.

Panelists:
Steve Ackerlund
John Lathrop
Willy Roed
Rob Waller

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Applied Risk Management SG

3:30 PM
M4-E.1

Title: The Battle of the Guidelines: Four Competing Ideas for Domain-Specific Risk Management Guidelines

Author(s): John Lathrop

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Panelists:
Steve Ackerlund
John Lathrop
Willy Roed
Rob Waller

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Applied Risk Management SG

3:30 PM
M4-F.1


Author(s):Brathwaite SK, California Environmental Protection Agency

Note: The Many Meanings of “Safer”: Toward a Clarifying Framework Without Consensus

Author(s): Polly GM, Risk Sciences International

Note: This roundtable will discuss periodic review and lessons learned from agencies' experience with requirements to review risk regulatory policies every X years. Some agencies engage in such periodic reviews, others do not; what can we learn about how well it works in practice and how it could work better? Such periodic review can be one instrument for planned adaptive regulation – a process of monitoring, data collection, analysis, review and potential revision, thus shifting risk regulation from a one-time decision to an ongoing series of multiple sequential decisions with learning and updating. In this roundtable, key questions will include: (1) How do agencies view periodic reviews (e.g., as a burden or as an opportunity), and what can we learn from their experience? (2) How do stakeholders (e.g., industry, advocacy groups) view periodic reviews, and how does this affect their strategies? (3) How frequent should the optimal time period of review be (e.g., every 5 years, 10 years, when new information has arisen, etc.)? (4) Which data should be collected and analyzed, by whom, on which types of impacts, with how much transparency? (5) What kinds of policy revisions should be made based on such reviews, on what criteria? (6) Should policy revisions be discretionary choices (by whom), or automatic adjustments based on pre-set thresholds? (7) How can periodic review be better designed or implemented to foster better regulatory learning and outcomes? Participants will include: Jonathan Wiener (Duke U.), introduction and key questions; Chris Frey (NCU), the 5-year reviews of the national ambient air quality standards (NAAQS) by CASAC and EPR; Jay Turner (Wash. U. in St. Louis), the 8-year reviews of air toxics standards (NESHAPs) by EPA; Deborah Aiken (DOT), the periodic reviews at DOT, including NAAQS and NHTSA; John Graham (Indiana U., former OIRA), the mid-term review of the 2002-2025 CAFE/GHG standards by NHTSA/EPA/CARB; Clark Nardinelli (FDA), retrospective review at FDA, and FDA should conduct regular periodic reviews.

Panelists:
Frey, HC
Turner, J
Aiken, D
Graham, JD
Nardinelli, C

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<td>Playing with Nature: The Challenges of Synthetic Biology</td>
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<td>Trail JB, Mocal CM, Castiglioni AJ, MacDonell MM, Kikendall NL, Evtalek EA</td>
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<td>Cummings CL, Nanyang Technological University, Singapore</td>
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<td>Kohl P, Brassard D, Scheufele D, Xenos M, University of Central Florida, University of Wisconsin-Madison</td>
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<td>Eichmeier AA, Bao L*, Brassard D, Xenos MA, Scheufele DA, University of Wisconsin-Madison</td>
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<td>Karanth S, Pradhan AK, University of Maryland, College Park</td>
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<td>Use of Graph Theory and Networks to Insure Whole Bacterial Genome Sequencing Data Connectedness with Food Safety Epidemiological and Control Data – the Case of Salmonella Enterica</td>
<td>Moez Sanao MS, Regis Pouillot RP, Francisco Garces-Vega FGV, Errol Strain ES, Van Doren JM, CFSAN - FDA</td>
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<td>A Graphical Tool to Better Explore Links between Environmental, Food and Clinical Strains of Pathogens – the Case of Listeria Monocytogenes</td>
<td>Pouillot R, Sanao M, Garces-Vega F, Strain E, Van Doren JM, Consultant / CFSAN - FDA</td>
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<td>Lu H, McComas KA, Kretser H, Lauber B, Cornell University</td>
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<td>Is It Really An Abundance of Caution? Experimental Study to Improve Food Safety Crisis Communication</td>
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National Taiwan University of Science and Technology

P.77 A Method to Include Preference Uncertainty in Benefit-cost Analysis
Baik S, Davis AL, Morgan MG
Carnegie Mellon University

P.78 ITRC TPH Risk Evaluation at Petroleum Contaminated Sites
Ries DN, Booze T, Kwiecinski M, Thun R
Interstate Technology and Regulatory Council (ITRC) TPH Risk Evaluation Team and MI DEQ

P.79 Final Assessment of Space Weather Risk Perception in Brazil
Caruzzo A, Ribeiro JR, Denorlando CM, Rezende Costa, JE
McGill University, Aeronautics Institute of Technology, National Institute for Space Research (INPE)

P.80 Risk Analysis to Support Characterizing and Communicating Safety and Security Risks in Biological Laboratories
Caskey A
Sandia National Laboratories

P.81 NTP Case Study: Examining the Utility of In Vitro Tox21 Bioactivity Assays for Prioritization and Safety Assessment of Botanical Dietary Supplements
Hubbard TD, Hsieh JH, Spies NS, Collins BJ, Auerbach SS, Devito MJ, Walker NJ, Rider CV
Division of the National Toxicology Program, NIEHS
Monday

P.82 Derivation of an Oral Reference Dose for Propylene Glycol Monomethyl Ether and Propylene Glycol Monomethyl Ether Acetate: Challenges and Solutions in Application of a Published PBPK Model
Magurany KA, Cao KC
NSF International

P.83 A Risk-based Spatiotemporal Groundwater Management Approach
Lee CH, Yu HL
National Taiwan University

P.84 Together We Thrive: Social Capital and Disaster Resilience after Hurricane Harvey
Chu H, Yang JZ
University at Buffalo, The State University of New York

P.85 Getting Unstuck: Application of Risk Communication Principles to Improve Project Schedules and Outcomes at Hazardous Waste Sites
Ackerlund WS
Ecology and Environment

Risk Communication

P.86 Restoring Biotechnology’s Moral Fiber? Lessons from a Stakeholder Workshop on Genetically Modified American Chestnut Trees and Public Engagement
Binder AR, Barnes JC, Barrhill-Dilling SK, George D, Kokotovich A, Rivers L, Sudweeks J, Delborne JA
NC State University

P.87 Data Visualizations – Making the Most of Big Data
Bornstein K, Skuce C*, Hobbie K, Henning C, Williams A, Feiler T
ICF

P.88 Social Amplification of Risk Framework 2.0: Theoretical and Methodological Applications
Chakolution PC, Binder AR, Turner VK, Schook ES, Ajayakumar J, Honda DM
Arizona State University

Sun Yat-sen University

P.91 Distance or Valence? Exploring Motivated Reasoning Related to Climate Change
Chu H, Yang JZ
University at Buffalo, The State University of New York

P.92 Do Consumers Notice the Source of Messages about Foodborne Illness Outbreaks? Cuite CL, Wu F, Hallman WK
Rutgers University

P.94 Reconciling Visions of the Environment: Using Photovoice for Community-Based Participatory Research in Coastal Management
Duffy KP, Rickard LN
University of Maine

P.95 Deciding to Participate in Clinical Trials: Risk Perception and Information Needs of Cancer Patients Gerido LH, Cole CR
Florida State University

P.98 The Impact of Monetary Cost on Chinese Women’s HPV Vaccination Intentions Liu S, Chu H, Yang JZ
University at Buffalo, The State University of New York

P.99 Exploring the Role of Incidental and Message-induced Compassion and Anger in Health Risk Communication about Pollution
Lu H
Cornell University

P.100 Communicating Risk in the Immediate Aftermath of a Disaster: Challenges and Opportunities
Manandhar R
Arkansas Tech University

P.101 Collaborative Emergency Management for Effective Disaster Risk Communication
Manandhar R
Arkansas Tech University

P.102 Gambling Behavior and Prevalence of Illegal Gambling where Legal Options Exist
Steinhardt JS
Michigan State University

P.103 Eye-Tracking the Storm: Evaluating Visual Risk Information Seeking and Processing
Sutton J, Fischer L
University of Kentucky

P.104 No More Niceness: Exploring the Effects of Aggressive and Stigmatizing Communication in Climate Change Debate
Yuan S, Lu H
Northern Illinois University

P.106 Risk Communication for Individual Decision-making: An Empirical Study from Fukushima During a Post-emergency Period
Nishizawa M
Litera Japan Co.

P.107 Risk Perception of Pregnant Women on Health Effects of Electromagnetic Fields and a Booklet of “EMFs and Health for Pregnant Women”
Ohkubo C
Japan EMF Information Center

P.108 Climate and Energy Literacy: Final Findings from a UK Study.
Warren GW
King’s College London

P.109 What do People Think about When Thinking About Climate Change? Any Anger?
Yang J, Chu H, Rickard L, Feeley T
University at Buffalo

P.110 Research Engineer
Comin JMC, Orange Labs

P.111 Public vs. Private Information in Risk Communication
Wang Y
Georgia Institute of Technology

P.112 Examining Collectivism-oriented Risk Characteristics: Analyzing Data from China’s First National Survey of Public Risk Perception
Zhang J, Su Y, Jia H, Chen L
Sun Yat-sen University, Hong Kong Baptist University, Cornell University

P.113 Perceptions of Uncertain Risks in Societal Groups
Jansen T, Claassen L, van Kamp I, Timmermans DRM
Dutch National Institute for Public Health and the Environment (RIVM), VU Medical Center Amsterdam

P.114 Examining the Interaction between Public Participation and Risk Communication – the Case of Nuclear Power in China
Deng L, Jia H
Sun Yat-sen University and Cornell University

P.115 Outrage Factors in Climate Change Risk Perception
Noblis Inc., Department of Defense

Risk, Policy & Law

P.118 Health and Environmental Protection in Hydraulic Fracturing: A Focus on British Columbia and Alberta, Canada
Larkin PM, Gracie R, Krewski D
University of Ottawa

P.119 Considerations in Human Health Risk Assessment of Low-Cost Monitoring Data
Jones L, Patterson J, Lange S
Texas Commission on Environmental Quality, University of Cincinnati

P.120 IRGC’s Guidelines for the Governance of Systemic Risks: Bradford, UK, November 2018
Bejtullahu K, Florin MV, Trump B
EPFL International Risk Governance Center (IRGC)

P.121 Will Digital Technologies Threaten Private, Risk Based, Health Insurances?
Eisenger F, Hoy M
Poli-Calmettes Institut INSERM

P.122 Re-imagining Risk to Improve Interagency and Public-Private Collaboration
Cohen AA
Duke University

Security and Defense

P.125 Hazard Assessment of Hydrofluorocarbons (HFCs) for Potential Impacts to National Defense
Bruckner MS, Vogel CM, Glaccum WW, Rok A, Scanlon KA

Final Program 31
Monday

P.126 Quantitative Risk Assessment of Hydrogen Fueling Station That Uses Organic Hydride
Tsushima K, Yoshida K, Yoshida M, Kata E, Kawamoto A, Kihara T, Ono K, Saburi T
National Institute of Advanced Industrial Science and Technology

P.127 Hazard Assessment of 1,4-Dioxane for Potential Impacts to National Defense
Vogel CM, Glaccum IW, Rok A, Scanlon KA
Nobilis Inc., Department of Defense

P.128 Characterising the Robustness of Coupled Power-Law Networks
Johnson C, Flage R, Guevara SD
University of Stavanger, University of Michigan

P.129 Risk-Cost-Benefit Analysis for Access Reconfiguration of Transportation Networks
Alsultan M, Lambert JH
University of Virginia

P.130 Breaking the Routine: A New Approach of Airport Security Measures
Stotz T, Ghelfi SM, Beath A, Siegrist M
Swiss Federal Institute of Technology Zurich

Zurich

P.132 An Adversarial Risk Analysis Approach for Differential Games: A Botnet Defense Model
Gonzalez-Ortega J, Rios Insua D, Gomez-Corral A
ICMAT (CSIC-UAM-UC3M-UCM)

P.133 Metacognition and Phishing Emails: Do People Know When They Are Taking Risks?
Connell A, Sullivan R, Wilkinson J
University of Stavanger, University of Michigan

P.134 Risk Assessment of Organic Lead in Rice Products Using Taiwan Food Consumption Database and Taiwan Traditional Snacks Consumption Database
Lai TJ, Ho WC, Chiu SY, Chang PH, Huang HY
China Medical University

P.135 Hazard Screening of Flavoring Compounds Based on EU Chemical Groups: Identification of Principle Endpoints of Concern for Risk Assessment
ToxServices LLC

P.136 Importance of Scientifically-Current Toxicity Factors: Recent Dose-Response Assessments by the State of Texas
Honey JT
Texas Commission on Environmental Quality

P.137 Developing Health-Based Screening Levels for Lead in Environmental Media
Chiger A, Lynch MT, Houlihan J
Abit Associates

P.138 Risk Assessment of Organic Lead in Rice Products Using Taiwan Food Consumption Database and Taiwan Traditional Snacks Consumption Database
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Lai TJ, Ho WC, Chiu SY, Chang PH, Huang HY
China Medical University

P.140 In Silico Prediction of Concentration-Response and Cytotoxicity
Druwe IL, Wheeler MW
U.S. Environmental Protection Agency, Center for Disease Control, National Institute for Occupational Safety and Health

P.141 The Risk Assessment of Dichlorvos Residue in Vegetables and Fruits in Taiwan from 2012 to 2017
Hou J, Wu KY, Wu CL
National Taiwan University

P.142 Botnet Defense Model
Approach for Differential Games: A
Gomez-Ortega J, Rios Insua D, Gomez-Corral A

P.134 Risk Assessment of Organic Lead in Rice Products Using Taiwan Food Consumption Database and Taiwan Traditional Snacks Consumption Database
Lai TJ, Ho WC, Chiu SY, Chang PH, Huang HY
China Medical University

P.143 Hazard Screening of Flavoring Compounds Based on EU Chemical Groups: Identification of Principle Endpoints of Concern for Risk Assessment
ToxServices LLC

P.144 Assessing Human Health Risks of Non-Cancer Effects Due to Short-Duration and Intermittent Exposures to Chemicals at Contaminated Sites: A Case Study on the Slate Islands, Ontario, Canada
Somers NL, Li-Muller A, Mohapatra A, Petrovic, S
Health Canada and University of Toronto

P.145 History of the Algerian Natural Hazards Insurance Pool Towards Resilience and Sustainable Development
Benouar D
University of Sciences & Technologies Houari Boumedienne

P.146 Assessing Human Health Risks of Non-Cancer Effects Due to Short-Duration and Intermittent Exposures to Chemicals at Contaminated Sites: A Case Study on the Slate Islands, Ontario, Canada
Somers NL, Li-Muller A, Mohapatra A, Petrovic, S
Health Canada and University of Toronto

P.147 Utilizing Cumulative Risk Assessment Principles in Developing Targeted Intervention Strategies to Reduce the Prevalence of Work-Related Asthma
Johns DO, Virji MA, Park JH, MacDonell MM, Cox-Ganser JM
CDC/NIOSH, Argonne National Laboratory

P.148 Developing Health-Based Screening Levels for Lead in Environmental Media
Chiger A, Lynch MT, Houlihan J
Abit Associates

P.149 A Bayesian Networks and Risk Dynamics Simulation Coupled Approach to Accidental Water Pollution Risk Assessment for Mine Tailings Ponds in Guanting Reservoir Watershed, Zhangjiakou City, China
Liu J, Liu RZ, Zha ZJ
Beijing Normal University, China

P.150 Visualizing Critical Infrastructure Dependencies and Interdependencies
Power DG, Rath C, Baumgardner K, Howard PM
RS21

P.151 Understanding Impacts of Hurricane Landfall in Charleston, SC
Power DG, Rath C, Baumgardner K, Howard PM
RS21

P.152 Pharmacokinetic Models for Quantifying Mother-to-Offspring Transfer of Lipophilic Chemicals
Kapraun DF, Schlösser PM, Carlson LM, Lehmann GM
US Environmental Protection Agency

P.153 A Quality Assurance Project Plan to Evaluate Physiologically-Based Pharmacokinetic (PBPK) Models for Use in Risk Assessment
Schlösser PM, Kapraun DF, Iklin C, Lin YS, Sasso AF, Morozov V
NCEA, U.S. EPA

P.154 Measuring Urban Resilience Using Access to Essential Services: Case Study with Hurricane Florence
Logan TM, Guikema SD
University of Michigan, Ann Arbor

P.155 Deliberating the Public Acceptability of Energy Storage in Great Britain
Pidgeon NF, Thomas G, Denski C
Cardiff University

P.156 Evaluation of Countermeasures for Reducing Unusual Chemical Release Triggered by Serious Natural Hazard: Case Study in the Yodo-river basin
Kojima N, Toyoda M, Tabuchi Y, Matsuura M, Zhou L, Tokai A
Osaka University

P.157 Quantitative Risk Assessment (QRA) of Compounds Generated from Electronic Nicotine Delivery Systems (ENDS) and Cigarette Smoke
Laboratory of Risk Assessment, US Environmental Protection Agency

P.158 PFAS – The European Perspective
Wilkinson J, Connel A, Sullivan R
Ramboll

P.159 An Evaluation of Measurement Error Correction in Radiation Risk Analysis Focusing on Low Dose Exposure
Misumi M
Radiation Effects Research Foundation

P.160 Aggregate Risk of Reactive Nitrogen under Anthropogenic Disturbance in the Pearl River Delta
Dong Y, Xu LY
Beijing Normal University

P.161 Embodied Primary PM2.5 Emissions and Health Risk Assessment in International Trade
Sheng HZ, Xu LY
School of Environment, Beijing Normal University

P.162 Impacts of Showering Compliance Rates on the Risk of Infection from Cryptosporidium spp. in Swimming Pools
Michigan State University

P.163 The Use of Top-Down Risk Communication Strategies and Their Effectiveness in the Case of the ASARCO Tacoma Smelter
Wilson SJ
King’s College London

P.164 An Enhanced Model for Assessing Choking Risk in Children
Gregori D, Berchialla P, Lorenzoni G
University of Padova

P.165 Per- and Polyfluoroalkyl Substances (PFAS): Status of Exposure and Health Studies Surrounding an Evolving Issue
Kadon DA, Huang CK, Dell L
Ramboll
Monday

P.166 The Challenges of developing Resilience to Co- and Post-Seismic Hazards in Sichuan Province, China, Site of the Devastating 2008 Wenchuan Earthquake
MacGillivray B, Hoels TC, Gong Y, Ran J, Rezgui Y, Cere G, Xuanmei F, Horton A, Francis O
Cardiff University

P.167 The Association Between Dietary Toxins and Microbial Infection in Tanzanian Children
Chen C, Mitchell N, Wu F
Michigan State University

P.168 Estimating the Burden of Disease of Congenital Toxoplasmosis in Denmark
Georgiadis S, Pires SM
Technical University of Denmark

P.169 Energy Reform Policy and risk Perception of Laypeople: A Unique Experience in Taiwan
Chang HL, Song HT
Legislative Yuan, Taiwan and National Yang-Ming University

P.170 Flu vs. Influenza: Do different Terms Contribute to Disease Perceptions?
Kong WY, Eng N*
Nanyang Technological University and North Carolina State University

P.171 Assessing the Exposure Associated with Cholesterol Oxidation Products in Food Using Dietary Intake Modeling
Jain E, Mitchell J*
Michigan State University

P.172 Development and Testing of an Instrument to Measure Workplace Perceptions, Communications and Behavioural Intentions to Reduce Modern Slavery Risks in UK Business Supply Chains
Cakir MS, Wardman JK, Trautrimas A
University of Nottingham

P.173 Risk Management and Local Governance Strategies to Prevent and Control Hexavalent Chromium Exposures with Public Health-based Air Standards
Butler KB, Montes CM, Soberos RS, Contreras CC, Rangan CR
Los Angeles County Department of Public Health

P.174 Comparing Opportunistic Premise Plumbing Pathogen Infection Risks Between Conventional and Low-Flow Fixtures
Michigan State, Drexel, Cornell, Ohio State

P.175 Near-Ground Gradient and Interference-Free Ozone Measurements In A Suburban-Commercial US location
Ollison WM, Leston AR
American Petroleum Institute, AirQuality Research & Logistics, LLC

P.176 A Quantitative Microbial Risk Assessment Model for Intervention Targeting of the San Diego Homeless Population HepA Outbreak
The Ohio State University

P.177 Climate Change Risk Communication Strategies Based on Public Perception Analysis
Lee S
Korea Environment Institute

P.178 New Science and Considerations in the Re-evaluation of Health Canada’s Guideline for Canadian Drinking Water Quality on Manganese
MacAulay J, Cherry A, Payne SJ, Carrier R, Lemieux F
Water and Air Quality Bureau, Health Canada

P.179 The Use of GISweb VICON as a Tool to Support Disaster Risk Management in Civil Defense in Curitiba, Brazil
Acordes FA, Ferenztz LMS, Stringari D*, Pinheiro EG
University Centre for Disaster Studies and Research (CEPED/PR)
This roundtable seeks to stimulate a robust discussion around the importance of diversity in the risk analysis profession. The overarching intent is to examine how SRA can support and grow the diversity of the profession, particularly among graduate students and young professionals. Topics include what is meant by diversity and why diversity is important to all facets of risk analysis. Roundtable organizers will offer a summary of research examining diversity in STEM fields, more generally, and offer some data on the current diversity of SRA’s membership. Through audience participation, we seek to generate examples of what other professional and scientific organizations have done to increase diversity in their membership and consider what role SRA may play in promoting diversity in the risk analysis profession.

Sponsored by:
Risk Communication SG
In April 2018, the U.S. Environmental Protection Agency (EPA) issued a notice of proposed rulemaking entitled “Strengthening Transparency in Regulatory Science.” In June, the Agency then announced that it was considering whether to propose a second rule on “Increasing Consistency and Transparency in Considering Costs and Benefits in the Rulemaking Process.” The titles of each initiative suggest worthy goals, but they have been controversial. One set of concerns relates to the political motivations, given the current Administration’s interest in rolling-back environmental regulations. A second set of concerns relates to the substantive details of each proposal, which raise several complicated and difficult questions.

In this roundtable, we will focus on this latter set of more substantive concerns, bringing together a cross-disciplinary group of experts to discuss the details and implications of the proposals from a variety of perspectives. We will provide an overview of each proposal, comment on the issues raised and on how to best address them, then open the discussion to the audience.

For more information on each proposal, see:

Panelists:
Lisa A. Robinson, Senior Research Scientist, Center for Health Decision Science and Center for Risk Analysis, Harvard T.H. Chan School of Public Health
Shaun Goho, Deputy Director, Emmett Environmental Law and Policy Clinic, Harvard Law School
Anthony (Tony) Cox, Clinical Professor, University of Colorado, and President, Cox Associates; Editor-in-chief, Risk Analysis, and Chair, EPA Clean Air Scientific Advisory Committee
George Gray, Professor, Milken Institute School of Public Health, George Washington University; former Assistant Administrator, EPA Office of Research and Development and EPA Science Advisor
Clark Nardinelli, former Chief Economist, U.S. Food and Drug Administration

Sponsored by:
Decision Analysis and Risk SG & The Society for Benefit Cost Analysis (SBCA)
Over the last two decades, the resilience field has developed strongly – resilience thinking has become ubiquitous and is now broadly recognized in different application areas. Today, for example, resilience thinking is commonly used in policy documents related to disaster management. In fact, many organizations, scholars and leaders, such as the former Secretary-General of the United Nations, Ban Ki-moon, have even called for a shift from risk to resilience.

This boost for resilience raises some interesting questions in relation to the risk field: does it conflict with the risk field? Does resilience analysis and management challenge the current ideas, principles and methods concerning prudent risk analysis? Can we speak about a distinctive resilience field and science in parallel to risk analysis, or should we think about risk analysis as the overriding concept and field, and resilience as a key supporting pillar for this field? Current risk management and governance frameworks do consider resilience as a key strategy for handling risk, but we still see risk perspectives and practices which give rather limited weight to resilience-based thinking.

The roundtable gathers scholars in the fields of risk and resilience to discuss these issues. We seek to enhance the understanding of what the current knowledge of risk and resilience analysis and management is and what the interrelationships between these fields are. We also aim to stimulate a discussion on how to further develop the interactions between the fields and, in particular, how we can obtain improved collaboration between professionals belonging to the different ‘schools’.

Participants:
Terje Aven
James Lambert
Igor Linkov
Myriam Merad

Sponsored by:
Resilience Analysis SG
Tuesday

1:30 PM – 2:30 PM
Galerie 6, 2nd Floor
T3-F Symposium: Geoengineering Risks, Decisions, and Governance, Part II
Chair: Mark Borsuk

1:30 PM T3-F.1
Risk Sharing Agreements and Geo-engineering Governance
Mallampalli VR, Felgenhauer T, Borsuk M
Pratt School of Engineering

1:50 PM T3-F.2
Geo-Wedges: A Portfolio Approach to Geoengineering the Climate
Ricke KL, Moreno-Cruz JB
University of California - San Diego

2:10 PM T3-F.4
Modeling Disruptive and Dynamic Futures to Assess and Manage Project Risks
Collier ZA, Lambert JH
University of Virginia

Sponsored by:
Emerging Nanoscale Materials SG

1:30 PM – 3:00 PM
Mardi Gras Ballroom ABC, 3rd Floor
T3-G Dietary and Drinking Water Exposures
Chair: Amina Wilkins

1:30 PM T3-G.1
A Systematic Review on Bioaccessibility of Arsenic in Rice
Zhou Z, Shao K
Indiana University

1:50 PM T3-G.2
Estimating Water Age and its Effects on Water Quality in a Full-Scale Green Home
Julien R, Mitchell J
Michigan State University

2:10 PM T3-G.4
Risk Assessment of Benzo[a]pyrene in Heat-processed Meat in Denmark: A Probabilistic Approach
Georgiadis S, Jakobsen LS, Nielsen BF, Nauta MJ, Fries SM
Technical University of Denmark

Sponsored by:
Emerging Nanoscale Materials SG

1:30 PM – 3:00 PM
Mardi Gras Ballroom D, 3rd Floor
T3-H Economics of Food Risk-Benefit Analysis
Chair: Aiyah Sassi

1:30 PM T3-H.1
Targeting and Evaluating Investments in Food Safety in Low and Middle Income Countries
Hoffmann S, Muhammad A, Meade B
USDA Economic Research Service

1:50 PM T3-H.2
The Impact of Food Safety Outbreaks on Produce Supply, Imports, and Exports
Astill GA, Minor T
USDA Economic Research Service, US Department of Agriculture

2:10 PM T3-H.3
A Retrospective Analysis of the U.S. Food and Drug Administration's Seafood HACCP Rule and Program
Sassi A, Morante J
FDA

2:30 PM T3-H.4
Nutritional Risk and Benefit Associated with Red Meat Consumption in France
De Oliveira Mota J, Tourniè P, Guillou S, Pierre F, Membré JM
INRA, Oniris

Sponsored by:
Economics and Benefits Analysis SG & The Society for Benefit Cost Analysis (SBCA)

1:30 PM – 2:30 PM
Mardi Gras Ballroom E, 3rd Floor
T3-I Modeling & Simulation for Security, Safety and Risk Monitoring
Chair: Ramin Moradi

1:30 PM T3-I.1
Methodology for System-level Risk Monitoring Using Simulated and Sensor Data
Moradi RM, Groth KMG
SyRRA Lab, Center for Risk & Reliability, University of Maryland, College Park

1:50 PM T3-I.2
CFD Study of the Dispersion and Combustion of a Gas Mixture in the 20L Sphere
Serrano JDJ, Pico PD, Torrado DE, Muñoz F, Dufaud O
Universidad De Los Andes, Universite De Lorraine

2:10 PM T3-I.3
A Probabilistic Analysis of Nuclear Deterrence Failure
Reinhardt JC, Paté-Cornell ME
Stanford University

Sponsored by:
Security & Defense SG

1:30 PM – 2:30 PM
Mardi Gras Ballroom FGH, 3rd Floor
T3-J From AI to Fake News: Media & Emerging Risks
Chair: Sharon Friedman

1:30 PM T3-J.2
Gradients of Fear and Anger in the Social Media Response to Terrorism
Baucum MP, John RS*
University of Southern California

1:50 PM T3-J.3
Structured Introspection: Can a Simple Intervention Help People Identify Fake News about Climate Change on Facebook?
Lutzke L, Drummond C, Slovic P, Árvai J
University of Michigan, Decision Research

2:10 PM T3-J.4
The Effects of Media Coverage of Scientific Retractions on Trust in Science
Sarathchandra D, McCright AM
University of Idaho

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Risk Communication SG

Final Program 37
Foundational Issues in Risk Analysis SG
Sponsored by:

Risk analysis vs safety management: two ships passing in the night? - How closely integrated could and should these two approaches be for improving the joint management of safety and risk?

Risk analysis vs safety management: two ships passing in the night? - How closely integrated could and should these two approaches be for improving the joint management of safety and risk?

Historically the focus on quantitative risk assessments has been very strong and quantified risk assessments (QRA) and probabilistic risk assessments (PRAs) have had and still have the major role in risk management. QRA and PRAs are rooted in engineering and natural sciences, and the quantitative methods used are attractive for supporting decision-making on the design and management of technical systems. At the same time, industry associations and regulatory organizations are paying a great deal of attention to the analysis and normative prescriptions of safety management (SMS) in technical organizations. SMS approaches have been guided by accident literature as well as by high reliability organization research. While SMS guidelines “call for risk assessments as part of the SMS strategy, attention is also paid to management practices, incentives, safety culture and organizational resilience as key elements. These organizational, perceptual and attitudinal variables have found their way into formal risk assessments. Nor does the safety management literature provide much reference to risk analysis.

In important respects, risk management and safety management are different. Safety is about assurance, risk is about loss. Safety is in many respects a perceptual property, risk is a calculated one. The aim of this roundtable is to assess the potential for integrating risk analysis and safety management. Is it possible, or desirable to integrate safety and risk management? What are the analytic and methodological challenges to integrating research in both fields? What are the possibilities of integrating the two perspective and methods in management practice? How can we move forward with a dialogue between different definitions and practices?

Participants:
Kenneth A Pettersen Gould, University of Stavanger
Terje Aven, University of Stavanger
Rob Goble, Clark University
Jean Christophe Le Coze, INRS
Paul Schulman, CCRM UC Berkeley

Sponsored by: Foundational Issues in Risk Analysis SG
### Tuesday

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Topic</th>
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| 3:30 PM – 5:10 PM | Mardi Gras Ballroom ABC, 3rd Floor | T4-F Symposium: Department of Defense Efforts to Advance the Risk Assessment of Nanomaterials  
Chair: Jo Anne Shatkin |
| 3:30 PM – 5:00 PM | Mardi Gras Ballroom D, 3rd Floor | T4-H Application of QMRA: From Evaluating Potential Interventions to Risk-Benefit Analysis  
Chair: Amir Mokhtarzadeh |
| 3:30 PM – 5:10 PM | Mardi Gras Ballroom E, 3rd Floor | T4-I Symposium: Risk Transfer and Global Workplace Health  
Chair: Mary O'Reilly |

**3:30 PM – 5:10 PM**  
**Galerie 6, 2nd Floor**  
**T4-F Symposium: Department of Defense Efforts to Advance the Risk Assessment of Nanomaterials**  
Chair: Jo Anne Shatkin

- **Single Visit Nanocoatings System for Offshore & Marine Corrosion Protection**  
  Hawkins T, Virtanen J, Tesla Nanocoatings
- **Application of the DOD Framework for Examining Possible Health and Environmental Impacts Of Nanomaterials for Use in Weapon Systems**  
  Underwood PM, Rok A, Department of Defense and Noblis Inc.
- **Lessons Learned from Case Studies**  
  Demonstrating a DoD Framework to Evaluate Health and Environmental Impacts of Nanomaterials  
  Ede J, Shatkin JA, Vireo Advisors
- **Life Cycle Hotspot Assessment of an Anti-corrosion Nanomaterial Coating**  
  Ong KJ, Henderson A, Rak A, Shatkin JA, Vireo Advisors, LLC
- **Application and Testing of Risk Screening Tools for Nanomaterial Risk Analysis**  

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|--------------|----------------|-------------------------------------------------------------------------------------------------------------------------------|
| 8:30 AM – 9:30 AM | Galerie 1, 2nd Floor | Coping with Globalization. Risk Regulation in High-Risk Industries  
Engen OAE  
University of Stavanger  
8:50 AM  
W1-A.2  
The Good, the Bad and the Ugly: An Empirical Assessment and Comparison of Three Competing Models for Explaining the Acceptance of Technologies  
Elgueta H  
Universidad de Magallanes  
9:10 AM  
W1-A.3  
The Human Side of Systemic Risks  
Goble R  
Clark University  
Sponsored by:  
Resilience Analysis SG |
| 8:30 AM – 9:30 AM | Galerie 2, 2nd Floor | Considering Risk in Radiological Evacuation and Reoccupation Decision Making  
Bralley GS, Johnson TE  
Colorado State University  
8:50 AM  
W1-C.2  
Risk Communication and Siting Hazardous Facilities: Understanding Local Support and Why It Matters  
Gupta K, Jenkins-Smith HC, Ripberger J, Silva CL  
University of Oklahoma  
9:10 AM  
W1-C.4  
The Ghosts of Our Radiant Past: Institutional Path Dependencies in Radiological Risk Assessments and Communication  
Linberg J  
King’s College London  
Sponsored by:  
Risk Policy and Law SG |
| 8:30 AM – 9:30 AM | Galerie 3, 2nd Floor | Institutional Fragmentation and Critical Infrastructure Systems: How Network Structure Impacts Performance, Resilience, and Equity  
Scott TA, Scott RP, Greer RA  
University of California, Davis, Colorado State University, Texas A&M University  
8:50 AM  
W1-D.1  
Forecast of Critical Infrastructure System for the Risk Analysis and Investment  
Lewis LP, Burdi CA, Schlueter SG, Wagner AM, Bergerson JD, Petit FD  
Argonne National Laboratory  
9:10 AM  
W1-D.3  
A New Generation of Decision Support System for the Risk Analysis and Forecast of Critical Infrastructure  
ENEA, Italian National Agency for New Technologies, Energy and Sustainable Economic Development |
| 8:30 AM – 10:00 AM | Galerie 4, 2nd Floor | Analysis of Service Level Interdependencies between Critical Infrastructures under Dynamic Conditions and Disruptive Events  
Giannopoulos G, Galbusera L*  
European Commission, Joint Research Centre, Directorate E – Space, Security and Migration, Technology Innovation in Security Unit  
Sponsored by:  
Engineering and Infrastructure SG |
| 8:30 AM – 10:00 AM | Galerie 5, 2nd Floor | In keeping with the conference theme, “The Many Faces of Risk,” this session focuses on the little-known and often-misunderstood practice of financial risk management. Financial risk management evolved out of the field of financial economics, which is the study of the economics of financial decisions. What occurs in the financial world affects every human being, through the capital raised by companies to the values of the savings and retirement portfolios of workers. Likewise, movements in exchange rates and capital flows between countries affect the competition between domestic and foreign firms that propel the global economy. Yet, for most individuals little is known about financial risk management, and what is believed to be known is often incorrect. Many people think that the industry is a lawless wild west with everyone gambling, and a small number of visionaries that know where markets are heading. The field of financial economics reveals that this impression is far from the truth. Borrowing from the vast body of quantitative theory in economics, finance has evolved into a discipline almost entirely focused on risk analysis and management. The origins of modern finance derive from the mean-variance portfolio models of Markowitz and Sharpe. With the development of derivative pricing theory in the early 1970s, quantitative models in finance began a sharp ascent to the summit of the academic and practitioner worlds and led to the awarding of several Nobel Prizes. Unfortunately, the misapplication of the models has contributed to financial stresses. Understanding what finance has contributed to risk analysis is an important step in gaining a comprehensive understanding of the subject of risk. This roundtable provides an overview of the development of risk models in portfolio analysis and derivative pricing and concludes with an application that demonstrates how finance is used to handle financial stress in a variety of industries.  
Participants:  
Robert Brooks, Ph.D., CFA  
Sharon Brown-Hruska, Ph.D.  
Sponsored by:  
Applied Risk Management SG |
## Wednesday

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<tr>
<th>8:30 AM – 10:10 AM</th>
<th>8:30 AM – 10:00 AM</th>
<th>8:30 AM – 9:30 AM</th>
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<tr>
<td><strong>W1-F Symposium: Risk Analysis for Uncertain Futures</strong>&lt;br&gt;Chair: Daniel Pérez</td>
<td><strong>W1-G Ecosystem Services and Management</strong>&lt;br&gt;Co-chairs: Amanda Bailey, Gregory Kiker</td>
<td><strong>W1-H Presence and Survival of Microbial Pathogens in Environment and Supply Chain</strong>&lt;br&gt;Chair: Jade Mitchell</td>
<td><strong>W1-I Symposium: The Security and Resilience Nexus</strong>&lt;br&gt;Chair: Sissel Jore</td>
<td><strong>W1-J Roundtable: Risky Conversations: Examining the Dual Impacts of the SRA Annual Meeting on Thinking and Practice in Risk Science</strong>&lt;br&gt;Chair: Katherine McComas</td>
</tr>
<tr>
<td><strong>Risk Analysis for Uncertain Futures</strong>&lt;br&gt;Dudley SE, Carrigan C, Mannix B, Pérez DR&lt;br&gt;The George Washington University</td>
<td><strong>Multi-Criteria Decision Analysis in the Kruger National Park (South Africa): Assessing Potential Trade-offs in Elephant Population and Vegetation Impacts under Varying Climate Scenarios</strong>&lt;br&gt;Ramey C, Kiker G&lt;br&gt;University of Florida</td>
<td><strong>Effects of Water Chemistry on Infectivity of Legionella Pneumophila</strong>&lt;br&gt;Mraz AL, Weir MH&lt;br&gt;Ohio State University</td>
<td><strong>How to Explore the Uncertainty Dimension of Security: Resilience Driven Security</strong>&lt;br&gt;Jore SHJ&lt;br&gt;University of Stavanger</td>
<td>In this roundtable we discuss qualitative research examining informal discussions at the 2018 SRA Annual Meeting and their impact on the state of risk science and practice. The trajectory of discussion at the Annual Meeting is influenced by two forces. The first force is clear, well-documented and “top-down”; it is the risk theme that is decided upon and advertised in advance of the meeting. The second force is more elusive. It is the tone of the conference that evolves “bottom-up” from the content of seminars, informal discussions, round-tables, debates, serendipitous questions asked at plenaries, and even sometime or ongoing feeds. This second force is critically important—as is its impact on the state of the science moving forward, however, SRA has yet to formally examine its integration or discussion of it into the meeting’s proceedings. Much of this is the result of technological and logistical pressure, i.e., presenters having to generate their talks and posters in advance of the meeting. While necessary, such pressure makes it difficult for presenters to adapt to the evolving discussion, leaving presenters to speak past one another, while more meaningful discussions and their impacts go unacknowledged. Rather than restructure the entire meeting, here we report on a series of ongoing interviews with members of the society (by necessity primarily in our own areas of risk communication and perception but including members of the society in general) at all levels (early, mid and late-level academics, practitioners and regulators) documenting how the events of the meeting shape both their thinking about risk issues and, importantly, their research and practice going forward. We will also suggest means for conducting and improving such research at later meetings.</td>
</tr>
<tr>
<td><strong>Anticipating the Unanticipated—On the Maritime Transportation System</strong>&lt;br&gt;Roberts FS&lt;br&gt;Rutgers University</td>
<td><strong>Evaluating Uncertainty and Variability in the Survival Module for Toxoplasma Gondii Tissue Cysts in Fresh Pork under a Temperature Gradient</strong>&lt;br&gt;Rani S, Dubey JP, Pradhan AK&lt;br&gt;University of Maryland, College Park</td>
<td><strong>The Trajectories of AMR</strong>&lt;br&gt;Goldman A, Peluso R&lt;br&gt;Johns Hopkins University</td>
<td><strong>Sponsored by:</strong>&lt;br&gt;Microbial Risk Analysis SG</td>
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<tr>
<td><strong>How to Explore the Uncertainty Dimension of Security: Resilience Driven Security</strong>&lt;br&gt;Jore SHJ&lt;br&gt;University of Stavanger</td>
<td><strong>Security and Resilience in Supply Chain Networks</strong>&lt;br&gt;Ganin AA, Mersky AC, Kitsak M, Keister JM, Linkov I&lt;br&gt;University of Virginia, U.S. Army Engineer Research and Development Center, Northeastern University, University of Massachusetts Boston</td>
<td><strong>Sponsored by:</strong>&lt;br&gt;Biosafety and Biosecurity Society</td>
<td><strong>Sponsored by:</strong>&lt;br&gt;Risk Communication SG</td>
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<td><strong>Sponsored by:</strong>&lt;br&gt;Decision Analysis and Risk SG</td>
<td><strong>Sponsored by:</strong>&lt;br&gt;Ecological Risk Assessment SG</td>
<td><strong>Sponsored by:</strong>&lt;br&gt;Technical Research Centre of Finland</td>
<td><strong>Sponsored by:</strong>&lt;br&gt;Microbial Risk Analysis SG</td>
<td><strong>Sponsored by:</strong>&lt;br&gt;Biosafety and Biosecurity Society</td>
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The use of emerging technologies in consumer products has expanded rapidly, revealing both innovative improvements over conventional technologies, as well as novel risks to human health and the environment. Moreover, the convergence of new technologies (e.g., new materials and artificial intelligence) into a consumer product generates hazards and threats that had been previously uncertain or poorly framed. In certain cases, this uncertainty has been magnified by social taboos and stigmas which left society reluctant to address emerging consumer product risk concerns. This presents challenges for stakeholders who manage product risks, which are responsible for protecting the public health from unreasonable risks. In this spirit, this roundtable will discuss new challenges posed by emerging consumer products and the latest efforts to address current and future technological challenges. The roundtable will begin by discussing consumer product innovation and risk analysis at the micro-scale, such as with consumer products enabled via engineered nanomaterials and advanced materials, as well as emerging applications of synthetic biology. Next, the roundtable will address emerging topical hazards of sex robots which make use of artificial intelligence) into a consumer product. The roundtable will assemble risk scholars and practitioners to discuss conceptual needs as well as concrete experiments.

Participants:
Trey Thomas, Consumer Product Safety Commission
Igor Linkov, US Army Corps of Engineers
Christine Hendren, Duke University
Jacquelyn (Ruddie) Clarkson, Former Chief Epidemiologist, State of LA

Sponsored by:
Applied Risk Management SG
### Wednesday

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<th>Session Title</th>
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<td>10:30 AM</td>
<td>Galerie 6, 2nd Floor</td>
<td>W2-F Symposium: Benefit-Risk Assessment for Regulatory Review of Human Drugs and Biologics</td>
<td>Chair: Hong Yang&lt;br&gt;Implementation of a Structured Benefit-Risk Framework into FDA's Human Drug Review&lt;br&gt;Thompson GW, Lackey LG, Eggers SL* Food and Drug Administration</td>
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<td>11:10 AM</td>
<td>Mardi Gras Ballroom ABC, 3rd Floor</td>
<td>W2-F.2 CBER’s Experience with Benefit-Risk&lt;br&gt;Yang H, Forshee RA&lt;br&gt;Office of Biostatistics and Epidemiology, CBER, FDA</td>
<td>CBER’s Experience with Benefit-Risk&lt;br&gt;Yang H, Forshee RA&lt;br&gt;Office of Biostatistics and Epidemiology, CBER, FDA</td>
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<td>10:30 AM</td>
<td>Mardi Gras Ballroom ABC, 3rd Floor</td>
<td>W2-J From Flint to Fracking: Media &amp; Environmental Risk&lt;br&gt;Chair: Sharon Friedman</td>
<td>Any News is Good News: The Importance of Access to Local Information for Ameliorating Psychological Stress about Shale Gas Development Risks in Rural Pennsylvania&lt;br&gt;Casagrande DG, Friedman SM*&lt;br&gt;Lehigh University&lt;br&gt;10:50 AM&lt;br&gt;Earthquake Country: A Qualitative Analysis of the Uses of a Facebook Discussion Group for Risk Communication&lt;br&gt;Lambert CF&lt;br&gt;Cornell University&lt;br&gt;11:10 AM&lt;br&gt;Understanding #FlintWaterCrisis: Risk Communication and Attribution of Responsibility on Twitter&lt;br&gt;Roche AJ, Rickard LN, Rosenbaum JE&lt;br&gt;University of Maine&lt;br&gt;Sponsored by: Risk Communication SG</td>
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* SG: Special Group
Wednesday

**Galerie 1, 2nd Floor**

**W3-A Symposium: Resilience and Critical Infrastructure**
Chair: Margaret Kurth

1:30 PM
How Much Does Resilience Cost in Transportation Networks? Ganin AA, Kitsak M, Mersky AC, Linkov I University of Virginia, U.S. Army Engineer Research and Development Center, Northeastern University

1:50 PM
Building Resilience of Buildings Kurth MH, Linkov I US Army Engineering Research and Development Center

2:10 PM
Decision and Risk Modeling for Implementing Regional Environmental Protection Policies on Interdependent Economic and Infrastructure Systems Resurreccion JZ, Santos JR University of the Philippines

Sponsored by: Resilience Analysis SG

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**Galerie 2, 2nd Floor**

**W3-B Symposium: Foundational Issues in Risk Analysis V**
Chair: Scott Ferson

1:30 PM
Explicit and Tacit Assumptions in Risk Assessment – Some Examples and Assessment Strategies Askeland T, Flage R University of Stavanger

1:50 PM
On the Role of Protocol Driven Resilience in Coupled Infrastructure and Natural Systems Amodeo DC, Francis RA* George Washington University

2:10 PM
Naked Expert Elicitations of Probabilities of Rare Events Ferson S Institute for Risk and Uncertainty

Sponsored by: Foundational Issues in Risk Analysis SG

---

**Galerie 3, 2nd Floor**

**W3-C Roundtable: Food Innovations: Communication and Regulation for Commercial Viability**
Chair: Sandra Hoffman

Dramatic science and technology advances in culturing methodologies, genetic modifications, and CRISPR techniques are offering practical, commercially viable opportunities to improve existing food products and create new food sources. The interface of emerging scientific research and technological applications is revolutionizing many aspects of the food and agricultural industry while simultaneously creating new challenges for regulatory agencies responsible for the safety of the food supply. Given the speed at which innovations are finding their way to the market, a comprehensive narrative, endorsed by private sector-governmental stakeholders, is required to accurately inform the public about these new food choices. Communication currently used to publicly introduce new, modified food products need to reflect the diverse view of a broad cross section of stakeholders (e.g., retail distributors, marketing experts, public advocacy groups, etc.). Success by all stakeholders will certainly depend on public trust in how new food will promote healthy lifestyles while promoting economic prosperity. Research has confirmed that consistent, evidence-based public messaging benefits all stakeholders. This panel will provide the necessary historical context in which science and tech advances in food and agriculture are currently operating. It will provide perspectives from industry, government, and communication science to inform the comprehensive narrative necessary for public adoption of food innovations.

Participants: Chakraborty, Sweta Bouder, Frederic Bobo, Jack Kulkarni, Deepi

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**Galerie 4, 2nd Floor**

**W3-D Symposium: Advancements in Quantitative Applications for Data Integration in the Characterization of Hazard, Dose-Response, and Uncertainty**
Chair: Daniele Wikoff

1:30 PM
Quantitative, Meta-analytical Approaches for the Analysis of Animal Toxicological and Epidemiologic Data in Human Health Risk Assessments Davis JA, Kopylev L, Gift J US Environmental Protection Agency

1:50 PM
Inflammation as a Tumor Co-Initiator: New Theory Predicts Most (Perhaps All) Carcinogens Increase Cancer Risk Nonlinearly at Low Doses Bogen KT Consulting Toxicologist

2:10 PM
Non-Parametric Benchmark Dose Models for Non-Monotone Dose-Response Relationships Wheeler MW NIOSH

2:30 PM
Practical Applications of Meta-regression and Bayesian Approaches to Characterize Dose-response and Uncertainty in Development of Toxicity Values Ring CL, Wikoff DS, Thompson C, Budinsky RA, Haws LC ToxStrategies, Inc.

Sponsored by: Applied Risk Management SG

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**Galerie 5, 2nd Floor**

**W3-E Advanced Methodology to Support Risk Management**
Chair: Willy Roed

1:30 PM
Machine Learning and Expert Judgment to Inform Risk Management Decision Making Barrett AM ABSG Consulting (ABS Group)

1:50 PM
A Defense of Small Data: Risk Prediction Approaches that Reduce Privacy Invasions Applied to Adverse Pregnancy Outcomes Davis A, Krishnamurti T Carnegie Mellon University

2:10 PM

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<td>1:30 PM – 2:30 PM</td>
<td>Galerie 6, 2nd Floor</td>
<td>W3-F Decision Analysis and Risk Case Studies</td>
<td>Williams A, Ezell B, Caskey S,</td>
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<td>1:30 PM – 3:00 PM</td>
<td>Mardi Gras Ballroom ABC, 3rd Floor</td>
<td>W3-G Symposium: Potential Exposure and Health Effects Related to the Development of Oil and Natural Gas from Unconventional Resources in the United States</td>
<td>Chair: Donna Vorhees</td>
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<td>1:30 PM – 2:30 PM</td>
<td>Mardi Gras Ballroom D, 3rd Floor</td>
<td>W3-H Economics of Environmental Policy</td>
<td>Chair: Lisa Robinson</td>
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<td>1:30 PM</td>
<td>W3-H.1</td>
<td>Increasing the Benefits of Air Quality Warnings</td>
<td>Robinson LA, Buonocore J, Hammitt JK, O’Keefe L, Harvard University</td>
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<td>1:50 PM</td>
<td>W3-H.2</td>
<td>Risk of Bias Analysis of Ozone Epidemiological Studies Used in BenMAP Analyses</td>
<td>Sax SN, Dell L, Mundt KA, Lewis RJ Ramboll</td>
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<tr>
<td>2:10 PM</td>
<td>W3-H.4</td>
<td>Using Long-Term Integrated Sampling of Indoor Air (2-weeks) at Vapor Intrusion Sites to Assess Risk in Occupational Environments</td>
<td>Rossner A, Lutz C, Stone B Clarkson University</td>
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<tr>
<td>1:30 PM – 3:00 PM</td>
<td>Mardi Gras Ballroom E, 3rd Floor</td>
<td>W3-I Symposium: What Risk Assessors Should Know This Year about Occupational Risk Analysis: From Chemical Exposure to Traumatic Brain Injury to Cumulative Risk Assessment</td>
<td>Chair: Scott Dotson</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>W3-I.1</td>
<td>Chronic Traumatic Encephalopathy in the NFL Workplace: Risk Assessment Needed to Dispel Manufactured Doubt</td>
<td>Finkel AM, Bieniek KF University of Michigan School of Public Health, Mayo Clinic</td>
</tr>
<tr>
<td>1:50 PM</td>
<td>W3-I.2</td>
<td>Using Long-Term Integrated Sampling of Indoor Air (2-weeks) at Vapor Intrusion Sites to Assess Risk in Occupational Environments</td>
<td>Rossner A, Lutz C, Stone B Clarkson University</td>
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<tr>
<td>1:50 PM</td>
<td>W3-I.3</td>
<td>Using Long-Term Integrated Sampling of Indoor Air (2-weeks) at Vapor Intrusion Sites to Assess Risk in Occupational Environments</td>
<td>Rossner A, Lutz C, Stone B Clarkson University</td>
</tr>
<tr>
<td>2:10 PM</td>
<td>W3-I.4</td>
<td>Dermal Contact with Solid Metals and Implications for Both Occupational and Public Health Risk Assessment: Lead, Zinc, and Copper</td>
<td>Sahmel J, Ramachandran G University of Minnesota, Johns Hopkins University, Insight Exposure and Risk Sciences</td>
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**Wednesday**

**Final Program**

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3:30 PM – 5:00 PM
Galerie 1, 2nd Floor
W4-A Risk Perceptions and Decision Making: Approaches to Understanding Judgments and Supporting Decisions from Agriculture to Climate Change
Chair: Zach Collier

3:30 PM W4-A.1
Using Decision Support to Overcome Resistance to Science-Based Recommendations
Bessette DL, Wilson RS, Beaudrie CEH
Michigan State University

3:40 PM W4-A.2
An Intersectional Analysis of Young Ghanaian Women’s Responses to Climate Change
Wood AL
North Carolina State University

4:00 PM W4-A.3
Understanding Cumulative Risk Perception from Judgments and Choices: An Application to Flood Risks
De La Maza C, Davis A, Azevedo I,
Gonzalez C
Carnegie Mellon University

4:30 PM W4-A.4
Modeling the Relationship between Emotional Responses to and Judgments of Scientific Evidence
Drummond C, Fischhoff B
University of Michigan, Carnegie Mellon University

3:30 PM – 5:10 PM
Galerie 2, 2nd Floor
W4-B Symposium: Modernization of Study Quality Evaluation — A Survey and Discussion of the Evaluation and Integration of Study Validity as Part of Systematic Review
Chair: Daniele Wikoff

3:30 PM W4-B.1
Application of Systematic Review in TSCA Risk Evaluations
Camacho-Ramos JA, Beck N
US Environmental Protection Agency

3:50 PM W4-B.2
Research Quality in Focus: A Retrospective Look at Food & Nutrition Research
Doe JB, Myers E*
EF Myers Consulting

4:10 PM W4-B.3
Considerations and Approaches for Study Evaluation in Chemical Health Assessments
Kraft A, Thayer KA
U.S. Environmental Protection Agency

4:30 PM W4-B.4
Application of Risk of Bias in Evaluation of Epidemiological Study Quality: Successes and Challenges
Taylor KW, Rooney AA
National Toxicology Program

4:50 PM W4-B.5
A Discussion on the Practice of Evaluating and Integrating Study Validity in Systematic Assessments Involving Multiple Evidence Streams
Wikoff DS, Urban J, Doepker C, Chappell G, Borghoff S
ToxStrategies

Sponsored by: Foundational Issues in Risk Analysis SG

3:30 PM – 5:00 PM
Galerie 3, 2nd Floor
W4-C Symposium: Evaluating Public Health Impacts of Electronic Nicotine Delivery Systems
Co-chairs: Phil Yeager, Roxana Weil

3:30 PM W4-C.1
FDA Tobacco Regulations and Considerations for Evaluating Human Health Risks of Electronic Nicotine Delivery Systems (ENDS)
Weil RE
US Food and Drug Administration Center for Tobacco Products

3:50 PM W4-C.2
Evaluating Flavors in Newly Deemed Tobacco Products
Benson KA
US Food and Drug Administration Center for Tobacco Products

4:10 PM W4-C.3
Electronic Cigarette Heterogeneity Influences Individual and Population-level Effects
Eissenberg TE
Virginia Commonwealth University

4:30 PM W4-C.4
Evaluation of Chemical Exposures at Three Vape Shops Throughout the United States
Zwack LM, LeBouf RF, Chiu S, Stefaniak AB
National Institute for Occupational Safety and Health

Sponsored by: Dose Response SG and Occupational Health and Safety SG

3:30 PM – 5:00 PM
Galerie 4, 2nd Floor
W4-D Symposium: Cancer Risk Assessment
Chair: Andrey Korchevskiy

3:30 PM W4-D.1
Background Cancer Rates and Background Exposure: Theoretical and Practical Considerations
Rasmussen EJ
Chemistry & Industrial Hygiene, Inc.

3:50 PM W4-D.2
Mathematics of Extrapolation: Validation of Dose-response Relationships at the Low Exposure Levels
Korchevskiy A, Rasmussen J
Chemistry & Industrial Hygiene, Inc.

4:10 PM W4-D.3
Bayesian Analysis of Residual Risk: This is What We Mean by Safe
Pagone FJ
RHP Risk Management Inc.

4:30 PM W4-D.4
Asbestos Lung Burden Analysis: What We Know About Background Levels in Non-exposed Individuals
Carney JM, Pavlikso EN, Sporn T, Roggli VL
Duke University Medical Center

4:50 PM W4-D.5
Reconstruction of Takehome Exposure: Are the Risks Significant?
Boelter F
RHP Risk Management Inc.

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Wednesday

3:30 PM – 5:00 PM

W4-F Roundtable: Navigating the Risk Landscape: Facilitating Critical Thought in an Information Rich World
Chair: Donna Moenning

Science and discovery are advancing at a rapid pace and consumers are hard pressed to keep up. Inaccurate, yet compelling narratives and visuals promulgated via social media widen the gap between actual risks and risk perceptions. This creates uncertainties for consumers. In a world where we are prone to cognitive leaps and the scary stuff is always easier to believe, how can consumers make sense of complex information related to risk? As risk communicators, we are constantly challenged to operate in this complex environment. We are tasked to better understand how various publics recognize and react to risk and to find ways of proactively and effectively communicating in an environment of growing distrust. For this panel session, our experts will:

1. Provide an overview of the social contexts within which vast amounts of information is shared;
2. Discuss how social media and the media shapes public perceptions of science and risk;
3. Showcase examples of how risk can be communicated in meaningful ways to diverse audiences;
4. Explore options (remedies) for empowering the public to think critically about information and to showcase new outreach and communication opportunities.

Panelists:
Alison Bernstein, Michigan State University
Iida Ruishalme, Thoughtscapism
Charlie Arnot, The Center for Food Integrity

Sponsored by:
Ecological Risk Assessment SG

3:30 PM – 5:10 PM

W4-G Symposium: Understanding the Ecological and Health Risks Associated with Trace Organisms in the Environment
Chair: Sheree Pagsuyoin

3:30 PM W4-G.1
Identifying the Next Drug Epidemic by Testing Municipal Wastewater
Keshovich A
Mathematica Policy Research

3:50 PM W4-G.2
Detection of Illicit Drugs in Sewage and Analysis of Community Drug Use Through Wastewater Data
Pagsuyoin SA, Bello D, Luo J
University of Massachusetts Lowell

4:10 PM W4-G.3
Perman JA
University of South Florida

4:30 PM W4-G.4
PAH Contaminant Accumulation in Stormwater Catchment Basins: New Implications for Management Guidelines
Oyandele-Craver V, Kasaraneni V, Shifman
University of Rhode Island

4:50 PM W4-G.5
Risk Threshold Calculation for Emerging Contaminants – Just Because it is There, and We Can Now Detect it, Does That Mean that it is Toxic?
Kashuba RO, Goodfellow W, Roey L, Gard N
Exponent

Sponsored by:
Ecological Risk Assessment SG

3:30 PM – 4:30 PM

W4-H Economics of Low Probability / High Impact Events
Chair: Deborah Alken

3:30 PM W4-H.1
Treatment of Risks and Benefits in DHS Security Regulations: Theory and Practice
Gungor A, Alken D
U.S. Coast Guard, U.S. Department of Transportation

3:50 PM W4-H.3
U.S. Tropical Cyclone Flood Insurance Claim Losses: Storm Surge vs. Freshwater
Tonn GL, Czajkowski JR
University of Pennsylvania

4:10 PM W4-H.5
Are Ellicited Risk Perceptions Reliable Enough to be Used in Decision-making? Some Evidence from Residential Customers’ Costs of Large Long-duration Power Outages in Regions Facing Significant Risks
Baik S, Davis AL, Morgan MG
Carnegie Mellon University

Sponsored by:
Economics and Benefits Analysis SG & The Society for Benefit Cost Analysis (SBCA)

3:30 PM – 5:00 PM

W4-I Communicating Health & Environmental Risks
Chair: Christopher Cummings

3:30 PM W4-I.1
Mental Models Risk Communication to Promote Private Well Testing in Underserved Minority Communities, Part I: Communication Design
Wood E, Stillo III FJ, Bruine de Bruin W, Lockhart S, MacDonald Gibson J
University of North Carolina at Chapel Hill, Leeds University Business School

3:50 PM W4-I.2
Mental Models Risk Communication to Promote Private Well Testing in Underserved Minority Communities, Part II: Randomized-controlled Trial
Stillo III FJ, Wood E, Bruine de Bruin W, MacDonald Gibson J
University of North Carolina at Chapel Hill, Leeds University Business School

4:10 PM W4-I.3
What Prompts People to Believe that Vaccines Cause Disease? A Cross-cultural Comparison of How People Misperceive Vaccinations
Cummings CL
Nanyang Technological University, Singapore

4:30 PM W4-I.4
Communicating Risk in Entertainment: The Role of Social Norms
McClaran N
Michigan State University

Sponsored by:
Risk Communication SG

3:30 PM – 5:10 PM

W4-J Climate Change Communication: Implications for Messaging
Chair: Laura Rickard

3:30 PM W4-J.1
Beyond Fear: Examining the Role of Discrete Negative Emotions in Climate Change Risk Perception
Atkinson L
University of Texas at Austin

3:50 PM W4-J.2
Communicating the Scientific Consensus on Climate Change: A Meta-Analysis of Experiment-Based Studies
Clarke CE, van der Linden S, Ross R
George Mason University, University of Cambridge, University of London

4:10 PM W4-J.3
Instability in Public Preferences Around Climate-Adaptive Forestry in British Columbia
Findlater KM, Peterson St-Laurent G, Hageman S, Kozak R
University of British Columbia

4:30 PM W4-J.4
Impact of Climate Change Message Frames on Risk Perception and Adaptation to Climate-exacerbated Hazards
Walpole EH, Wilson RS, Toman E
The Ohio State University

4:50 PM W4-J.5
Thinking Beyond Party Lines: Separating Climate Mitigation Policy from Political Ideology
Zwickle A, Singh A
Michigan State University, California State University Sacramento

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THE WORLD CONGRESS ON RISK is organised by the Society for Risk Analysis (SRA) to grow innovation and knowledge across risk analysis and management communities, researchers, practitioners, policymakers and related stakeholders. The event seeks to stimulate ideas and solutions for regional and global risk challenges. The past World Congresses in Singapore (2015), Sydney (2012), Guadalajara (2008) and Brussels (2003) engaged thousands of scholars and professionals from more than forty countries. In 2019, the SRA brings the World Congress to Cape Town, South Africa, where organisations, companies, academia and individuals will gather with a theme of Development and Resilience, across a variety of topics:

- Emerging technologies and innovation
- Environment, ecology, climate
- Agriculture, food and water supply
- Human health and safety
- Law, policy and governance
- Business processes and standards
- Population and workforce behaviors
- Disaster preparedness and resilience
- Energy, transportation, logistics
- Poverty in rural and urban areas
- Infrastructure systems
- Economics, finance and fraud-related issues in enterprise and government
- Ethnic and socio-economic risks

The objectives of the Fifth World Congress on Risk are to:

- Stimulate dialogue and learning on risk issues of worldwide interest
- Share insights to analytic methods, decision processes and policy making
- Disseminate advances in risk assessment, management, and communication
- Connect organisations and individuals
- Facilitate educational opportunities and transfer science-informed practices to user communities

The broad interdisciplinary programme features symposia, instructional courses, oral and poster presentations, informal discussion and exchange with international experts, and training workshops.

Participation of researchers and practitioners based in developing countries is essential. Applications for support of participant travel and related expenses are invited. The initial Call for Abstracts was released in July 2018 with a due date of December 1, 2018 (www.sra.org). Session organisers are asked to include presenters or discussants from developing countries.

Interested in sponsoring this event? Agencies, corporations, not-for-profits, societies, et al. are invited to co-sponsor and participate in the Congress, in ways most suited to the individual sponsors. A particular need is funding for travel, training, and other expenses of participants from Africa, Asia, Oceania, Middle East, and Latin America. The World Congress offers sponsorship opportunities at several levels – Champion, Supporter, and Friend. Those interested in sponsoring the event should contact the Executive Secretary, Mr. Brett Burk, Secretariat@SRA.org.

We look forward to your joining in the Fifth World Congress.

Please contact the organisers at:
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