Society for Risk Analysis Annual Meeting

Risk and Resilience: Viva la Revolución!

Preliminary Program
Sheraton San Diego • San Diego, California
11–15 December 2016
On the cover: La Jolla Over Coves
Photo courtesy of Joanne DiBona, SanDiego.org
Join us in San Diego, CA
This year the SRA Annual Meeting will take place at the Sheraton San Diego in San Diego, California. The theme of the meeting is Risk and Resilience: Viva la Revolución! There are many fantastic opportunities planned, some new and some that we enjoy every year. Check us out at www.sra.org for more information on the Annual Meeting and housing.

Risk Analysis Meeting
Join us for this year’s SRA Annual Meeting. The Society for Risk Analysis is a remarkable association. Its members are scientists and practitioners trained in multiple disciplines who come from around the world. They are employed by government, industry, consulting firms, NGOs, academic institutions, and themselves. They seek one another’s company because they face problems requiring such diverse perspectives. This diversity of disciplines and perspectives is crucial for gaining insights to the complex challenges of globalization and can help policy makers cope with the uncertainties and ambiguities of 21st century governance, technology innovation, and social change.

See it all
Make your plans to attend the entire meeting from Workshops to Opening Reception on Sunday (11 December, 6:00-7:30 PM) to T-Shirt Giveaway on Wednesday (14 December, 5:00-5:30 PM). The meeting includes lunch on both Monday and Tuesday. There is a fee of $25 for the Plenary Lunch on Wednesday. Be sure to join us for conversation and a light dinner at the Poster Reception on Monday evening (6:00-8:00 PM)

Registration
On-site check-in and registration hours for the meeting:
- Sunday 11 December: 4:00 PM - 6:00 PM
- Monday 12 December: 7:00 AM - 5:00 PM
- Tuesday 13 December: 8:00 AM - 5:00 PM
- Wednesday 14 December: 8:00 AM - 4:00 PM

Calling all authors and exhibitors
At the SRA exhibition, attendees have a first-hand opportunity to examine, discuss, and learn from the products and services on display. To request a booth at the SRA exhibition, or for more information on sponsorship opportunities, contact us at exhibits@burkinc.com or go to www.sra.org and download the exhibit information.

Exhibit schedule:
- Monday, 12 December: 6:00 PM - 8:00 PM Poster Reception
- Tuesday, 13 December: 9:45 AM - 3:30 PM
- Wednesday, 14 December: 9:45 AM - 3:30 PM

Got a late-breaking abstract?
You can submit a poster abstract until 15 November 2016, for consideration in the Monday evening poster session. Click here.

Plenary Session on Monday begins at 8:30 AM so plan to arrive early!
**Registration Information**

**REGISTER!!** All participants (speakers, panelists, poster presenters, workshop attendees, et al.) must be registered to attend AND to appear in the program. Please register online at: [www.sra.org](http://www.sra.org)

**REGISTER BY FAX:** Fax your completed form with credit card information to (703) 790-2672 (Purchase orders not accepted for workshops).

**REGISTER BY MAIL:** Mail your completed form with payment to: SRA Headquarters, 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101. Mail completed registration form with check, purchase order or credit card information. You are considered registered when full payment or purchase order has been received.

**CANCELLATION POLICY:** All cancellations are subject to a 20% service charge. Cancellations must be in writing to the SRA Secretariat.

Cancellation letters received by **11 November** will be refunded total registration fees minus the 20% service charge and will be refunded **after** the meeting. No refunds will be issued on cancellations received after **11 November**.

Please note - registered participants will not received a refund if they cancel.

**DIETARY RESTRICTIONS:** Please note any dietary restrictions on the forms when you register.

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**Lunchtime Events**

**MONDAY - 12:00-1:30 PM, Business Meetings for Specialty Groups** - All participants should pick up their box lunches (included in the registration fee) and take them to the rooms designated for each of the specialty groups or to a large open area where they can enjoy the opportunity to network. All of the specialty groups will hold their business meetings during the Monday lunch break.

**TUESDAY** - Don’t miss the annual SRA Awards Luncheon and Business Meeting, which will include the announcement of all SRA awards and the Five Best-Poster Award winners from Monday’s Poster Reception! Luncheon is included in your registration fee.

**WEDNESDAY** - All participants should plan to attend the Plenary Luncheon. There is a fee of $25 for this event.

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**Evening Events**

**SUNDAY - Welcome Reception, 6:00-7:30 PM**

**MONDAY - Poster Reception, 6:00-8:00 PM** – This year’s meeting will feature a Poster Reception on Monday evening from 6:00 to 8:00 PM, with food and cash bar. During this time, attendees will have the opportunity to vote for the Five Best-Posters. Posters will be on display starting at 5:00 PM and poster presenters will be at their posters for questions and discussion during the Reception. Don’t miss it!

**WEDNESDAY - T-Shirt Giveaway, 5:00-5:30 PM**
**Committee Meetings and Events**

**Workshops**
Sunday, 12/11
Full Day - 8:30 AM-5:30 PM;
Half Day Morning - 8:00 AM-Noon;
Half Day Afternoon - 1:00-5:00 PM.

**SRA Council Meetings**
Sunday, 12/11 – Noon–5:00 PM and
Tuesday, 12/13 – 7:00-10:00 PM

**SRA Welcome Reception – (Cash Bar)**
Sunday, 12/11 – 6:00–7:30 PM

**New Member, Student/Young Professional Welcome Breakfast**
Monday, 12/12 - 7:00-8:00 AM
All SRA Fellows, Students and Young Professionals, as well as 2015 and 2016 New Members (badges with a New Member ribbon) are welcome to attend. Join us for coffee and breakfast and an opportunity to “meet-and-greet” many of our current and former elected SRA Council members, Specialty Group chairs, and esteemed SRA members and learn more about SRAs ongoing activities and ways to get more involved in SRA. We look forward to seeing you there!

**Specialty Group Meetings**
Monday, 12/12 - 12:00-1:30 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.

**Poster Reception**
Monday, 12/12 – 6:00-8:00 PM

**Specialty Group Mixers**
Tuesday, 12/13 – 6:00–7:30 PM
- Mixer 1 - DSG, MRS, EAS, ARMSG
- Mixer 2 - SDS, DAR, EIS, FRSG
- Mixer 3 - RSC, OHS, ERASG
- Mixer 4 - EBS, ENMS, RPLS, RDSG

**T-Shirt Giveaway Registration Area**
Wednesday, 12/14 – 5:00–5:30 PM
Receive a free T-shirt when you come to the Registration Desk at the end of the meeting between 5 and 5:30 PM on Wednesday!!

**Workshops**
Thursday, 12/15
Full Day - 8:30 AM-5:30 PM
Hotel Reservations

Sheraton San Diego
1380 Harbor Island Drive
San Diego, CA 92101
Phone: 619-291-2900

For reservations, go to www.sra.org and follow the link from the Annual Meeting page to make your reservation online at www.starwoodmeeting.com/Book/2016SocietyForRiskAnalysis, OR call 619-291-2900. The daily room rate for this meeting is: single/double - $169.00. Room rate for this meeting is available from 9-17 December 2016, subject to availability. SRA has reserved a block of rooms at the meeting rate, but once this block of rooms is sold out the hotel may offer any remaining rooms at the prevailing rate, so reserve your room early. The cut off date for this rate is 11 November 2016, or until the SRA room block is sold out.

From the airport: The Sheraton San Diego Hotel & Marina provides complimentary airport shuttle service to/from the San Diego International Airport. The courtesy airport shuttle arrives every 20-25 minutes from 4:45 AM – 1:00 AM, seven days a week. If you are arriving in San Diego, see below for Terminal 1 & 2 shuttle pickup instructions. Taxi is approximately $10 one way.

Parking: Valet parking is $37.00 daily. Self Parking is $32.00.
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. PLEASE NOTE: Workshops that do not meet the minimum number of required registrations will be cancelled on October 31, 2016. Students enjoy a substantial discount on workshop registration.

<table>
<thead>
<tr>
<th>Workshop #</th>
<th>Workshop Title</th>
<th>Day/Time</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>WK1S</td>
<td>Monte Carlo Simulation and Probability Bounds Analysis in R with Hardly Any Data</td>
<td>Sunday, December 11th 8:30 AM-5:30 PM</td>
<td>$300</td>
</tr>
<tr>
<td>WK2S</td>
<td>Integrating Strategic Risk Communication with Risk Management to Enhance Organizational and Behavioral Change</td>
<td>Sunday, December 11th 8:30 AM-5:30 PM</td>
<td>$450</td>
</tr>
<tr>
<td>WK3S</td>
<td>Fundamentals of Risk Assessment &amp; Toxicology at Contaminated Sites</td>
<td>Sunday, December 11th 8:30 AM-5:30 PM</td>
<td>$325</td>
</tr>
<tr>
<td>WK4S</td>
<td>Developing Spreadsheet-Based Decision Support Systems</td>
<td>Sunday, December 11th 8:30 AM-5:30 PM</td>
<td>$350</td>
</tr>
<tr>
<td>WK5S</td>
<td>UC San Diego Natural Reserve System Field Trip</td>
<td>Sunday, December 11th 8:30 AM-5:30 PM</td>
<td>$140</td>
</tr>
<tr>
<td>WK6S</td>
<td>Categorical Regression Modeling</td>
<td>Sunday, December 11th 8:30 AM-5:30 PM</td>
<td>$300</td>
</tr>
<tr>
<td>WK7S</td>
<td>Probabilistic Dose-Response Assessment: New Guidance from the World Health Organization</td>
<td>Sunday, December 11th 8:30 AM-5:30 PM</td>
<td>$300</td>
</tr>
<tr>
<td>WK8S</td>
<td>Cumulative Risk Assessment: Addressing Combined Environmental Stressors Impacts</td>
<td>Sunday, December 11th 8:30 AM-5:30 PM</td>
<td>$350</td>
</tr>
<tr>
<td>WK9S</td>
<td>Methods for Quantifying and Valuing Population Health I</td>
<td>Sunday, December 11th 8:00 AM-12:00 PM</td>
<td>$275</td>
</tr>
<tr>
<td>WK10S</td>
<td>Eliciting Judgments from Experts and Non-experts to Inform Decision-making</td>
<td>Sunday, December 11th 8:00 AM-12:00 PM</td>
<td>$250</td>
</tr>
<tr>
<td>WK11S</td>
<td>Exposure-Response Array Training</td>
<td>Sunday, December 11th 1:00 PM-5:00 PM</td>
<td>$150</td>
</tr>
<tr>
<td>WK12T</td>
<td>Monte Carlo Simulation and Probability Bounds Analysis in R with Hardly Any Data</td>
<td>Thursday, December 15th, 8:30 AM-5:30 PM</td>
<td>$300</td>
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</tbody>
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### FULL DAY WORKSHOPS

**SUNDAY 11 December, 8:30 AM-5:30 PM**

**WK1S: Monte Carlo Simulation And Probability Bounds Analysis in R with Hardly Any Data**

**Cost:** $300  
**Instructor:** Scott Ferson, Applied Biomathematics  
This revamped 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 a CD with software and data sets for the examples.
WK2S: Integrating Strategic Risk Communication with Risk Management to Enhance Organizational and Behavioral Change

**Cost:** $450

**Instructors:** Steve Ackerlund, Kleinfelder; Gordon Butte, Decision Partners; Sarah Thorne, Decision Partners

Successful risk management depends on the design, adoption, and implementation of plans and processes that achieve organizational and individual behavioral change. These plans and processes often fall short of achieving optimal outcomes because the technical elements are not aligned with the values, needs, interests and priorities of all of the relevant stakeholders, both within and outside the organization – those who determine project success through their judgments, decision making and behavior. This can result in risk management plans that are not implemented, or are implemented in a non-optimal manner despite their high intrinsic value. This full-day workshop will introduce the state-of-the-science concepts and practices of Strategic Risk Communications and stakeholder engagement to systematically understand and influence judgment, decision making and behavior as an integrated element of effective risk management. Using lecture, case study review and interactive class exercise formats, facilitators will provide examples from real-world projects that successfully integrated risk communication and risk management. The Mental Modeling Technology™ (MMT) approach will be presented and discussed as a core technique for understanding and communicating about risk, along with other methods to address wide-ranging communication and stakeholder engagement needs. The workshop will feature a dialogue and problem-solving session where participants will be encouraged to share their own risk challenges. Simple tools and templates for integration of risk communication and risk management will be used in the workshop to allow participants to develop solutions to current needs in their organizations.

WK3S: Fundamentals of Risk Assessment & Toxicology at Contaminated Sites

**Cost:** $325

**Instructors:** Michael P. Musso, HDR, Inc.; Patricia Nance, TERA Center/University of Cincinnati; Michael Dourson, TERA Center/University of Cincinnati

This workshop provides an overview of the 4 Step process of Human Health Risk Assessment (HHRA) utilized to evaluate chemical contamination at hazardous waste sites, Brownfields, and other types of settings. Environmental regulatory frameworks (e.g., Federal, State agencies) into which HHRA are integrated for decision-making will be discussed. Examples and case studies regarding hazardous waste sites, contaminated media, and exposure settings relevant to human health will be provided for illustration purposes by the instructor, with opportunity for class participants to share experiences. Hazard identification, including interpretations of environmental data, and Exposure Assessment modules will be presented during the first half of the workshop. Toxicological Evaluation and Risk Characterization will be presented in the afternoon. During the course, key reference documents and tools available to the risk assessor, including updates that have been issued, will be discussed. In-class exercises will also be administered during the day to demonstrate the HHRA process. The workshop is geared towards entry to mid-level environmental professionals working on contaminated or hazardous waste sites (e.g., EPA – or State-led) who would like to learn more about the fundamental 4-step HHRA process, or persons with a general interest in applying HHRA at contaminated sites.

WK4S: Developing Spreadsheet-Based Decision Support Systems

**Cost:** $350

**Instructor:** Joe Mlakar, USDA

This workshop will teach the basic skills required to build and develop spreadsheet-based Decision Support Systems (DSSs) using Microsoft Excel and the Visual Basic for Applications (VBA) programming language. By the end of this workshop, participants will (1) understand the basic attributes of an interactive, user-friendly DSS and (2) be able to immediately begin developing DSSs in their professional duties to help their leadership make more informed decisions. A DSS is a computer-based information system that processes or analyzes data using problem-specific methodologies and assists the user in the decision-making process through a graphical user interface. A DSS is most appropriate for recurring problems or decisions that managers typically face and/or problems that are underspecified or not well structured. A properly designed DSS will be interactive, user-friendly systems that will help the decision-maker compile useful data and gain insight from that data in order to identify problems and make better-informed decisions. A DSS should be flexible and adaptable to accommodate changes in the problem construct, available data, methodology, and decision making approach of
the user. For this workshop, Microsoft Excel will be used as the DSS platform because of its accessibility, ease of use, transparency, flexibility, adaptability, and breadth of capabilities. Excel’s functionality is augmented with the VBA programming language, which will also be introduced and used in this workshop.

WK5S: UC San Diego Natural Reserve System Field Trip  
Cost: $140  
Instructors: Randall Ryti, Neptune and Company; Isabelle Kay, UC San Diego
A field trip workshop is being offered to SRA members to see firsthand two of the natural reserves managed by UC San Diego. We will see how access to these reserves is managed as well as the safety issues are identified and communicated. Both of the properties will offer potential for viewing wildlife and native vegetation, and we expect to see some native birds while on the field trip. We will board the charter bus at the hotel and have an orientation to the field trip while traveling to the Elliott Chaparral Reserve. The Elliott Chaparral Reserve, formerly part of the Camp Elliott Military Reservation, is located adjacent to the Marine Corps Air Station Miramar near Scripps Ranch, California. It includes a mixture of both coastal and desert habitats with a wide variety of coastal chaparral and coastal sage scrub. The Elliott reserve is part of a Formerly Used Defense Sites (FUDS) and contains debris left from military activity. Large mammals such as mountain lion, bobcat, and deer remain part of the Elliott Chaparral ecosystem thanks to the open military lands to the south. Native birds found at the reserve include the greater roadrunner and rufous-crowned sparrow. Next we will travel via charter bus to the Scripps Coastal Reserve. The trip to the shoreline is timed to coincide with low tide for better viewing of the rocky intertidal environment.

WK6S: Categorical Regression Modeling  
Cost: $300  
The objective of this full-day course is to provide participants with interactive training on the use of the U.S. Environmental Protection Agency’s (EPA) Categorical Regression software (CatReg) and its application to risk assessment. 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. CatReg calculates the probabilities of observing the different severity categories over the continuum of the explanatory variables describing exposure conditions. 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. CatReg can also estimate the lower confidence limit on the dose (the equivalent of a BMDL) associated with a given severity probability and exposure duration. Additionally, the meta-analytical capability of CatReg allows for the filtering of data in order to determine statistically significant different responses between sexes, strains, and/or species. Recently, EPA has released a new graphic-user interface for CatReg that will greatly increase the efficiency with which users can perform categorical regression analyses; this version of the software will be the focus of this training workshop. Participants need to bring their own laptops, with CatReg installed, to the workshop. The latest version of the software program can be found at: www.epa.gov/ncea/catreg. Disclaimer: 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.

Cost: $300  
Instructors: Weihsueh Chiu, Texas A&M University; Greg Paoli, Risk Sciences International
WHO/IPCS recently published a guidance document on evaluating uncertainties in human health dose-response assessment. Rather than single values for the point of departure (POD) and for any adjustment/uncertainty factors, the WHO/IPCS approach uses uncertainty distributions that reflect the assumed or estimated uncertainties in each of those aspects. Additionally, it quantitatively defines the protection goals in terms of incidence (I) and magnitude (M) of the critical effect in the human population. By contrast, traditional approaches for developing dose-response toxicity values result in a single value (e.g., RfD, ADI) whose uncertainty is not known and for which the associated values for I and M are not quantified. By quantifying the overall uncertainties in the target human dose at explicitly specified values of I and M, the probabilistic approach developed by the WHO/IPCS expert group allows risk managers to better weigh the benefits from reduced human health effects associated with different risk management options against other considerations, including economic costs. Further, the probabilistic analyses can inform the value of information associated with different options for developing a higher tier assessment. This hands-on training Workshop is aimed at both risk professionals interested in applying the latest approaches to dose-response assessment, as well as students and researchers interested in developing new methods for dose-response. The Workshop will include an overview of the WHO/IPCS approach, case study exercises developing probabilistic dose-response toxicity values using an Excel spreadsheet tool, and a discussion of broader applications of the approach, including economic benefit-cost analyses. A laptop with Microsoft Excel is required.
WK8S: Cumulative Risk Assessment: Addressing Combined Environmental Stressors  
Cost: $350  
Instructors: Linda K. Teuschler, LK Teuschler & Associates; Rick Hertzberg, Biomathematics Consulting; Margaret MacDonell, Argonne National Laboratory; Moiz Mumtaz, ATSDR; Jane Ellen Simmons, USEPA; Amanda M. Evans, Association of Schools of Public Health Research Fellow; Michael Wright, USEPA; Glenn E. Rice, USEPA

Cumulative risk assessment (CRA) addresses the impacts of multiple chemical and nonchemical stressors on real world individuals and communities, resulting in complex exposures for individuals and populations with a variety of vulnerabilities, in applications that range from environmental justice and community sustainability to individual health promotion and protection. Nonchemical stressors include biological and physical agents (e.g., microbes and noise) as well as socioeconomic stressors and psychosocial conditions (e.g., associated with natural disasters). Public concerns that can initiate CRAs include (1) elevated environmental measurements or biomonitoring data; (2) multiple sources of pollutants or stressors; and (3) changes in disease rates or patterns (e.g., leukemia cluster) or ecological effects (e.g., loss of wildlife diversity). This workshop focuses on human health and begins with an overview of three CRA elements: analysis, characterization, and quantification (as feasible) of the combined risks from multiple stressors. Teaching methods include lectures and hands-on exercises. Presentations highlight basic concepts, methods, and resources for conducting a population-based CRA. A central theme is integrating exposure and dose-response information with population characteristics during planning and scoping based on initiating factors. Vulnerability factors are addressed, e.g., diet/nutritional status, behaviors, genetic traits, socioeconomic status, sensitivities, and psychosocial stress. Methods for estimating human health risks are discussed and applied, including epidemiologic approaches and assessing the joint toxicity of chemical mixtures. In the exercises, participants develop chemical, biological and physical stressor groups using exposure and toxicity factors, link them with population vulnerability factors and conduct a risk characterization. Participants are asked to bring a calculator.

WK9S: Methods for Quantifying and Valuing Population Health Impacts  
Cost: $275  
Instructors: Kevin Brand, University of Ottawa; Sandra Hoffman, USDA

The workshop reviews standard practices and emerging issues related to the quantification of a population’s health state. Particular attention is paid to the array of metrics available for this purpose, their use in quantifying population health impacts, and how these impact projections can be integrated into economic valuations. Risk assessment typically couples exposure information with an exposure-response relationship to estimate changes in incidence rates (e.g., a mortality rate). Expressed in this fashion (along an incident rate scale) these impact measures fall short. They do not capture the burden of disease, are not readily interpretable, complicate the comparison of disease outcomes, and are not suited to a single number summary. This workshop focuses on the methods required to get readily interpretable, comparable, bottom-line, summaries of health impact. A dizzying array of metrics can be used to quantify health impacts. Consider for example ‘avoidable deaths,’ PEYLLs, life-expectancy, lifetime risk, HALEs, QALYs, DALEs, DALYs and `attributable-fractions’ to name just a few. In this workshop we survey and bring order to these variants, classifying the metrics into a couple of categories. A finer grained classification is provided based on how the metric is calculated; for example does it adjust for the size and age structure of the population under study. The key choices and their influence upon projected outcomes will be outlined. Finally, a survey of the key steps and considerations that are required to map the health impacts, expressed in units such as change in life-expectancy, into health-economic evaluations will be offered.

WK10S: Eliciting Judgments from Experts and Non-experts to Inform Decision-making  
Cost: $250  
Instructors: Aylin Sertkaya, Eastern Research Group, Inc. (ERG); Cristina McLaughlin, FDA; Frank Hearl, NIOSH; Christy Parson, U.S. EPA; Elizabeth L. Durmowicz, U.S. FDA

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, and 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 electronic cigarettes.

AFTERNOON WORKSHOPS
SUNDAY 11 December, 1:00-5:00 PM

WK11S: Exposure-Response Array Training
Cost: $250

Instructors: George Woodall, US Environmental Protection Agency; Ingrid Druwe, US Environmental Protection Agency

The use of exposure-response arrays in risk assessment has increased and created a need for guidance and training to orient risk assessors and other individuals on the uses and applications of exposure-response arrays, and recommendations for producing informative arrays suitable for publication. This training course (including 3 PowerPoint presentation modules, practice exercises, and tutorials) is intended to fill this need by presenting the basic principles of exposure-response arrays and providing guidance on using some of the tools available at present. It is not intended to present strict guidelines, but rather provide guidance and best practices to those wishing to learn more about this up-and-coming risk assessment tool. Current projects will also be discussed which are designed to encourage risk assessors and other interested parties to explore innovative approaches in presenting exposure-response data, develop and improve upon the tools to create exposure-response arrays, and share these innovations with the risk assessment community in an open-source environment.

FULL DAY WORKSHOPS
THURSDAY 15 December, 8:30 AM-5:30 PM

WK12T: Monte Carlo simulation and probability bounds analysis in R with hardly any data
Cost: $300

Instructor: Scott Ferson, Applied Biomathematics

This revamped 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 a CD with software and data sets for the examples.
Mark your calendar!

Dates for the 2017 - 2019 Annual Meetings:

2017 – 10-14 December
Crystal Gateway Marriott, Arlington, Virginia

2018 – 9-12 December
Marriott, New Orleans, Louisiana

2019 – 8-12 December
Crystal Gateway Marriott, Arlington, Virginia

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.

Announcing the 2016 SRA Membership Drive

The SRA is an exciting international society for professionals who deal with risk analysis for a diverse set of multidisciplinary areas. SRA members enjoy collaborations with the risk analysis community, receive copies of the journal Risk Analysis, receive up to date communications, host or give SRA webinars and attend SRA supported meetings and workshops.

SRA is looking to increase its membership and offer these benefits to a wider audience from academia, government, industry, consulting and non-government organizations. SRA is promoting new membership signups at the Annual Meeting and is offering one of two gifts to all new members (pre-registrations included), as shown below.

Sign up Today!

Laser Pointer LED Light Key Tag – OR – Portable Power Bank
PLENARY SESSIONS
All Plenary Sessions will be held in the Sheraton San Diego

Monday 12 December, Morning Plenary, 8:30 – 10:00 AM
TBD

Tuesday 13 December, Morning Plenary, 8:30 – 10:00 AM
TBD

Wednesday 14 December, Plenary, 12:00 PM – 1:30 PM
[Additional fee - $25]
TBD
Monday

Technical Program

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

10:30 AM – 12:10 PM

Marina 1
M2-A Power System
Risk and Resilience
Chair: Andrea Staid
10:30 AM M2-A.1
Smart scenario generation for power system resilience
Staid A, Watson J
Sandia National Labs

10:50 AM M2-A.2
Multi-hazard risk mitigation for electric power systems using investment optimization
Jones K, Nozick L
Sandia National Laboratories, Cornell University

11:10 AM M2-A.3
The effects of residential decisions on electric power system reliability in areas that experience repeated hurricanes
Reilly A, Tonn G, Guikema S
University of Michigan

11:30 AM M2-A.4
Electricity demand analysis in the residential sector
Nateghi R, T
Purdue University

11:50 AM M2-A.5
Proactive and reactive operations paradigms for improving power system resilience to extreme weather events
Sandia National Laboratories

10:30 AM – 12:00 PM

Marina 2
M2-B This is Roquette
Science: Microbiological Produce Safety from Satellite Dish to the Dinner Table
Co-chairs: Wendy Fanaselle, Abani Pradhan

10:30 AM M2-B.1
Using a risk-based approach to evaluate intervention options for fresh produce in post-harvest processing plants
Oryang D, Chen Y, Mokhtari A, Kowalczyk B, Van Doren J
FDA and RTI International

10:50 AM M2-B.2
Evaluation of meteorological factors affecting pre-harvest contamination risk of listeria species in a mixed produce and dairy farm
Pang H, McEgan R, Micallef S, Pradhan A
University of Maryland College Park

11:10 AM M2-B.3
A system modeling approach to estimate the risk of E. coli O157:H7 contamination of pre-harvest leafy greens
Mishra A, Pang H, Buchanan R, Schaffner D, Pradhan A
University of Maryland and Rutgers University

11:30 AM M2-B.4
Forecasting produce contamination potential using geospatial risk assessment in a multicriteria decision analytic framework
Oryang D, Fanaselle W, Anyamba A, Cooley M, Burdett C, Van Doren J
FDA, FDA, NASA-GSFC, USDA-ARS, Colorado State University, FDA

10:30 AM – 12:10 PM

Marina 3
M2-C Behavioral Issues in Risk Analytic Modeling for Security and Defense
Chair: Gilberto Montibeller

10:30 AM M2-C.1
Decomposing the intention to act
Dillon-Merrill R
Georgetown University

10:50 AM M2-C.2
The influence of causal attributions on responses to near-miss terrorist events
John R, Cui J, Nguyen K, Rosoff H
University of Southern California

11:10 AM M2-C.3
Increasing the behavioral validity of counter-terrorism risk analysis models
Montibeller G, Jaspersen J
Loughborough University

11:30 AM M2-C.4
The effect of information format on police officer risk perceptions
Ritchie R, Franco L
Loughborough University

11:50 AM M2-C.5
Identifying, structuring, and comparing objectives of terrorists
von Winterfeldt D, Siebert J, John R
University of Southern California

10:30 AM – 12:00 PM

Marina 4
M2-D Roundtable: Post-Election Prospects and Challenges for Risk Policy
Chair: Lisa Robinson

The results of the presidential election will have numerous important implications for risk policy. This roundtable brings together a group of experts from diverse policy areas and disciplines to discuss these implications, including perspectives from economics, law, and public policy.

Participants:
- James K. Hammitt, Harvard University
- Sally Kane, University of New South Wales
- David Schkade, University of New South Wales
- Jonathar Wiener, Duke University
- Richard Williams, George Mason University
- Additional speakers to be confirmed

Sponsored by:
The Economics and Benefits Analysis Specialty Group and Society for Benefit-Cost Analysis

10:30 AM – 12:00 PM

Marina 6
M2-E Symposium: Foundational Issues in Risk Analysis I
Chair: Terje Aven

10:30 AM M2-E.1
Requirements analysis and canonical formulation of a risk, safety, resilience, or security program
Thorisson H, Lambert J
University of Virginia

10:50 AM M2-E.2
Conceptualizing security risk — a discussion of the value, threat, vulnerability definition of security risk
Jore S
University of Stavanger

11:10 AM M2-E.3
Reflections on historical events, unforeseen events and major accident risk
Røed W
University of Stavanger

11:30 AM M2-E.4
Automating causal judgments in risk analysis
Cox T
Cox Associates, University of Colorado
Monday

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

10:30 AM – 12:00 PM
Nautilus 1
M2-F Communicating Health Risks: Attitudes, Perceptions and Strategic Messaging
Co-chairs: Michael Siegrist, Joseph Steinhardt

10:30 AM M2-F.1
Beyond "Under the Dome": amplified risk perception increases knowledge and public engagement about air pollution in China
Huang J, Yang Z
State University of New York at Buffalo

10:50 AM M2-F.2
Communicating radon risk: from workplace to community testing
Nicol A, Brokaw W
Simon Fraser University

11:10 AM M2-F.3
Intuitive toxicology: lay people’s risk perception
Siegrist M
ETH Zurich, Switzerland

11:30 AM M2-F.4
Low-income adult smoker attitudes and beliefs about cheaper smoking alternatives
Steinhardt J, Kenkel D, Niederdeppe J, Byrne S
Michigan State University

10:30 AM – 12:10 PM
Nautilus 2
M2-G Low Dose Monotonic Response
Chair: Jacqueline Patterson, Rita Schoeny

10:30 AM M2-G.1
The concept of hormesis and application in risk assessment
Dourson M
TERA Center, University of Cincinnati

10:50 AM M2-G.2
Strengths and weaknesses of low-dose observations and their relevance to human exposures and risk assessment
Schoeny R, R
Rita Schoeny LLC

11:10 AM M2-G.3
Determination of critical effect for risk assessment
Seed J
Independent consultant (US EPA, retired)

11:30 AM M2-G.4
Concepts of ‘low dose’ and non-monotonic dose response in toxicological research and regulatory science: harmonization of terminology
Yi K
Syngenta Crop Protection, LLC

10:30 AM – 12:10 PM
Nautilus 3
M2-H Governing Interconnectedness of Multiple Risks
Chair: Kirk Hartley

10:30 AM M2-H.1
Tools and methods for assessing interconnected risks
Heng Y
University of Tokyo, Japan and Visiting Fellow, University of St Andrews, UK

10:50 AM M2-H.2
Interaction between extreme natural events and technological changes
Kishimoto A
The University of Tokyo

11:10 AM M2-H.3
Interconnectedness of multiple risks – the case of infectious diseases pandemic
Matsuo M
The University of Tokyo

11:30 AM M2-H.4
Interconnected risks in space and cyberspace
Nagai Y
The University of Tokyo

11:50 AM M2-H.5
Governing interconnectedness of multiple risks
Shiroyama H, Taniguchi T
The University of Tokyo

10:30 AM – 12:00 PM
Nautilus 4
M2-I Symposium: The NFL as a Workplace: Uncertainties and Opportunities in Assessing and Managing the Health and Safety Risks of Playing Professional Football
Chair: Adam Finkel

10:30 AM M2-I.1
What are the key legal and ethical issues motivating the attention to NFL player health?
Cohen I, Deubert C*
Harvard University

10:50 AM M2-I.2
What do we know about the risks of playing in the NFL?
Zafonte R
Harvard University

11:10 AM M2-I.3
Risk-based governance options for improving NFL player health and safety
Finkel A
Univ. of Pennsylvania Law School, Univ. of Michigan School of Public Health

11:30 AM M2-I.4
NIOSH activities in football epidemiology and safety
Howard J
National Institute for Occupational Safety and Health

11:50 AM M2-I.5
Political and legal issues surrounding federal, state, or private governance of NFL risks
Lobel O
University of San Diego

10:30 AM – 12:00 PM
Nautilus 5
M2-J Poster Platform: Revolutions and Evolutions in Resilience
Chair: TBD

M2-J.1
Special event risk analysis in the maritime security risk analysis model and risk based maritime security response operations tools
Sobotka K, Norcross B*, Howard P
ABS Group

M2-J.2
Evaluating sustainment strategies for defense systems using a risk-informed business case analysis with expert elicitation
Mayer L, Canim F, Matsumara J, Siler-Evans K
RAND Corporation

M2-J.3
Quantitative evaluation of organized disaster response capacity through functional exercises
Kato T, Konyama K, Ito S, Aso H, Taninobu M
University of Kitakyushu

M2-J.4
An integrative framework for assessing the resilience of complex adaptive systems based on present and future needs
Gillespie-Marthaier L, Nelson K
Vanderbilt University

M2-J.5
Multi-asset protection and resilience assessment
Petri F, Dickinson D, Phillips J
Argonne National Laboratory
### M2-J.6
Building resilience by means of risk analysis
O’Neill P, P
RiskLogik

### M2-J.7
Resilience metrics: gaps and extensions
Emanuel R
University of Maryland, Johns Hopkins
University Applied Physics Laboratory

### M2-J.8
Resilience analysis to inform priority-setting
Connelly E, Lambert J, Linkov I
University of Virginia

### M2-J.9
Climate change and infrastructure adaptation
Verner D, Butler J, Petit F, Wall T
Argonne National Laboratory

### M2-J.10
Risk and resilience: summary of the 2016 NATO workshop
Linkov I
US Army Engineer R&D Center

<table>
<thead>
<tr>
<th>Time</th>
<th>Marina 1</th>
<th>Marina 2</th>
<th>Marina 3</th>
<th>Marina 4</th>
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<tbody>
<tr>
<td>1:30 PM – 3:00 PM</td>
<td><strong>Marina 1</strong></td>
<td><strong>Marina 2</strong></td>
<td><strong>Marina 3</strong></td>
<td><strong>Marina 4</strong></td>
</tr>
<tr>
<td><strong>M3-A Symposium: Understanding Infrastructure Network Risks at National and Global Scales</strong></td>
<td><strong>M3-B Brave New World: Evolution &amp; Revolution in Salmonella Risk Assessments</strong></td>
<td><strong>M3-C Presidential Roundtable: Cyber Risk Analysis</strong></td>
<td><strong>M3-D Symposium: Climate Change &amp; Economic Analysis</strong></td>
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<tr>
<td>Co-chairs: Raghav Pant, Ed Oughton, Jonas Johansson</td>
<td>Co-chairs: Janell Kause, Elisabeta Lamberti</td>
<td>Chair: Elisabeth Pate-Cornell</td>
<td>Chair: Elisabeth Gilmore</td>
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<tr>
<td>1:30 PM</td>
<td><strong>M3-A.1</strong> Understanding risks in global infrastructure systems</td>
<td><strong>M3-B.1</strong> Comparing health risk impacts of qualitative and semi-quantitative microbiological criteria for Salmonella in poultry</td>
<td><strong>M3-C.1</strong> Benefit cost and distributional effects analysis for solar PV in the United States</td>
<td><strong>M3-D.1</strong> Economic growth, armed conflict and the implications for climate change</td>
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<td></td>
<td>Thacker S, Hall J University of Oxford</td>
<td>Lambertini E, Kowalcyk B, Thomas E, Ruzante J RTI International</td>
<td><strong>M3-C.2</strong> Using visualization science to diagnose and improve global change indicator understandability</td>
<td><strong>M3-D.2</strong> Markets, morals, and climate change</td>
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<tr>
<td>1:50 PM</td>
<td><strong>M3-A.2</strong> Societal consequences of multi-infrastructure disruptions: exploring Swedish national critical infrastructures</td>
<td><strong>M3-B.2</strong> The prevalence risk model as an alternative to traditional QMRA: application to estimating human food-borne Salmonella illness reduction after implementing new slaughter inspection</td>
<td><strong>M3-C.3</strong> Co-sponsored by: The Economics and Benefits Analysis Specialty Group and the Society for Benefit-Cost Analysis</td>
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<td></td>
<td>Johansson J Div. of Risk Management and Societal Safety, Lund University</td>
<td>LaBarre D, Ebel E, Williams M, Disney W, Catlin M Food Safety and Inspection Service</td>
<td><strong>M3-D.3</strong> Co-sponsored by: The Economics and Benefits Analysis Specialty Group and the Society for Benefit-Cost Analysis</td>
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<td>2:10 PM</td>
<td><strong>M3-A.3</strong> Cyber-attack risk and critical infrastructure: the economic impact of a cyber-attack on London’s electricity distribution network</td>
<td><strong>M3-B.3</strong> Quantitative microbial risk assessment for Salmonella on sliced tomatoes</td>
<td><strong>M3-C.4</strong> Co-sponsored by: The Economics and Benefits Analysis Specialty Group and the Society for Benefit-Cost Analysis</td>
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<td>2:30 PM</td>
<td><strong>M3-A.4</strong> Vulnerability of New Zealand transportation networks to disruptions in electricity supply</td>
<td><strong>M3-B.4</strong> Farm to fork quantitative microbial risk assessment of Salmonella on tomatoes</td>
<td><strong>M3-C.5</strong> Co-sponsored by: The Economics and Benefits Analysis Specialty Group and the Society for Benefit-Cost Analysis</td>
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<td>Zorn C, Pant R, Thacker S, Shamseldin A University of Auckland, University of Oxford,</td>
<td>Todd-Searle J, Danyluk M, Schaffner D Rutgers University</td>
<td><strong>M3-D.5</strong> Co-sponsored by: The Economics and Benefits Analysis Specialty Group and the Society for Benefit-Cost Analysis</td>
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<td>1:30 PM</td>
<td>Marina 6</td>
<td>M3-E Risk, Consequences, and Resilience of Cyber Infrastructure</td>
<td>Chair: Adam Rose</td>
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<td>M3-E.1 Reduced-form modeling of maritime cyber threats</td>
<td>Wei D, Chen Z, Rose A*</td>
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<td>University of Southern California</td>
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<td>1:30 PM</td>
<td>Nautilus 1</td>
<td>M3-F Symposium: Can Principles of Risk Analysis Assist in the Development of Recommendations for Nutrient Intakes that Reduce the Risks of Chronic Diseases?</td>
<td>Co-chairs: Debra Kaden, Joseph Rodricks</td>
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<td>1:30 PM</td>
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<td>M3-E.2 Cost of cyber incidents</td>
<td>Livingston O, Shabat M, Cheesebrough T</td>
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<td>Department of Homeland Security</td>
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<td>1:30 PM</td>
<td>Nautilus 2</td>
<td>M3-G Exposure Assessment Methods &amp; Models</td>
<td>Chair: Chris Greene</td>
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<td>1:30 PM</td>
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<td>M3-E.1 Assessing exposure from consumer product use: methods that have been developed to address manufacturer, consumer and agency concerns</td>
<td>Sheehan P, Kalmes R Exponent</td>
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<td>1:30 PM</td>
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<td>M3-E.2 Nutrition evidence: what you see is not necessarily what you get</td>
<td>Bier D Baylor College of Medicine</td>
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<td>1:30 PM</td>
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<td>M3-E.3 Current realities and future options for using chronic disease endpoints to set Dietary Reference Intake (DRI) values</td>
<td>MacFarlane A Health Canada</td>
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<td>1:30 PM</td>
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<td>M3-E.4 Modelling U-shaped exposure response curves</td>
<td>Krewski D Ottawa University, Ontario, Canada</td>
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<td>1:30 PM</td>
<td>Nautilus 3</td>
<td>M3-H Roundtable: Opportunities and Obstacles to More and Better Use of Risk Perspectives in Development Settings</td>
<td>Co-chairs: Rob Goble, Luis Cifuentes</td>
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<td>1:30 PM</td>
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<td>M3-H.1 Opportunities and obstacles to more and better use of risk perspectives in development settings</td>
<td>Goble R Clark University</td>
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<td>1:30 PM</td>
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<td>M3-H.3 Risk and development perspectives from the Southern Hemisphere</td>
<td>Cifuentes L Pontificia Universidad Católica de Chile</td>
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<tr>
<td>1:30 PM</td>
<td>Nautilus 4</td>
<td>M3-I Contaminants, Food Security, and GM Food Risks</td>
<td>Chair: Louis Rivers III</td>
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<td>1:30 PM</td>
<td></td>
<td>M3-I.1 Genetic engineering, genetic modification, or agricultural biotechnology: does the term matter</td>
<td>Zahry N, Besley J Michigan State University</td>
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<td>2:10 PM</td>
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<td>M3-I.2 Participatory ensemble modeling to study the multiscale social and behavioral dynamics of food security in dryland West Africa</td>
<td>Rivers L, Ligmann-Zielinska A, Schmitt-Obabisi L, Du J, Marquart-Pyatt S North Carolina State University</td>
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<td>2:10 PM</td>
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<td>M3-I.3 Gut reactions to GMO foods: analyzing the interplay of attitudes, trust, and risk perceptions</td>
<td>Rose K, Su L, Wirz C, Brossard D, Scheufele D, Xenos M University of Wisconsin-Madison</td>
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<td>2:10 PM</td>
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<td>M3-I.4 A mental models approach to informing risk communication about contaminants in the Arctic</td>
<td>Furgal C, Boyd A Trent University, Washington State University</td>
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</tbody>
</table>
Monday

1:30 PM – 3:00 PM

Nautilus 5
M3-J Poster Platform: Disaster Communication: Terrorism, Flooding and Epidemics
Chair: Heather Rosoff

M3-J.1
An expert elicitation to characterize the diagnosticity of environmental cues that signal a tornado
Broomell S, Wong-Parodi G
Carnegie Mellon University

M3-J.2
Preparing for local adaptation: understanding flood risk perceptions in Pittsburgh
Wong-Parodi G, Klima K
Carnegie Mellon University

M3-J.3
Understanding individual’s voluntary flood insurance purchase from flood risk perspective
Xian S, Shao W, Lin N, Kunreuther H, Goidel K
Princeton University, Auburn University
Montgomery, Wharton Business School, Texas A&M University

M3-J.4
Communicating about lone-actor terrorism: the challenges in practice
Parker D, Pearce J, Lindekilde L, Rogers M
King’s College London, University of Aarhus

M3-J.5
Communicating public guidance for firearms and weapons attacks: factors influencing intention to ‘run, hide, tell’ in the UK and Denmark
Pearce J, Parker D, Lindekilde L, Rogers M
King’s College London, Aarhus University

M3-J.6
Inverting the dominant crisis communication logic — a case study based on the Brussels terror attacks.
Marynissen H, Van Achte T, Pieters S
Antwerp Management School

M3-J.7
Fear and loathing following a terrorist attack on a commercial passenger plane
Betz M, John R
University of Southern California

M3-J.8
Effects of psychological distance and cumulative sequences on near-miss appraisals
Cui J, John R
University of Southern California

M3-J.9
Psychological adaptation during stress inducing social events: the case of the 2014-2015 Ebola outbreak
Gaspar R, Silva C, Collins E
William James Center for Research, ISPA-Instituto Universitario

M3-J.10
A case study on the use of Twitter for crisis communication during Hurricane Sandy
Wang B, Zhuang J
University at Buffalo, The State University of New York

M3-J.11
Zika outbreak: a multilingual analysis of social media discourse surrounding the Zika virus and genetically engineered mosquitoes
Wirz C, Chung J, Rose K, Brossard D, Scheufele D, Xenos M, Massarani L, Maynard A
University of Wisconsin-Madison

M3-J.12
How framing, controllability, and aspiration influence communications and decision making about natural disaster early warning programs
Rosoff H, John R, Guney S, Nguyen K
University of Southern California, Price School of Public Policy
<table>
<thead>
<tr>
<th>Time</th>
<th>Venue</th>
<th>Session Details</th>
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</thead>
</table>
| 3:30 PM – 5:00 PM | Marina 1 | M4-A Electric Power Systems Risk, Reliability and Interdependencies | Chair: Stanley Levinson  
 3:30 PM M4-A.1 | Modeling electric power and natural gas systems interdependencies: application to climate change and natural hazards  
 Kavicky J, Portante E, Petit F, Clifford M  
 Argonne National Laboratory  
 3:40 PM M4-A.2 | Energy markets impact on the risk of cascading outages in power systems  
 Li B, Sansavini G*  
 Reliability and Risk Engineering Laboratory  
 4:10 PM M4-A.3 | Assessing the damage of large scale power outages to residential customers  
 Baik S, Davis A, Morgan M  
 Carnegie Mellon University  
 4:30 PM M4-A.4 | The economic and societal impact of baseload power generation on local communities  
 Carless T, Fischbeck P  
 Carnegie Mellon University, Department of Engineering and Public Policy Engineering |
| 3:30 PM – 5:10 PM | Marina 2 | M4-B Integrated Risk Assessment and Emerging Lines of Evidence to Address Uncertainty | Chair: Randall Ryti  
 3:30 PM M4-B.1 | The use of incident data in assessing risks from pesticides  
 Rossmeisl C, Panger M  
 U.S. Environmental Protection Agency  
 3:50 PM M4-B.2 | Framework development for integrated risk assessment and vulnerability assessment: Charleston Harbor deepening case study  
 Indiana University, NDAA, University of South Carolina, Western Washington University, Exponent  
 4:10 PM M4-B.3 | Framework for environmental causal analysis that accounts for uncertainty in data quality  
 Kashuba R, Morrison A, Palmquist K, Menzie C  
 Exponent, Inc.  
 4:30 PM M4-B.4 | Are population ecology concepts routinely applied to ecological risk assessments?  
 Ryti R  
 Neptune and Company, Inc.  
 4:50 PM M4-B.5 | Considering the impact of classification uncertainty in weed risk models  
 Powell M  
 US Dept Ag |
 3:30 PM M4-C.1 | Defensibility — a new concept in risk analysis  
 Bier V, Gutfraind A, Lu Z  
 University of Wisconsin-Madison, University of Illinois at Chicago  
 3:50 PM M4-C.2 | Modeling the value of deterrence  
 John R  
 Univ of Southern California  
 4:10 PM M4-C.3 | Cost-benefit analysis of fire protection resource allocation in the United States: models and a 1980-2011 case study  
 Madasseri Payyappalli V, Behrendt A, Zhuang J  
 University at Buffalo, SUNY  
 4:30 PM M4-C.4 | Analyzing different decision-making methods for situations with deep uncertainty  
 Zhang M, MacKenzie C*  
 Iowa State University  
 4:50 PM M4-C.5 | On the role of customs in securing the containerized global supply chains  
 Pourakbar M, Zuidwijk R  
 Rotterdam School of Management, Erasmus University |
| 3:30 PM – 5:10 PM | Marina 4 | M4-D Symposium: The Global Burden of Food Borne Risk: Results and Lessons | Chair: Sandra Hoffman  
 3:30 PM M4-D.1 | WHO global burden of foodborne disease estimates and use of expert elicitation to develop global foodborne disease source attribution estimates  
 Hoffmann S, Aspinall W, Cooke R, DeDeveleesschauwer B, Bhavelaar A, Hald T  
 USDA Economic Research Service  
 3:50 PM M4-D.2 | Aflatoxin in maize and peanuts: global burden of cancer  
 Wu F  
 Michigan State University  
 4:10 PM M4-D.3 | Global perspectives on foodborne chemical exposures  
 Gibb Epidemiology Consulting LLC  
 4:30 PM M4-D.4 | Foodborne illness source attribution: providing critical information for food regulatory authorities to target their efforts and measure their progress  
 Goldman D  
 US Department of Agriculture Food Safety and Inspection Service  
 4:50 PM M4-D.5 | The role of the global burden of disease estimates in managing global health risks  
 Forouzanfar M, GBD 2015 researchers and collaborators  
 Institute for Health Metrics and Evaluation - University of Washington |
| 3:30 PM – 5:10 PM | Marina 6 | M4-E Symposium: One Size Fits All? Challenges of Risk Governance | Chair: Pia-Johanna Schweizer  
 3:30 PM M4-E.1 | Some foundational issues of importance for risk governance  
 Aven T  
 University of Stavanger, Norway  
 3:50 PM M4-E.2 | Global governance on systemic risks as dynamic multilevel governance  
 Klinke A  
 Memorial University of Newfoundland  
 4:10 PM M4-E.3 | Lessons from Denmark for risk governance of renewable energies  
 Ram B, Clausen N  
 University of Delaware and Danish Technical University (Guest Sr Researcher)  
 4:30 PM M4-E.4 | Systemic risks: challenges for risk governance  
 Renn O  
 Institute for Advanced Sustainability Studies (IASS)  
 4:50 PM M4-E.5 | Inclusive risk governance: lessons learnt and demand for further research  
 Schweizer P  
 Stuttgart University |
### Monday

#### 3:30 PM – 5:00 PM

**Nautilus 1**  
M4-F Symposium: Alternatives Analysis for Safer Consumer Products: Exploring Decision Analytic Approaches to Reducing Risks in California  
Chair: Christian Beaudrie

- **3:30 PM**  
  **M4-F.1**  
  Addressing Colorado’s public health concerns on the potential health risks of hydraulic fracturing through surveillance and science  
  Malloy T  
  University of California, Los Angeles

- **3:40 PM**  
  **M4-F.2**  
  Implementing resilience in regulatory law: substantive provisions  
  Stevens Y  
  Arizona State University

- **4:00 PM**  
  **M4-F.3**  
  Evaluating the risk of spread of highly pathogenic avian influenza virus to wild migratory birds via leachate from municipal solid waste landfills accepting poultry carcass waste  
  Malladi S, Weaver J, Mlakar J, Spackman E, Pantin-Jackwood M  
  U.S. Department of Agriculture

- **4:40 PM**  
  **M4-F.4**  
  Quantification of emissions exposure risk from hydraulic fracturing in the marcellus shale region of Pennsylvania  
  Banan Z, Gernand J  
  Pennsylvania State University

- **5:00 PM**  
  **M4-F.5**  
  Pharmaceutical and hormones in groundwater of the United States  
  Toccalino P, Belitz K  
  U.S. Geological Survey

#### 3:30 PM – 5:10 PM

**Nautilus 2**  
M4-G Exposure and Risks to Water Contaminants  
Chair: Amina Wilkins

- **3:30 PM**  
  **M4-G.1**  
  Models of alternatives analysis: evaluating the evaluation  
  Malloy T  
  University of California, Los Angeles

- **3:50 PM**  
  **M4-G.2**  
  Coal ash risk assessments—a demonstration of resilience  
  Bradley L  
  Haley & Aldrich

- **4:10 PM**  
  **M4-G.3**  
  Quantification of emissions exposure risk from hydraulic fracturing in the marcellus shale region of Pennsylvania  
  Banan Z, Gernand J  
  Pennsylvania State University

- **4:30 PM**  
  **M4-G.4**  
  Evaluating the risk of spread of highly pathogenic avian influenza virus to wild migratory birds via leachate from municipal solid waste landfills accepting poultry carcass waste  
  Malladi S, Weaver J, Mlakar J, Spackman E, Pantin-Jackwood M  
  U.S. Department of Agriculture

- **4:50 PM**  
  **M4-G.5**  
  Pharmaceuticals and hormones in groundwater of the United States  
  Toccalino P, Belitz K  
  U.S. Geological Survey

**Nautilus 3**  
M4-H Resilience vs Risk-Based Regulatory Approaches  
Chair: Igor Linkov

- **3:30 PM**  
  **M4-H.1**  
  Integrating resilience into mainstream regulation: a thought experiment  
  Malloy T  
  University of California, Los Angeles

- **3:50 PM**  
  **M4-H.2**  
  Evaluating the risk of spread of highly pathogenic avian influenza virus to wild migratory birds via leachate from municipal solid waste landfills accepting poultry carcass waste  
  Malladi S, Weaver J, Mlakar J, Spackman E, Pantin-Jackwood M  
  U.S. Department of Agriculture

- **4:10 PM**  
  **M4-H.3**  
  Implementing resilience in regulatory law: substantive provisions  
  Marchant G  
  Arizona State University

- **4:30 PM**  
  **M4-H.4**  
  International risk governance council resource guide on resilience: metrics and approaches for quantification  
  Linkov I, Fox-Lent C, Florin M  
  US Army Engineer R&D Center

- **4:50 PM**  
  **M4-H.5**  
  Qualitative methods for early stage regulation of synthetic biology  
  Trump B  
  University of Michigan

**Nautilus 4**  
M4-I Symposium: Integrating Cumulative Risk Assessment into Occupational Safety and Health  
Chair: Scott Dotson

- **3:30 PM**  
  **M4-I.1**  
  Drivers for occupationally-focused cumulative risk assessments  
  Dotson G  
  Centers for Disease Control and Prevention (CDC)/National Institute for Occupational Safety and Health (NIOSH)

- **3:50 PM**  
  **M4-I.2**  
  Connecting cumulative risk and total worker health  
  Chosewood K  
  National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention

- **4:10 PM**  
  **M4-I.3**  
  International risk governance council resource guide on resilience: metrics and approaches for quantification  
  Linkov I, Fox-Lent C, Florin M  
  US Army Engineer R&D Center

- **4:30 PM**  
  **M4-I.4**  
  Integrating non-chemical and psychosocial factors into occupational cumulative risk assessment  
  Clougherty J  
  University of Pittsburgh

- **4:50 PM**  
  **M4-I.5**  
  Research directions in cumulative risk assessment  
  Rice G  
  US EPA National Center for Environmental Assessment

#### 3:30 PM – 5:10 PM

**Nautilus 5**  
M4-J Symposium: Relationships between Climate Experiences, Risk Perceptions, and Beliefs around the World  
Co-chairs: Marijn Poortvliet, Meredith Niles

- **3:30 PM**  
  **M4-J.1**  
  Experiences of extreme weather, belief bias and perceived climate change risks  
  Pidgeon N, Sposito R, Capstick S, Demski C, Spence A  
  Cardiff University, Austria, Cardiff University, University of Nottingham

- **3:50 PM**  
  **M4-J.2**  
  Integrating non-chemical and psychosocial factors into occupational cumulative risk assessment  
  Clougherty J  
  University of Pittsburgh

- **4:10 PM**  
  **M4-J.3**  
  Farmer experiences and perceptions of climate change influence adaptive behaviors  
  Niles M  
  University of Vermont

- **4:30 PM**  
  **M4-J.4**  
  Evaluating the risk of spread of highly pathogenic avian influenza virus to wild migratory birds via leachate from municipal solid waste landfills accepting poultry carcass waste  
  Malladi S, Weaver J, Mlakar J, Spackman E, Pantin-Jackwood M  
  U.S. Department of Agriculture

- **4:50 PM**  
  **M4-J.5**  
  Public support for solar radiation management depends on concern about climate change and nationality  
  Visschers V, Shi J, Siegrist M, Arvai J  
  ETH Zurich, University of Michigan, Erb Institute, School of Natural Resources & Environment and Ross School of Business, Decision Research
Monday

6:00 PM – 8:00 PM

Poster Reception
Grande Ballroom

Applied Risk Management

P.1 Risk mapping of technological disasters and its application in land use planning: the state of art
Alves E
Engine Engenharia Ltda

P.2 Inter-organizational collaboration during complex risk events: communication task performance and satisfaction in homogeneous and mixed stakeholder teams
Beaudry M, Lemyre L, Blust-Volpato S, Boutette P, Pinsent C
University of Ottawa

P.3 Development of cloud-based food safety assessment system from post-market surveillance with Bayesian inference via Markov Chain Monte Carlo technique.
Chuang Y, Wu K
National Taiwan University

P.4 Enhancing operational risk management for wintertime oil spills with smart response services
University of Ottawa

P.5 Estimation of human risks induced by chemical accidents
Murayama T, Yoshida M
Tokyo Institute of Technology

P.6 Association between air pollution exposure and acute myocardial infarction emergency room visits: the effects of comorbid chronic conditions
Pani S, Huang C, Ho W, Chen B, Guo Y
National Taiwan University

P.7 Creation of REDESTARE as a strategy for capacity building and support for the implementation of the Sendai Framework in the Parana State - Brazil
Pinheiro E, Stringari D*
Disaster Research Center of Parana State - Brazil

P.8 Screening for developmental and reproductive toxicity hazards in the workplace
Sullivan K, Dodge D, Lewandowski T
Graduation Corporation

P.9 Uncertainty analysis with the assessment processes in the screening hazard assessment of human health under Japan’s Chemical Substances Control Law
Yamaguchi H, Matsumoto M, Kato H, Hirose A
National Institute of Health Sciences

P.10 SISDC Mobile: a support tool for municipalities for disaster management.
Barros E, Borges M
University Centre for Disaster Studies and Research on the State of Paraná

P.11 Comparison and validation of statistical methods for predicting the failure probability of trees
Kabir E, Giukema S
University of Michigan

P.12 Can risk governance function without a risk council?
Bonneck S

P.13 Thailand’s granary faces risks of drought due to climate change
Yi C
Tohoku University

P.14 Estimation and management of risks of injury at institutions due to fuel burning appliances
University of Ottawa

P.15 Understanding cause and outcomes of electrical injuries at institutions from an epidemiological perspective
Moody J
Electrical Safety Authority

P.16 A risk based framework to protecting the rights of residents of retirement homes in Ontario, Canada
Bates A, Castellina A
Retirement Homes Regulatory Authority

P.17 Pathways to learning in selecting voluntary risk management practices
Scott R
University of Washington

P.18 Establishing and implementing enterprise risk management in government agencies
Arimoto C, Howard P
ABSG Consulting Inc

P.19 Enterprise risk management implementation after organizational crisis: opportunity to build a resilient structure in a multinational company
Janickova M
Paris Dauphine University

P.20 Evaluation of a model which supports decision-making on information security risk treatment using statistical data
Kawasaki I, Abal R, Hiromatsu T
Institute of Information Security

P.21 Going further than physical and cyber connections: consideration of logical interdependencies
Lewis L, Petit F, Berry M
Argonne National Laboratory

P.22 Prioritizing chemical residue testing in meat, poultry, and egg products
USDA FSIS Office of Public Health Science

P.23 Key role of capacity building and participation in promoting the improvement of articulated risk and impact assessment system in Western Mexico
Clausen J, Gomez Quiroga G
ITESO University

P.24 IRGC resource guide on resilience
Florian M, Linkov I*
IRGC, Switzerland and US Army Engineer R&D Center, Boston

P.25 Race/ethnicity and climate change polarization: evidence from a U.S. survey experiment
Schultz J, Pearson A
Cornell University

P.26 Public perceptions of clean energy technologies
Abdulla A, Vaishnav P
UC San Diego, Carnegie Mellon University

P.27 Game-theoretic model for attack and defense of smart grids at three levels
Shan X, Zhuang J, Rao N
University of Houston - Clear Lake and State University of New York at Buffalo and Oak Ridge National Laboratory

P.28 Assessment of human health under Japan’s Chemical Substances Control Law
Yi C
Tohoku University

P.29 Adversarial hypothesis testing
González-Ortega J, Rios Insua D, Cano J
Instituto de Ciencias Matemáticas and Universidad Rey Juan Carlos

P.30 Implementation of a decision support tool for sustainable remediation in practice - lessons learned
Norman J, Söderqvist T, Volchko Y, Rosén L, Franzén F
Chalmers University of Technology, Enveco Environmental Economics Consultancy

P.31 Is sustainable remediation of contaminated land more efficient?
Anderson R, Norman J, Rosén L, Volchko Y
Chalmers University of Technology

P.32 Developing a predictive model to detect mishandling in the self-reported water discharge data
Michigan State University and North Carolina State University

P.33 VRAKA — a method for environmental risk assessment of potentially polluting shipwrecks
Landquist H, Rosén L, Lindhe A, Hassellöv I
Chalmers University of Technology
**Monday**

P.35  The consequences of climate change-driven land-use shifts in New England forests  
Borsuk M, Thompson J, Kittredge D, Lindsay M, Orwig D, Foster D  
Dartmouth College

P.36  Should we design for 100 year flood?  
Xian S, Small M, Lin N  
Princeton University, Carnegie Mellon University

P.37  Risk transfers in managing hazards: a tale of two floods  
McDaniels T, Dowlatabadi H  
Oak Ridge National Laboratory

P.38  Portfolio analysis for research prioritization: application to NOAA Fisheries  
Wood M, Foran C  
US Army Engineer Research & Development Center

P.39  Visualization of Life Cycle Assessment (LCA) output  
Brandum M, Wood M, Linkov I  
United States Army Corps of Engineers

P.40  Advances in risk assessment of farm product and biota intake in SADA version 6  
Bolus K, Manning K, Stewart R, Dolislager F, Walker S  
Oak Ridge National Laboratory

P.41  Optimizing resources: an environment, health & safety risk model  
Pierce A, Warshaw C, Posin L, Hancock G  
General Electric Co. and Gnarus Advisors

P.42  Comparison of evaluation functions for setting priority of risk management  
Maeda Y, Muramatsu G  
Shizuoka University

P.43  Siting high-level radioactive waste disposal facilities: 50 years of failure  
Luk S, Mumpower J*  
Texas A&M University

P.44  Application of structured decision making to radiological air monitoring  
Black P, Stockton T, Perona R, Ryti R  
Neptune and Company, Inc.

P.45  An exposure based Multi-Criteria Decision Analysis (MCDA) approach for the risk prioritization of antibiotic products  
Chabrelie A, Mitchell J, Norby B  
Michigan State University

**Dose Response**

P.46  Impact of temperature and humidity on stroke among diabetes mellitus patients using statins  
Ho W, Chou Y, Tsan Y, Chan W, Lin M, Lin Y, Chen P  
China Medical University

P.48  A series of unfortunate events: perpetuation of the pervasive misconception that rats receive a 3-5 times lower lung tissue dose than humans at the same ozone concentration  
McCant O, Lange S, Haney J, Honeycutt M  
Texas Commission on Environmental Quality

**Ecological Risk Assessment**

P.49  Review and assessment of phosgene mammalian lethality data and the development of a human estimate  
Sommerville D, Channel S  
US Army Edgewood Chemical Biological Center and Leidos

P.50  Prediction of hepatotoxicity in rats by statistical approaches  
Takeshita J, Oki H, Yoshinari K  
National Institute of Advanced Industrial Science and Technology, University of Shizuoka

P.51  The effects of air pollution and statin use on the risk of stroke in diabetes mellitus patients after transient ischemic attack: a 5-year population-based cohort follow-up study  
Yin M, Wu T, Chou Y, Chu Y, Chan W, Tsan Y, Ho W, Chu C, Chen P  
China Medical University

**Economics and Benefits Analysis**

P.52  Human’s health risk assessment based on the content of Pb, Cd, Cu, Zn, Fe and Mn in layer muscles farms samples of El-Fayoum Governorate, Egypt  
Abdou K, Walaa A, Manal M, Ehdoo O  
Faculty of Veterinary Medicine, Beni Suef University, Egypt

P.53  National-level evaluation of pesticide risks to endangered and threatened species  
Rossmoise C, Peck C, Garber K  
U.S. Environmental Protection Agency

P.54  Improving ecological risk assessment by embracing benchmark dose analysis  
Mayfield D, Skall D  
Gradient

P.55  Extrapolation strategies for ecological risk assessment: inhalation toxicity in cetaceans  
Rosenstein A, Collier T  
Independent Consultant

P.56  An attacker-defender resource allocation game with complementary or substituting effects  
He M, Zhuang J  
University at Buffalo

**Emerging Nanoscale Materials**

P.57  Combining quantitative microbial risk assessment and disability adjusted life years to estimate microbial risk reduction for cost-benefit analysis in drinking water systems  
Bergion V, Rosén R, Lindhe A  
Chalmers University of Technology

P.58  Combining cost benefit analysis with multi criteria analysis for sustainability assessment of regional water supply policies  
Sjöstrand K, Rosén L, Kärman E, Blom L, Lindkvist J, Ivarsson M, Lång L, Lindhe A  
SP Technical Research Institute of Sweden, Chalmers University of Technology, City of Gothenburg, Gothenburg Region, Enviroco Environmental Economics Consultancy, Geological Survey of Sweden

P.59  The long and winding road: controlling CO2 emissions from international aviation  
Vaishnav P  
Carnegie Mellon University

P.60  PM2.5 related welfare loss in Beijing, China: health and psychological mood impacts  
Yin H, Xu L  
Beijing Normal University

P.61  Benefits of mercury controls for China and the neighboring countries in East Asia  
East Tennessee State University

P.62  Cost-benefit analysis of copper recycling in remediation projects  
Volchko Y, Karlfeldt Fedje K, Normann J, Rosén L  
Chalmers University of Technology

**Engineering and Infrastructure**

P.63  Development of innovative methodology for safety assessment of industrial nanomaterials: report of research project in Japan (FY2011-2015)  
Gamo M, Honda K, Yamamoto K, Fukushima S, Takebayashi T  
National Institute of Advanced Industrial Science and Technology (AIST), Japan Bioassay Research Center, Keio University

P.64  Technology “Risk Radars”: an example in the area of nanotechnology  
Jovanovic A, Quintero F, Klimek P, Markovic N  
Steinbeis Advanced Risk Technologies, Stuttgart, Germany

P.65  Risk assessment of groundwater drawdown in subsidence sensitive areas  
Sundell J, Rosén L  
Chalmers University of Technology

P.66  Cuba, enfoque de seguridad de procesos en instalaciones industriales con peligro mayor. Enfoque de ingeniería y proyecto  
Prieto Recarey R, Cueto Alonso A  
Empresa Ingeniería y Proyectos del Petróleo, CUPET
P.67 Accidents risk assessment on China petroleum and chemical enterprises
Zhao Y
Peking University

P.68 The environmental competitiveness of small modular reactors: a life cycle study
Carless T, Griffin W, Fischbeck P, Carnegie Mellon University

P.69 Health impacts of transportation and the built environment: a quantitative risk assessment
Mansfield T, MacDonald Gibson J
University of North Carolina at Chapel Hill

P.70 Cooling energy analysis of commercial buildings in the U.S.
Lokhandwala M, Shevade P, Nateghi R
Purdue University

P.71 Visualizing uncertainty in marine navigation in the Canadian Arctic
Pelot R, Etienne L, Stoddard M
Dalhousie University

P.72 Climate change policy risks associated with weak pathways for industrial sectors
Morrow W
Lawrence Berkeley National Laboratory

Exposure Assessment
P.73 Comparison of risk-based concentrations derived for pesticides in drinking water with US EPA human health benchmarks
Mattuck R
Gradient

P.74 Prioritization of water contaminants using the USGS-EPA water quality portal
Greene C
Minnesota Department of Health

P.75 Review of potential risk from various exposure pathways to Marcellus shale flowback water
Abuafaraj N, Gurian P, Dixon M
Drexel University

P.76 Mercury contamination in the Columbia River Basin: health risk assessment of tribal exposure through subsistence lifeways
Arachy H
Harvard University

P.77 The risk assessment of Carbofuran residue in vegetables and fruits in Taiwan from 2010 to 2015
Chao K, Wu K
National Taiwan University

P.78 Exposure sources and predictors of urinary phthalate metabolites in Taiwanese children
National Health Research Institutes

P.79 Estimations of health risk in food, by national food sampling analysis, to Taiwan
Chen Y, Wu J, Huang S, Wu K
National Taiwan University and Public Health

P.80 Assessing the health risks of Gossypol from animal derived food in the Taiwanese population
Hsing H, Chuang Y, Wu K
National Taiwan University

P.81 Modeling study on the areal variation of the sensitivity of photochemical ozone concentrations and associated health impacts to VOC emission reduction in Japan
Inoue K, Higashino H
National Institute of Advanced Industrial Science and Technology

P.82 Proposed methods for characterizing dermal exposure to BPA for purposes of Proposition 65
Exponent, Inc.

P.83 Probabilistic risk assessment of Fipronil Residue in Tea in Taiwan
Lu E, Wu K
National Taiwan University

P.84 Improvements in biota modeling for EPA’s Preliminary Remediation Goal and Dose Compliance Concentration calculators: intake rate derivation, transfer factor compilation, and mass loading factor
Manning K, Dolislager F, Walker S
University of Tennessee, Oak Ridge National Laboratory, US EPA

P.85 Probabilistic health risk assessment of 2-amino-3,4-dimethyimidazo[4,5-f] quinoline on fish consumption
Msiq S, Chuang Y, Wu C, Wu K
National Taiwan University

P.86 Measuring, assessing and communicating individual external doses in the evacuation zone in Fukushima
Naito W
National Institute of Advanced Industrial Science and Technology

P.87 City noise: propagation and health impact
Exponent, Inc.

P.88 Using diffusive samplers to measure formaldehyde in residential indoor air
Singhal A, Renee K, Sheehan P
Exponent, Inc.

P.89 Presentation of new EPA online Vapor Intrusion Screening Level (VISL) tool
Stewart D, Galloway L, Dolislager F, Smith S, Frame A, Gaines L
The University of Tennessee, US Environmental Protection Agency

P.90 Health risk assessment of malic and fumaric acid in Taiwanese adult population via LC-MS/MS and Bayesian Statistical Markov chain Monte Carlo Simulation
Wu C, Shi J, Chuang Y, Wu K
National Taiwan University

P.91 The risk assessment of dietary exposure to acrylamide for adults in Taiwan
Yeh S, Wu C, Wu K
National Taiwan University

P.92 Risk assessment for non carcinogenic health effects for people living in a contaminated area by chemicals in Sao Paulo, Brazil.
Toledo M, Nardocci A
University of Sao Paolo

P.93 Solving complex radioactive decay chains for future assessment and cleanup decisions
Galloway L, Bolus K, Bellamy M, Dolislager F, Walker S
University of Tennessee, Ingenium Inc, Oak Ridge National Laboratory, Environmental Protection Agency

P.94 Evidence integration facilitated by Dragon Online
Turley A, Burch D, Henning C
ICF International

P.95 Delimiting the study of risk: risk assessment guidelines and values-based judgments
Kokotovich A
University of Minnesota

P.96 Reference framework for the application of Quantitative Risk Analysis for hydrocarbon pipelines, coupled with uncertainty treatment methods: uncertainty in scenario identification through event trees
Ocampo Pantoja F, Villaña N, Muñoz F
Universidad de los Andes

P.97 Realizing disaster causation: critical realism as an underpinning philosophy for disaster risk analysis
Huang T
Department of Urban Planning, National Cheng Kung University

P.98 Computing risks with confidence
Sentz K, Ferson S
Los Alamos National Laboratory

Microbial Risk Analysis
P.100 Data resources for the development of a quantitative microbial risk assessment for Norovirus in foodservice facilities
Miranda R, Schaffner D
Rutgers, The State University of New Jersey

P.101 Quantification of the Effect of 17β-estradiol on Escherichia coli and Enterococcus faecalis Survival and Persistence in Water
Mraz A, Weir M
The Ohio State University

Monday
P.102 Evaluation of Salmonella survival and growth in rehydrated dry pet food
Qu Y, Lamberti E, Buchanan R, Pradhan A
University of Maryland, College Park

P.103 Development of a risk model to predict Mycobacterium avium subsp. paratuberculosis contamination in bulk tank milk
Rani S, Lamberti E, Pradhan A
University of Maryland

Occupational Health and Safety

P.104 Psychosocial intervention to strengthen community resilience to disasters
De la Yncera N, Lopez E, Lorenzo A
Universidad Autónoma del Estado de Morelos

P.105 Asbestos risk assessment modeling: what are the keys to “Carolinas’ mystery”?
Korchevskiy A
Chemistry & Industrial Hygiene, Inc.

P.106 Health risk communication to a non-technical workforce
Sexton K, Bhojani F
Shell

P.107 The risk assessment of radiation exposure and stochastic effect from Japanese Seafood for Taiwanese after Fukushima accident
Chen K, Chuang Y, Wu C, Wu K
National Taiwan University

P.108 Safety culture and return to work: does perception matter?
Gosen D, Shelton L
Grenoble Ecole de Management

P.109 Risk estimation on hydrogen fueling station and surrounding area
Tsuneni K, Kato E, Kawamoto A, Khara T, Saburi T
National Institute of Advanced Industrial Science and Technology

P.110 Cumulative risk assessment for occupational health: challenges and solutions
Williams P, Maier A
E Risk Sciences, LLP

P.111 Concern living near an AWACS airbase
van Poll R, Breugelmans O, van Kempen E, Houthuijs D
RIVM National Institute for Public Health and the Environment

P.112 Regulatory risk assessment perspective on the historical drinking water contamination at Camp Lejeune, NC
Haney J
Texas Commission on Environmental Quality

P.113 Associate professor
Seo K
Aoyama Gakuin University

P.114 Risk factors associated to cyberbullying in Chilean high school students
Gutiérrez V, Toledo M
Universidad Diego Portales

P.115 Risk factors of cyberbullying in 5th grade Chilean students
Ahumada W, Gutiérrez V, Toledo M
Universidad Diego Portales

P.116 Tyranny of P-value hacking: the different school of thought and its impact quantitative risk estimates
Owusu-Ansah E, Amponsah S, Abaidoo R
University of Energy and Natural Resources and Kwame Nkrumah University of Science and Technology

Risk Communication

P.117 Nuclear risk communication
Khan K
Vienna University

P.118 Risk perception on health effects of EMF among high school students in Japan
Ohkubo C
Japan EMF Information Center

Trumbo C, Peek L, Laituri M, Schumacher R, Makry M
Colorado State University

P.120 Seeking for your own sake: Chinese citizens’ motivation for information seeking about air pollution
Yang J, Huang J
University at Buffalo

P.121 Bridging the gap: exploring the role of situated distance cues in climate change visualization messaging
Schuldt J, Rickard L, Yang Z
Cornell University, University of Maine, and University at Buffalo [SUNY]

P.122 Risky discourses: framing as a function of accountability in climate change editorials
Holley J
Cornell University

P.123 Of sea lice and superfood: a comparison of regional and national news media coverage of aquaculture
Rickard L
University of Maine

P.124 Communicating the unfamiliar risk of ocean acidification to members of the public
Spence E, Pidgeon N, Pearson P
Cardiff University and Understanding Risk Group

P.125 The perceived risks and benefits of drones and their various uses
Zwickle A, Hann M, Farber H
Michigan State University and University of Massachusetts School of Law

P.126 Exploring the acceptability of human induced earthquakes
McComas K, Lu H*
Cornell University

P.127 Effects of climate change on Malian farmers
Wooten E, Rivers L
North Carolina State University

P.128 Enhancing environmental risk assessment with the protocol for community excellence in environmental health
Bartlett R
California Department of Public Health

P.129 Tornado risk perceptions in response to warning polygons
Huang S, Jon I, Lindell M*
University of Washington

P.130 Differences in risk perceptions about medical practices among general people and health professionals
Yuko A
Tokai Gakuin University

P.131 IPCC reports on climate change and media: comparing media coverage of IPCC AR4 and AR5
Aoyagi M
National Institute for Environmental Studies

P.132 FrackMap: a tool to communicate about fracking and potential environmental and public health impacts in the United States
De Marcellis-Warin N, Backus A
Harvard Center for Risk Analysis, Harvard T. Chan School of Public Health, Polytechnique Montreal and CIRANO

P.133 Communicating threat and efficacy through the media: an analysis of news broadcasts about the Zika virus
Olson M, Sutton J, Vos S
University of Kentucky

P.134 Investigating risk communications at Fukushima-Daiichi NPP accident
Tsuchida S
Kansai University

P.135 Extreme weather and climate change: the role of media use and interpersonal discussion in the formation of risk perceptions about climate change
Anderson A
Colorado State University

P.136 The relationship between stigma and public acceptance of food products – an example of chewy starch in Taiwan
Wu C, Huang S*, Wu H, Wu K
National Taiwan University

P.137 The role of risk attitudes in the reception of risk information for risk mitigation strategies in wildfire
Walpole H, Wilson R
The Ohio State University

P.138 Risky discourses: framing as a function of accountability in climate change editorials
Holley J
Cornell University
P.139 Public cues to relative credibility of disputing scientists.  
Johnson B  
Decision Research; University of Oregon

P.140 Disaster preparedness and natural disasters in Canada: a mixed-method inquiry of Canadians’ experiences  
Yong A, Lemyre L, Pمستهل، Krewski D  
University of Ottawa

P.142 Examining factors influencing risk perceptions of hydropower  
Mayeda A, Boyd A  
Washington State University

P.143 Media coverage of mercury contamination in the Arctic  
Fredrickson M, Boyd A, Furgal C  
Colorado School of Public Health, Washington State University, Trent University

P.144 Digital risk perception and communication unplugged: twenty years of data processing  
Wardman J  
University of Nottingham

P.145 Urban parks as the nexus for neighborhood vulnerability and resilience  
Winter P, Milburn L, Li W, Padgett P  
USFS, Pacific Southwest Research Station

P.146 Communicating visual risk: threat, efficacy, and emotion in SNS messages about Zika  
Yos S, Sutton J, Olson M  
University of Kentucky

P.147 Pittsburgh air quality: empowerment lending library  
Wong-Parodi G, Dias B, Taylor M  
Carnegie Mellon University

P.148 The chronological change of consumer anxieties and concerns related with radioactive contamination of foods in Japan: applying the text mining approach  
Naritauchi H, Shintani K, Harunada N  
National Institute of Health Sciences

P.149 Trust shaped through knowledge and elaboration: considering the attitude strength properties of trust  
Song H  
Cornell University

P.150 Global attitudes towards climate change: evidence from 15 countries  
Shao W, Xian S, Lin N, Lee T  
Auburn University Montgomery

P.151 How GM issue has been told at Chinese newspapers? Comparative Analysis of national and local newspaper coverage of GM issue in China, 2000–2014  
Zhang X  
The University of Tokyo

P.152 Implementing geographic information systems to support Coast Guard operational decision making  
Todd A, Howard P  
ABS Consulting

P.153 When are climate victim portrayals persuasive? The interplay of perspective taking and social-identity cues  
Lu H, Schuldt J  
Cornell University

Risk and Development

P.154 Perception of climate risk among rural farmers in Vietnam: consistency within households and with the empirical record  
Cullen A, Anderson C  
Evans School, University of Washington

P.155 Social vulnerability and the occurrence of gastrointestinal diseases associated with precipitation seasons in São Paulo, Brazil  
Roncancio D, Nardocci A  
University of São Paulo, School of Public Health

P.156 Structuring, implementation and management of a specialized basis in the wildlife oiled rescue in the event of environmental accidents in estuarine complex area of Paranaguá, Paraná State, Brazil  
Stringari D, Pinheiro E, Schneider G, Zamarchi K  
Disaster Research Center of Parana State – Brazil

P.157 Solving Sri Lanka’s public health crisis — employing a tiered investigation approach to pinpoint the risk factors associated with Chronic Kidney Disease of Unknown Etiology (CKDu)  
Redmon J, Womack D, Elledge M, Stringari D, Pinheiro E, Schneider G, Levine K  
RTI International, University of Sri Jayewardenepura, and University of Kelanaya

Risk, Policy and Law

P.158 Application of the averted disability-adjusted life year metric for proactive decision-making in a regulatory environment  
Sridharan S, Mangalam S  
Technical Standards & Safety Authority

P.159 Health outcomes and congressional control of consumer safety regulations  
Larson D  
Virginia Polytechnic Institute and State University

P.160 Geographic Risk Evaluation and Assessment Tool [GREEN]: model for transfusion transmitted infectious diseases  
Chada K, Lane C, Huang Y, Zhang G, Walderhaug M, Toledo S, Yang H  
U.S. Food and Drug Administration and Engility Corporation

P.161 Risk governance through the cooperation of a risk evaluation technology and the institutional system: attention to chemical stock in product  
University of Minnesota

P.162 Hazard assessment of four selected flame retardant chemicals of importance to national defense  
Rak A, Barry J, Morgan A  
Noblis and University of Dayton Research Institute (UDRI)

P.163 Epistemic uncertainty in agent-based modeling  
Ferson S, Sentz K  
Applied Biomathematics, Los Alamos National Laboratory

P.164 Surveillance of a comparative set of homeland security risks  
Lundberg R  
University of Stavanger

P.165 Tradeoffs between water security and climate security  
Doe J  
University of Witwatersrand

P.166 Water stability index for risk identification within transboundary river basins  
US Army Corps of Engineers Geospatial Research Laboratory

P.167 The security risk management regulation regime applied in the Norwegian context  
Jore S  
University of Stavanger

P.168 Military coalition’s organizational challenges in complex emergencies  
Stene L, Olsen O  
University of Stavanger

P.169 Modeling exposures in municipal water contamination scenarios using synthetic systems  
Battelle Memorial Institute

P.170 A case study in data access, exposure assessment, and extended analyses: diesel exhaust exposure and lung cancer  
Crump K, Van Ladingham C, McClellan R*  
Private Consultants

P.171 The University of Kentucky: hassle factor in online travel planning  
Wardman J  
University of Nottingham

P.172 The U.S. Tariff Commission: Adding value to the public participation process  
Matz J  
University of Oregon
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<tr>
<th>Time</th>
<th>Room</th>
<th>Session Title</th>
<th>Chair(s)</th>
<th>Speakers</th>
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<tbody>
<tr>
<td>10:30 AM</td>
<td>Marina 1</td>
<td>T2-A Developing Methods for Understanding Infrastructure Risk at Multiple Scales</td>
<td>Cameron MacKenzie</td>
<td>Lei X, MacKenzie C Iowa State University and IMSE</td>
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<td>University of Oxford</td>
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<tr>
<td>10:30 AM</td>
<td>Marina 2</td>
<td>T2-B Microbial Risks in the Environment: Are We In Hot Water?</td>
<td>Emma Hartnett</td>
<td>Hu X, Surminski S, Hall J, Pant R University of Oxford</td>
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<td>10:50 AM</td>
<td>Marina 3</td>
<td>T2-C Recent Topics in Homeland Security and Counter-terrorism</td>
<td>Henry Willis</td>
<td>Vanderbuilt University</td>
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<tr>
<td>11:10 AM</td>
<td>Marina 4</td>
<td>T2-D Roundtable: States as Risk Policy Innovators</td>
<td>Sandra Hoffmann</td>
<td>Drexel University</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>Marina 5</td>
<td>T2-E Roundtable: The Risk Analysis Field/Science</td>
<td>Terje Aven</td>
<td>Battelle Memorial Institute</td>
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</table>

**As a professional activity, risk analysis is interpreted in a wide sense as in SRA contexts covering in particular risk assessment, risk communication and risk management is young, not more than 30-40 years old. From this period we see the first scientific journals, papers and conferences covering fundamental ideas and principles on how to appropriately assess and manage risk. To a large extent, these ideas and principles still form the basis for risk analysis today. However, risk analysis has developed considerably since then. New and more sophisticated analysis methods and techniques have been developed, and risk analytical approaches and methods are now used in most societal sectors as illustrated by the range of specialty groups of SRA. Yet risk analysis struggles to be accepted as a separate/distinct scientific field; there are strong reasons for being concerned about the development of the risk area as discussed for example at the SRA annual meeting in December 2015. A key point made is the lack of consensus on fundamental concepts and principles; another the fact that there are rather few scientific positions (professorships) and university programs on all levels, covering risk analysis. Most of these degrees and positions are anchored in other more well-established fields, such as engineering and business, which allow for some specialisation in risk related topics. How can we obtain a strong development of risk analysis when young scholars cannot plan for a career in the field? In the Roundtable we will address these issues. More specifically we would like to discuss: 1. Is risk analysis actually a field or science? Why? Is it really important? And if it is, what is the core of this field or science? 2. Seeing risk analysis is a field and science, how can we best improve its scientific platform? 3. How can we improve the related practice of risk analysis?**
Tuesday

10:30 AM – 12:00 PM
Nautilus 1
T2-F Decision Tools for Managing Environmental Risks and Disasters
Chair: Sheree Pagsuyoin

10:30 AM T2-F.1
Interdependent vulnerabilities of US Economic Systems to disasters: an input-output key sector analysis
Santos J
George Washington University

10:50 AM T2-F.2
ADVISER model: an adaptive decision tool for analyzing regional drought impacts
Pagsuyoin S, Santos J
University of Massachusetts Lowell

11:10 AM T2-F.3
GIS-based hotspot analysis of residual antimicrobials in the environment
Pagsuyoin S, Gondle R*
University of Massachusetts Lowell

11:30 AM T2-F.4
A multidisciplinary approach for dam failure consequence analysis
Cao S, Ponnambalam K*
University of Waterloo

10:30 AM – 12:00 PM
Nautilus 2
T2-G Symposium: To Vape or Not to Vape: Vaping and New Health Risks
Co-chairs: Sara Henry, Daniel Conklin

10:30 AM T2-G.1
Cardiovascular effects of exposure to Harmful and Potentially Harmful Constituents (HPHCs) of new and emerging tobacco products
Conklin D, Chen L, Srivastava S
University of Louisville and New York University

10:50 AM T2-G.2
Effects of e-cigarettes on respiratory mucosal immune responses
Jaspers I
University of North Carolina at Chapel Hill

11:10 AM T2-G.3
Central nerve system effects from exposure to e-cigarettes in rodents during pregnancy and early life
Zelikoff J
NYU Langone Medical Center

11:30 AM T2-G.4
To vape or not to vape: questions and possible answers
Henry S
Retired Food and Drug Admin.

10:30 AM – 12:00 PM
Nautilus 4
T2-I Symposium: Toward a Common Language of Risk in Occupational Health and Safety, Part I
Co-chairs: Tee Guidotti, Charles Redinger

10:30 AM T2-I.1
Overview
Guidotti T
O+EH&M

10:50 AM T2-I.2
Understanding influences on electricians' decision making: mental modeling for OH&S
Kovacs D, Austin L, Thorne S, Evans N, Moody J
Decision Partners; Electrical Safety Authority

11:10 AM T2-I.3
Occupational medicine perspective
Guidotti T
O+EH&M

11:30 AM T2-I.4
Bridging the divide between speaking technical and hearing personal
Boelter F
RHP Risk Management Inc.

10:30 AM – 12:00 PM
Nautilus 5
T2-J Predicting Climate Change Support and Action
Chair: Graham Dixon

10:30 AM T2-J.1
A conflict on consensus: current critiques and future outlook on climate change consensus messaging research
Dixon G, Ma Y, Hmielowski J
Washington State University

10:50 AM T2-J.2
The influence of information about carbon dioxide reduction (CDR) technologies on support for climate change mitigation strategies: A test of risk salience and risk compensation hypotheses
Campbell-Arvai V, Hart P, Raimi K, Wolske K
University of Michigan

11:10 AM T2-J.3
Perceived efficacy, action, and support for climate change risk reduction
Crosmk K, Bostrom A*
University of Washington

11:30 AM T2-J.4
Climate change concerns, weather expectations, and willingness to adapt
Klima K, Bruine de Bruine W, Dessai S, Lefevre C, Taylor A
Carnegie Mellon University, University of Leeds, University College London
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<tr>
<th>Time</th>
<th>Marina 1</th>
<th>Marina 2</th>
<th>Marina 3</th>
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<td><strong>T3-A Energy Systems and Risk</strong></td>
<td><strong>T3-B Public Perception of Risk and Stakeholder Input</strong></td>
<td><strong>T3-C Symposium: Hazard Classification and Risk Assessment Frameworks</strong></td>
<td><strong>T3-D Symposium: Environment, Health Risk and Cost-Benefit Analysis</strong></td>
<td><strong>T3-E Symposium: Foundational Issues in Risk Analysis II</strong></td>
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<td>Chair: Kristen Schell</td>
<td>Chair: Alison Pecquet</td>
<td>Co-chairs: Jo Anne Shatkin, Christie Sayes</td>
<td>Chair: Amber Jessup</td>
<td>Co-chairs: Floris Goerlandt, Jon Selvik</td>
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<td><strong>T3-A.1</strong></td>
<td><strong>T3-B.1</strong></td>
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<td>Incorporating renewable generation risk and reliability measures into</td>
<td>Perceptions of environmental and social-psychological risk on the</td>
<td>Tiered testing of Nano-TiO2 release potential from self-cleaning concrete</td>
<td>The value of enhancing consumer confidence in the food supply</td>
<td>Finding fault with system safety risk analysis: a typology for</td>
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<td>Lackey T, Harrison D, Moser R</td>
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<td>Evaluating the cost, safety and proliferation risks of small floating</td>
<td>Stakeholder perceptions of water systems and hydro-climate information</td>
<td>Army Engineer Research and Development Center</td>
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<td>Critical assessment of the foundations of power transmission and</td>
<td>Upper Midwestern conventional farmers perceived vulnerability to</td>
<td>Developing DoD guidance for evaluation of engineered nano materials</td>
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<td>Noblis, Department of Defense, Vireo Advisors</td>
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<td>Correlated power plant failures in North America</td>
<td>Improving invasive species management using risk analysis: the case of</td>
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<td>University of Minnesota</td>
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<td>The tragedy of the anti-commons; a solution for coordination failures in</td>
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<td>for a “NIMBY” post-industrial world</td>
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<td>Palma-Oliveira J, Trump B, Wood M, Linkov I</td>
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<td><strong>T3-C.2</strong></td>
<td><strong>T3-C.3</strong></td>
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<td>Tiered testing of Nano-TiO2 release potential from self-cleaning concrete</td>
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<td>Racial disparities in access to community water service in Wake County,</td>
<td>State-of-the-art nano risk assessment frameworks and their relevance for decision making</td>
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<td>North Carolina: public health risks and costs of interventions</td>
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<td>MacDonald Gibson J, Stillo F</td>
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<td>Nautilus 1</td>
<td>T3-F Symposium: Coastal Flood Risk and Resilience: Exploring the effects of sea level rise and approaches to mitigation for coastal communities</td>
<td>Christian Beaudrie</td>
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<tr>
<td>1:30 PM</td>
<td>Nautilus 2</td>
<td>T3-G Dose-Response Modeling for Human Health Risk Assessment</td>
<td>Ingrid Druwe, Lauren Brown</td>
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<td>1:30 PM</td>
<td>Nautilus 3</td>
<td>T3-H Where are Science and Risk Analysis Taking us on Gene Drives</td>
<td>Todd Kuiken</td>
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<td>1:30 PM</td>
<td>Nautilus 4</td>
<td>T3-I Symposium: Toward a Common Language of Risk in Occupational Health and Safety, Part II</td>
<td>Tee Guidotti</td>
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<td>1:30 PM</td>
<td>Nautilus 5</td>
<td>T3-J All About Energy</td>
<td>Darnick Evensen, Chris Clarke</td>
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**Tuesday**

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<tr>
<td>1:30 PM</td>
<td>Nautilus 1</td>
<td>T3-F.1 Is it worth the effort? A case study of cumulative-based risk assessment versus scenario-based risk assessment methods for sea level rise.</td>
<td>Lyle T Ebbwater Consulting</td>
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<td>1:30 PM</td>
<td>Nautilus 3</td>
<td>T3-F.3 Educational tools for risk recognition and awareness of disaster mitigation as needed to lessen damage from tsunamis</td>
<td>Yasuda M, Rui N Tohoku University</td>
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<td>1:30 PM</td>
<td>Nautilus 4</td>
<td>T3-F.4 Incorporating more than the weather: differentiating reservoir operations based on seasonally varying opportunity costs and value at risk</td>
<td>Bates M, Linkov I US Army Corps of Engineers, Engineer Research &amp; Development Center</td>
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<td>1:30 PM</td>
<td>Nautilus 5</td>
<td>T3-F.5 Can short-term toxicity studies inform BMD estimation of long-term studies?</td>
<td>Shao K Indiana University Bloomington</td>
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<td>1:50 PM</td>
<td>Nautilus 1</td>
<td>T3-G.1 Bayesian re-analysis of lung tumor incidences in CD1 mice resulting from ‘whole life’ exposure to inorganic arsenic</td>
<td>Druwe I, Burgoon L Oak Ridge Institute for Science and Education, US Environmental Protection Agency, National Center for Environmental Assessment and US Army Engineer Research and Development Center, Environmental Laboratory</td>
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<tr>
<td>1:50 PM</td>
<td>Nautilus 2</td>
<td>T3-G.2 Assessing the relationship between adult blood lead levels and cardiovascular disease related mortality</td>
<td>Brown L, Lynch M Abt Associates</td>
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<td>1:50 PM</td>
<td>Nautilus 5</td>
<td>T3-G.5 The biological basis of gene drive technologies: Beyond the hype Gould F North Carolina State University</td>
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<td>1:50 PM</td>
<td>Nautilus 1</td>
<td>T3-H.1 Comparative risk analysis for agricultural genetic pest management technologies</td>
<td>Elsensohn J, Burrack H, Brown Z, Kuzma J North Carolina State University</td>
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<td>1:50 PM</td>
<td>Nautilus 2</td>
<td>T3-H.2 Contrasting ecological risks and benefits of genetic biocontrol for invasive rodents</td>
<td>Leitschuh C North Carolina State University and Genetic Engineering and Society Center at NCSU</td>
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<td>1:50 PM</td>
<td>Nautilus 3</td>
<td>T3-H.3 A behavioral perspective on risk perception, risk communication and human language</td>
<td>O’Reilly M SUNY School of Public Health and ARLS Consultants</td>
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<td>1:50 PM</td>
<td>Nautilus 4</td>
<td>T3-H.4 If harmonization possible? solutions and looking at ISO</td>
<td>Redinger C Redinger 360, Inc.</td>
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<td>T3-H.5 Is harmonization possible? solutions and looking at ISO</td>
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**Wednesday**

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### Tuesday

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<tr>
<th>3:30 PM – 5:10 PM</th>
<th>Marina 1</th>
<th>T4-A Flood Risk Modeling and Analysis</th>
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| 3:30 PM           | T4-A.1   | Assessing the resilience of coastal systems: a probabilistic approach  
                      Schultz M, Smith E  
                      US Army Corps of Engineers  
| 3:50 PM           | T4-A.2   | A post-event investigation of the 2008 Ghardaia (Algeria) flood and debris flow disaster  
                      Benouari D, Zelloum H, El Hadj F  
                      University of Science & Technology  
                      Houari Boumediene (USTHB)  
| 4:10 PM           | T4-A.3   | Quantitative risk assessment of Natech scenarios triggered by different types of floods  
                      Villalba N, Ocampo F, Muñoz F  
                      Universidad de Los Andes  
| 4:30 PM           | T4-A.4   | Utilizing resilient processes to combat catastrophic events  
                      Snell M, Seager T  
                      Arizona State University  
| 4:50 PM           | T4-A.5   | Use of hazi and regional climate models to identify vulnerable transport infrastructure due to future extreme precipitation events  
                      Camp J, Shaw A, Whyte D  
                      Vanderbilt University  
| 3:30 PM – 5:10 PM | Marina 2 | T4-B Would You Like a Side of Norovirus With That Sandwich?  
                      Understanding Norovirus Transmission and Risk to Improve Risk Management in Retail Settings  
                      Co-chairs: Regis Pouillot, Steven Beaulieu  
| 3:30 PM           | T4-B.1   | Norovirus dose-response modeling: use of multiple models in QMRA to describe uncertainty  
                      Van Abel N, Schoen M, Meschke J  
                      US EPA, Sottler Environmental, University of Washington  
| 3:50 PM           | T4-B.2   | Modeling cross-contamination and survival of Norovirus in foodservice settings  
                      Schaffner D, Igo M, Miranda R  
                      Rutgers University  
| 4:10 PM           | T4-B.3   | Not so secret agents in retail food settings: application of an agent-based model to evaluate Norovirus intervention strategies  
                      Beaulieu S, Mokhtari A, Anderson M, Kelly R, Swanson S, Jaykus L  
                      Neptune and Company, Inc.  
| 4:30 PM           | T4-B.4   | Modelling the impact of ill food employee behavior and interventions on Norovirus transmission in retail food establishments  
                      Food and Drug Administration  
| 4:50 PM           | T4-B.5   | Results and lessons learned from the risk assessment of norovirus in retail food facilities  
                      Fanaselle W, Duret S, Poullot R, Papafragkou E, Liggans G, Williams L, Van Doren J  
                      Food and Drug Administration  
| 3:30 PM – 5:10 PM | Marina 3 | T4-C Understanding Nanomaterial Health Risks  
                      Co-chairs: Jeremy Gernand, Christie Sayes  
| 3:30 PM           | T4-C.1   | Probabilistic approach for assessing infants’ health risks due to ingestion of nanoscale silver released from consumer products  
                      Ca’ Foscari University of Venice, Italy  
| 3:50 PM           | T4-C.2   | Understanding our exposure to emerging technologies: a screening level risk assessment of copper-containing micro- and nano-enabled products  
                      Aquino G, Sayes C  
                      Baylor University  
| 4:10 PM           | T4-C.3   | A clustering analysis of CNT pulmonary toxicity in rodents  
                      Ramchandran V, Gernand J  
                      Pennsylvania State University  
| 4:30 PM           | T4-C.4   | Utilizing the adverse outcome pathway model as a tool for elucidating zinc nanoparticle toxicity  
                      Sayes C  
                      Baylor University  
| 4:50 PM           | T4-C.5   | Testing the validity of proposed in vitro toxicity forecasting models for predicting pulmonary responses in rodents  
                      Gernand J, Ramchandran V  
                      Penn State University  
| 3:30 PM – 5:10 PM | Marina 4 | T4-D Revolutions in Benefit-Cost Analysis  
| 3:30 PM           | T4-D.1   | Challenges to product labeling: consumer protection or opportunism?  
                      Cantor R, Cross P, Mackoul C  
                      Berkeley Research Group  
| 3:50 PM           | T4-D.2   | Behavioral responses to health information and warnings  
                      U.S. Food and Drug Administration  
| 4:10 PM           | T4-D.3   | Using FDA adverse event data to estimate the avoided risk of allergic reactions from bakery products through recalls  
                      Federal government  
| 4:30 PM           | T4-D.4   | Innovative experiments to explore possible mis-estimation of the net benefits of environmental, public health, and safety regulations  
                      Finkel A, Johnson B  
                      Univ. of Pennsylvania Law School and Univ. of Michigan School of Public Health  
| 4:50 PM           | T4-D.5   | What if revealed preference isn’t so revealing? Insights from agent-based modeling and complex systems for the practice of benefit-cost analysis  
                      Campbell H  
                      Department of Politics and Policy, Claremont Graduate University  
| 3:30 PM – 5:10 PM | Marina 6 | T4-E Applying Risk Management to Hazards and Disasters  
| 3:30 PM           | T4-E.1   | Natural hazards and preparedness: a multi-hazard scenario  
                      Bronfman N, Cisternas P*  
                      Universidad Andres Bello  
| 3:50 PM           | T4-E.2   | Consequences of biological hazards: a systematic mapping of the literature  
                      Coopner N  
                      Massey University  
| 4:10 PM           | T4-E.3   | A hypervolume approach for assessing risk under uncertainty  
                      Natural Resources Canada  
| 4:30 PM           | T4-E.4   | Probabilistic consequence analyses for concurrent accidental releases of radiological materials from multiple reactor units at a shared nuclear power plant site: safety goal policy implications  
                      Hudson D  
                      Johns Hopkins University  
| 4:50 PM           | T4-E.5   | Managing risk to buildings from coastal storms: lessons learned from Hurricane Sandy  
                      Miller S, Gunan P*, Daley J, Elwell H, Matsil M, Montalto F  
                      Drexel University  

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*Society For Risk Analysis Annual Meeting*
Tuesday

3:30 PM – 5:10 PM

Nautilus 1
T4-F Risk and Resilience in Infrastructure Networks
Co-chairs: Jade Mitchell, Pravin Chopade

3:30 PM T4-F.1
Predicting risk of flight delays using the USELEI process
Truong D
Embry-Riddle Aeronautical University

3:50 PM T4-F.2
Network resilience of urban transportation infrastructure
Ganin A, Kitsak M, Linkov I
University of Virginia, Northeastern University, US Army Engineer Research and Development Center

4:10 PM T4-F.3
Risk analysis and systems integration of fleet electric vehicles with the power grid
Brannon M, Slutsky D, Wheeler J, Lambert J
University of Virginia

4:30 PM T4-F.4
Framework for computational risk analysis of large networks
Chopade P, Crowther K, Zhan J, Roy K
North Carolina A&T State University, MITRE Corporation, University of Nevada–Las Vegas

4:50 PM T4-F.5
Expert evaluation of the water crisis in Flint, Michigan
Mitchell J, Rose J, Donahue D
Michigan State University

3:30 PM – 5:10 PM

Nautilus 2
T4-G Consumer Exposure and Tools
Co-chairs: Rosemary Zaleski, Annette Giuseppi-Elie

3:30 PM T4-G.1
Advancing models and data for characterizing exposures to chemicals in consumer products
US Environmental Protection Agency

4:00 PM T4-G.2
Advances in exposure assessment: CEM updates and OECD use code activities
Fehrenbacher M, Bevington C, Hall F
US Environmental Protection Agency

4:30 PM T4-G.3
REACH consumer exposure and risk tools
Qian H, Dudzina T, Rodriguez C, Zaleski R
ExxonMobil Biomedical Sciences, Inc.

4:30 PM T4-G.4
Tiering consumer product exposure tools
Cowen-Elberry C, Greggs W
CE2 Consulting, Soleil Consulting

4:30 PM T4-G.5
Creating a web portal to facilitate consumer exposure science methods, databases, and projects
Becker R
American Chemistry Council

3:30 PM – 5:10 PM

Nautilus 3
T4-H Policy and Risk Governance Landscape Around Gene Drives
Chair: Caroline Leitschuh

3:30 PM T4-H.1
Reflections from the National Academy of Science committee on non-human gene drives and responsible conduct
Delborne J
North Carolina State University

3:50 PM T4-H.2
Mechanisms to engage scientific and policy communities on risk governance challenges of gene drives
Palmer M, Evans S
Stanford University

4:10 PM T4-H.3
CRISPR without walls: myths and realities about the democratization of genetic technologies
Kuiken T
North Carolina State University

4:30 PM T4-H.4
On gene drives: scientific uncertainty, technical safeguards and policy gaps
Oye K
Massachusetts Institute of Technology

4:50 PM T4-H.5
Systems-thinking about gene drives and risk governance: findings from a deliberative workshop
Kuzma J
NC State University

3:30 PM – 5:10 PM

Nautilus 4
T4-I Symposium: European Perceptions of Climate Change
Chair: Nick Pidgeon

3:30 PM T4-I.1
EPCC - the European perceptions of climate change project
Cardiff University, University Bergen, University Stuttgart, Symlog Paris

3:30 PM T4-I.2
Risky transitions — how public perceptions of the energy transitions differ across countries and cultures
Annika A, Scheer D, Sonnerberger M
University of Stuttgart

3:30 PM T4-I.3
Is fracking morally wrong? How to answer the question.
Evensen D
Cardiff University

3:30 PM T4-I.4
Place-based hazard risk perception: spatial disproportionalities in the context of fracking
Collins M, Harthorn B, Satterfield T, Copeland L
SUNY-ESF

3:30 PM T4-I.5
Measuring resilience: insights, challenges and the problem of thresholds
Satterfield T, Kaplan-Hallam M, Tam J, Wilson N, Chan K, Bennett N
University of British Columbia

3:30 PM – 5:10 PM

Nautilus 5
T4-J Symposium: US and UK Perceptions on Risk, Resilience, Fairness and Disproportionality in the Case of Fracking
Chair: Barbara Harthorn

3:30 PM T4-J.1
Health risk perception, justice and bodily resilience in US and UK public perceptions of fracking
Harthorn B, Partridge T, Enders C, Thomas M, Pidgeon N
University of California Santa Barbara

3:30 PM T4-J.2
Deliberating shale development in the US and UK: emergent views on issues of urgency and inequality
Partridge T, Harthorn B, Thomas M, Pidgeon N
University of California Santa Barbara

3:30 PM T4-J.3
Debating shale development in the US and UK: emergent views on issues of urgency and inequality
Harthorn B, Partridge T, Enders C, Thomas M, Pidgeon N
University of California Santa Barbara

3:30 PM T4-J.4
Measuring resilience: insights, challenges and the problem of thresholds
Satterfield T, Kaplan-Hallam M, Tam J, Wilson N, Chan K, Bennett N
University of British Columbia
### Wednesday

**Marina 1**
**W1-A Critical Infrastructure Risk Management**
Co-chairs: Hiba Baroud, Naleghi, R

<table>
<thead>
<tr>
<th>Time</th>
<th>Panel</th>
<th>Title</th>
<th>Chair/Speakers</th>
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</thead>
<tbody>
<tr>
<td>8:30 AM</td>
<td>W1-A.1</td>
<td>Reducing risk magnification in infrastructure failures</td>
<td>Zimmerman R New York University</td>
</tr>
<tr>
<td>8:50 AM</td>
<td>W1-A.2</td>
<td>Critical infrastructure protection and weather-related events in Brazil and Canada: an overview</td>
<td>Caruzzo, A, Santos, L, Gyakum, J, Joe, P McGill University</td>
</tr>
<tr>
<td>9:10 AM</td>
<td>W1-A.3</td>
<td>Probabilistic modeling of water supply safety measures in drinking water systems in arid areas</td>
<td>Lindhe A, Rosen L, Johansson P, Norberg T Chalmers University of Technology</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>W1-A.4</td>
<td>Multi-hazard risk-informed decision-making for infrastructure systems based on lifecycle cost analysis</td>
<td>Shafieezadeh A, Fereshtehnejad E Ohio State University</td>
</tr>
</tbody>
</table>

**Marina 2**
**W1-B What You Don’t Know Can Kill You: Emerging Disease Risk and Resilience**
Co-chairs: Charles Haas, Sanaa Moez

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<tr>
<th>Time</th>
<th>Panel</th>
<th>Title</th>
<th>Chair/Speakers</th>
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<tbody>
<tr>
<td>8:30 AM</td>
<td>W1-B.1</td>
<td>Risks from Ebola virus discharge from hospitals to sewer workers</td>
<td>Haas C, Rycroft T, Casson L, Bibby K Drexel University and University of Pittsburgh</td>
</tr>
<tr>
<td>9:10 AM</td>
<td>W1-B.3</td>
<td>Modeling the risk of human toxoplasma gondii infection through consumption of meat products in the United States</td>
<td>Pradhan A, Guo M University of Maryland, College Park</td>
</tr>
</tbody>
</table>

**Marina 3**
**W1-C Deterrence Analysis in Homeland Security and Defense**
Co-chairs: Richard John, Jinshui Cui

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<th>Time</th>
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<th>Title</th>
<th>Chair/Speakers</th>
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<tbody>
<tr>
<td>8:30 AM</td>
<td>W1-C.1</td>
<td>Deterrence: exploiting the connection between affect, risk perception and self-efficacy to demotivate an adversary</td>
<td>Burns W Decision Research</td>
</tr>
<tr>
<td>8:50 AM</td>
<td>W1-C.2</td>
<td>Defender-user coordination and attacker deterrence in a three-way behavioral cyber security game</td>
<td>Cui J, John R, Rosoff H University of Southern California</td>
</tr>
<tr>
<td>9:10 AM</td>
<td>W1-C.3</td>
<td>An interactive real-time behavioral game for cyber security</td>
<td>Kusumastuti S, Rosoff F, John R University of Southern California</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>W1-C.4</td>
<td>Behavioral experimentation of cyber attacker deterrence with deter testbed</td>
<td>Rosoff H, Gurey S, Nguyen K, John R University of Southern California</td>
</tr>
</tbody>
</table>

**Marina 4**
**W1-D The Economics of Health, Drugs, and Difficult Bugs**
Chair: Nellie Lew

<table>
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<tr>
<th>Time</th>
<th>Panel</th>
<th>Title</th>
<th>Chair/Speakers</th>
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<tbody>
<tr>
<td>8:30 AM</td>
<td>W1-D.1</td>
<td>Protecting patients from “Innocuous Drugs”: medical marketplace vs. FDA</td>
<td>Abdukadirov S Mercatus Center, George Mason University</td>
</tr>
<tr>
<td>8:50 AM</td>
<td>W1-D.2</td>
<td>As software eats the world, what happens to risk regulation?</td>
<td>Thierer A George Mason University</td>
</tr>
<tr>
<td>9:10 AM</td>
<td>W1-D.3</td>
<td>Economics of microinsurance</td>
<td>Hong J, Seog S* Daegu University and Seoul National University</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>W1-D.4</td>
<td>Calculating the Expected Net Present Value (ENPV) for the development of a rapid Point-of-Care diagnostic (POC) device for C. Difficile and Carbapenem-resistant enterobacteriaceae (CRE)</td>
<td>Jessup A, Sertkaya A*, Wong H HHS Office of the Assistant Secretary for Planning and Evaluation, Eastern Research Group, Inc.</td>
</tr>
</tbody>
</table>

**Marina 5**
**W1-E Symposium: Transparency and Uncertainty Analysis: Benefits and Pitfalls**
Chair: George Gray

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<th>Time</th>
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</thead>
<tbody>
<tr>
<td>8:30 AM</td>
<td>W1-E.1</td>
<td>Uncertainty analysis – a necessity for transparency</td>
<td>Foreman J ExxonMobil Biomedical Sciences, Inc.</td>
</tr>
<tr>
<td>8:50 AM</td>
<td>W1-E.2</td>
<td>Evidence based uncertainty analysis: what should Europe do?</td>
<td>Lofstedt R Kings College London</td>
</tr>
<tr>
<td>9:10 AM</td>
<td>W1-E.3</td>
<td>Uncertainty analysis to inform risk management</td>
<td>O’Connor R National Science Foundation</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>W1-E.4</td>
<td>Uncertainty according to EFSA</td>
<td>Sahlin U Lund University, Sweden</td>
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*Society For Risk Analysis Annual Meeting*
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<thead>
<tr>
<th>Time</th>
<th>Chamber</th>
<th>Session</th>
<th>Chair/Presenter(s)</th>
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<tbody>
<tr>
<td>8:30 AM – 10:00 AM</td>
<td>Nautilus 1</td>
<td>W1-F Storming the Risk and Decision Analysis Bastille with Information Infantry</td>
<td>Chair: Philip Howard</td>
</tr>
<tr>
<td>8:30 AM – 10:00 AM</td>
<td>Nautilus 2</td>
<td>W1-G Dose Response Modeling for Human Health Risk Assessment (III)</td>
<td>Co-chairs: John Lipscomb, Kenneth Bogen</td>
</tr>
<tr>
<td>8:30 AM – 10:00 AM</td>
<td>Nautilus 3</td>
<td>W1-H Vaccines and Risk: A global Perspective on Lessons Learned</td>
<td>Chair: Gary Marchant</td>
</tr>
<tr>
<td>8:30 AM – 10:00 AM</td>
<td>Nautilus 4</td>
<td>W1-I Symposium: Risk in the New ISO Regime</td>
<td>Chair: Charles Redinger</td>
</tr>
<tr>
<td>8:30 AM – 10:00 AM</td>
<td>Nautilus 5</td>
<td>W1-J From Seismicity to Pharmaceuticals: The Role of Trust</td>
<td>Chair: Christina Demski</td>
</tr>
</tbody>
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**Wednesday**

**8:30 AM** W1-F.1  
The value of privacy when data becomes commoditised: an experimental investigation  
Bryce C, Chmura T, Moore N  
University of Nottingham

**8:50 AM** W1-F.2  
Disaster event classification for population risk characterization using Twitter data  
Hunke J, Croitoru A  
George Mason University

**9:10 AM** W1-F.3  
Big data - connecting risk insights to business strategy  
Pierce A, Kipperman F, Hill T  
General Electric Co., Praedicat

**9:30 AM** W1-F.4  
Strategic-level cybersecurity risk assessment for decision-makers  
Howard P, Arimoto C  
ABS Group

**8:30 AM** W1-G.1  
Understanding the Database Uncertainty Factor (UFD)  
Hoang M, Gray G  
Department of Environmental and Occupational Health, GWU Milken Institute School of Public Health

**8:50 AM** W1-G.2  
Sustained oxidative stress and dysregulated adaptive hyperplasia: hypothesized threshold-like pathway for most chemically induced tumors  
Bogen K  
Exponent Health Sciences

**9:10 AM** W1-G.3  
Choosing effects and points of departure for Provisional Advisory Levels (PALs)  
Lipscomb J, Garrahan K, Nichols T  
U.S. Environmental Protection Agency

**9:30 AM** W1-G.4  
Low-dose extrapolation of the harmonic mean method for dose addition in mixtures risk assessment  
Swartout J  
US Environmental Protection Agency

**8:30 AM** W1-H.1  
Friend or foe? Challenges in influenza treatment and prevention  
Rath B  
Vienna Vaccine Safety Initiative

**8:50 AM** W1-H.2  
A Canadian national perspective on vaccine hesitancy: results of an online survey regarding a ‘wicked’ risk communication problem  
Driedger S, Greenberg J, Dubé E  
University of Manitoba, Carleton University and Institut National de Santé publique du Québec

**9:10 AM** W1-H.3  
Community risk perception of flu vaccination campaigns in New Zealand  
Gray L, MacDonald C, Mackie B, Paton D, Baker M, Johnston D  
University of Otago, Wellington

**9:30 AM** W1-H.4  
The patient voice in the 21st Century: are we listening?  
Holt D, Boudier F, et al., F  
Maastricht University

**8:30 AM** W1-I.1  
Using organizational objectives and context to drive risk management: risk in the new ISO regime  
Redinger C  
Redinger 360, Inc.

**8:50 AM** W1-I.2  
Risk in ISO 14001:2015 — environmental management  
Chaudhry R  
Becton Dickinson

**9:10 AM** W1-I.3  
Risk in ISO 45001:xxxx — occupational health and safety management  
Toy V  
US Technical Advisory Group to ISO 45001; formally with IBM

**9:30 AM** W1-I.4  
A registrar’s perspective on EHS risk management within the ISO paradigm  
Wecker-Seipke D  
BSI

**8:30 AM** W1-J.1  
Delivering energy transitions: the importance of trust  
Demski C, Evensen D, Pidgeon N  
Cardiff University

**8:50 AM** W1-J.2  
Medicines transparency and trust in Europe: results from 6 member state surveys  
Way D, Evensen D, Boudier F, Lofstedt R  
King’s College London

**9:10 AM** W1-J.3  
Communicating induced seismicity risk including low-probability high-consequence events and expert confidence: the cases of deep geothermal energy and shale gas  
Knoblauch T, Stauffacher M, Trufnevye E  
ETH Zürich

**9:30 AM** W1-J.4  
Societal acceptance of enhanced geothermal systems and their potential for induced seismic activity  
McComas K, Lu H, Keranen K, Furtney M, Song H  
Cornell University
10:30 AM – 12:10 PM

Marina 1
W2-A Repeated Hazards and their Influence on the Evolution of Regional Vulnerability
Co-chairs: Seth Guikema, Allison Reilly

10:30 AM W2-A.1
Beat the heat: a statistical analysis of the urban heat island
University of Michigan

10:30 AM W2-A.2
Agent-based modeling of repeated hazards: modeling to enhance inter-disciplinary collaboration
Guikema S, Reilly A
University of Michigan

11:10 AM W2-A.3
The role of risk perceptions in shaping coastal development dynamics
Magliocca N, Walls M*
Resources for the Future

11:30 AM W2-A.4
Higher ground: leveraging Baltimore’s topography to increase social and climate resiliency
O’Meara K, Zaitchik B, Ferreira C
Maryland Institute College of Art

11:50 AM W2-A.5
Identification of critical storms conditions for hurricane-induced coastal surge in the Mid-Atlantic Region
Melick K, Fu Z, Iguusa T*, Garzon J, Ferreira C
Dewberry, Johns Hopkins University, George Mason University

Marina 2
W2-B Hot Topics and Emerging Risks in Ecological Risk Assessment
Chair: Wayne Landis

10:30 AM W2-B.1
Methods development and environmental research on antibiotic uptake into food crops
Bartelt-Hunt S, Sallach J, Snow D, Li X, Hodges L
University of Nebraska-Lincoln and Michigan State University

10:50 AM W2-B.2
Biorisks — a generic risk assessment framework for organisms
Eleblu J, Danquah E, Dzidzienyo D, Bosompem K,Keese P
University of Ghana

11:10 AM W2-B.3
USDA regulation of confined field releases of genetically engineered organisms expressing pharmaceuticals
Viegais C, Rappaport K, Jones M
U.S. Department of Agriculture, Animal and Plant Health Inspection Service

11:30 AM W2-B.4
Requirements and schemes for the ecological risk assessment and adaptive management of gene drive organisms.
Lands W, Sawyer K
Western Washington University, The National Academies of Sciences, Engineering, and Medicine

Marina 3
W2-C Current and Future Global Catastrophic Risks
Chair: Anthony Barrett

10:30 AM W2-C.1
Technology forecasting for analyzing future global catastrophic risks
Barrett A, Baum S
Global Catastrophic Risk Institute and ABS Consulting

10:50 AM W2-C.2
Nuclear winter: science and policy
Frankel M, Scouras J
Johns Hopkins University Applied Physics Laboratory

11:10 AM W2-C.3
Nuclear autumn, deterrence, crisis stability and adversary models, tying them together to address a global catastrophic risk
Lahtrop J
Decision Strategies, LLC

11:30 AM W2-C.4
Value alignment for advanced machine learning systems as an existential priority
Tailer J, LaVictoire P, Critch A*
Machine Intelligence Research Institute

11:50 AM W2-C.5
Artificial general intelligence risk analysis
Yampolsky R
University of Louisville

Marina 4
W2-D Symposium: Burdens From Risk; Valuing Outcomes for Workers and the Public
Chair: Frank Heart

10:30 AM W2-D.1
Using attributable risk to assess the burden of worker injury and illness and prioritize research and prevention
Pana-Cryan R
National Institute for Occupational Safety and Health

10:50 AM W2-D.2
Application of health-related quality of life measures to foodborne risks
Hoffmann S
USDA Economic Research Service

11:10 AM W2-D.3
Measuring the benefits of FDA import inspections
McLaughlin C
U.S. Food and Drug Administration

11:50 AM W2-D.4
Valuing quality-adjusted life years for benefit-cost analysis
Hammitt J, Robinson L*
Harvard University

Marina 6
W2-E Symposium: Foundational Issues in Risk Analysis III
Chair: Myriam Merad

10:30 AM W2-E.1
Testing for resilience in energy scenarios: a summary of the National German Academies Report
Renn O, Dreyer M
Institute for Advanced Sustainability Studies (IASS)

10:50 AM W2-E.2
Reflections on assessment frameworks for safety and security risk prevention actions and public risk prevention policies
Merad Myriam, Aven Terje
INERIS

11:10 AM W2-E.3
Current changes in risk perspectives and understanding: implications for risk regulation
Rayksund M
University of Stavanger

11:30 AM W2-E.4
Vision Zero and the ALARP principle: can they be unified?
Soerskaar L, Abrahamsen E, Selvik J
University of Stavanger (UiS)

11:50 AM W2-E.5
Three risk conundrums in the design of development projects
Goble R, Carr E, Downs T
Clark University
**Wednesday**

**10:30 AM – 12:00 PM**

**Nautilus 1**

**W2-F Symposium: Advances in the use of Mechanistic Data in Evaluating Carcinogenic Risk**

Chair: Rita Schoeny

10:30 AM  **W2-F.1**
How well do High Throughput Screening (HTS) assay data predict in vivo rodent carcinogenicity of pesticides?
Cox T, Popken D, Kaplan A, Plunkett L*, Becker R
Cox Associates

10:50 AM  **W2-F.2**
Key characteristics of carcinogens as a basis for organizing data on mechanisms of carcinogenesis
US Environmental Protection Agency

11:10 AM  **W2-F.3**
A method for quantitative scoring of causality for side-by-side comparison of confidence for alternative MOAs (including case examples)
Becker R, Manibusan M
American Chemistry Council

11:30 AM  **W2-F.4**
Discussion

**Nautilus 2**

**W2-G Applied Exposure Assessment**

Chair: Tenaille Walker

10:30 AM  **W2-G.1**
Senior Director
Mason A, Howard B, Arnold S, Kingsbury T
American Chemistry Council

10:50 AM  **W2-G.2**
Assessing benzene exposures and risk among vehicle mechanics in the U.S. and abroad
Williams P
E Risk Sciences, LLP

11:10 AM  **W2-G.3**
The release of Nanoscale copper phthalocyanine from automobile coating and their transformation in environmental [freshwater] and biological [cell culture] media
Pang C, Neubauer N, Hristozov D, Marcomini A, Wolleben W
Ca Foscari University of Venice, Italy

11:30 AM  **W2-G.4**
Quantifying the environmental burden of cancer in Ontario, Canada
Greco S, Young S, MacIntyre E, Kim J, Candido E, Copes R
Public Health Ontario, Cancer Care Ontario

**Nautilus 3**

**W2-H New Molecular Data Streams as Drivers of Next Gen Risk Assessments**

Chair: Dominic Way

10:30 AM  **W2-H.1**
Molecular data is driving risk assessment changes for international and national decision making on health related subjects
Marchant G
Arizona State University

10:50 AM  **W2-H.2**
Molecular variability data streams are driving risk assessment changes for regulatory decisions on precision medicines and for personal injury lawsuits
Hartley K
LSP Group LLC

11:10 AM  **W2-H.3**
The epigenetic seed and soil model: a framework for understanding the role of environmental history in disease susceptibility and risk assessment
McCullough S
U.S. Environmental Protection Agency

11:30 AM  **W2-H.4**
Next generation human health decision-making incorporating population and inter-individual variability
Chiu H
Texas A&M University

**Nautilus 4**

**W2-I Maps, Graphs, and Tweets: Geospatial Elements of Risk Communication**

Chair: Julie Demuth

10:30 AM  **W2-I.1**
The influence of interactivity and uncertainty on reasoning with maps that depict an environmental hazard
Severtson D, Roth R, Sack C
Edgewood College

10:50 AM  **W2-I.2**
Communicating complex risk information to high and low numerates: the role of visual attention on relevant information and good instruction
Keller C
ETH Zurich

11:10 AM  **W2-I.3**
Examining the dynamic ways people evaluate and respond to evolving hurricane risks
National Center for Atmospheric Research

11:30 AM  **W2-I.4**
Next generation human health decision-making incorporating population and inter-individual variability
Chiu H
Texas A&M University

**Nautilus 5**

**W2-J Managing Crises: Institutions, Media Coverage, and Messaging**

Chair: Sara Goto

10:30 AM  **W2-J.1**
Institutional stereotypes in the context of trust in, and cooperation with, organizations facing hazard management decisions.
Johnson B, DeGarmo D
Decision Research, University of Oregon

10:50 AM  **W2-J.2**
How companies manage risks to their reputations: public perceptions of corporate behavior in response to controversies
Goto S, Sütterlin B, Arvai J
University of Michigan

11:10 AM  **W2-J.3**
Improving food safety crisis communications: an experimental study on public perception
Wu F, Hallman W
Rutgers University

11:30 AM  **W2-J.4**
Risk, media, and licorice: stakeholders' perceptions of and involvement in media coverage of the 2014 West Virginia water crisis
Simis Wilkinson M, M
University of Wisconsin-Madison
Wednesday

1:30 PM – 3:00 PM

Marina 1
W3-A Risk and Uncertainty Analysis: Applications in Hurricane Modeling and Cyber Security
Co-chairs: Allison Reilly, Giovanni Sansavini

1:30 PM W3-A.1
Identifying and managing cyber-physical risks in smart buildings
Crowther K
MITRE Corporation

1:50 PM W3-A.2
Subsidizing cybersecurity information sharing: a game between A Government and N Companies
Pala A, Zhuang J
University at Buffalo

2:10 PM W3-A.3
Modeling homeowner hurricane insurance purchasing behavior
Wang D, Davidson R, Trainor J, Nozick L, Kruse J
University of Delaware, Cornell University, East Carolina University

2:30 PM W3-A.4
Presenting the evolution of hurricane uncertainty over time with scenario-based hazard trees
Yang K, Davidson R, Nazick L, Blanton B, Blanton C
University of Delaware

1:30 PM – 3:00 PM

Marina 2
W3-B Symposium: Decision Making in Food Safety: Perspectives on Decision Analysis Approaches
Co-chairs: Moez Sanaa, Igor Linkov

1:30 PM W3-B.1
Structured decision making applied to wicked problems: using Bayesian belief networks to make decisions under uncertainty
Beaulieu S, Stockton T, Wind J
Neptune and Company, Inc., Partners in Sustainability Integration (PSI)

1:50 PM W3-B.2
Using FDA-iRISK® to quantify uncertainties in tiered and probabilistic ways and implications for decision making
Chen Y, Paoli G, Hartnett E, Ruthman T, Pouilot R*, Van Doren J, Dennis S
FDA/CFSAN

2:10 PM W3-B.3
From problems to solutions: experience feedback on the use of multiple criteria decision aiding methods to assess risks
Merad Myriam
INERIS

2:30 PM W3-B.4
Approaches for dealing with uncertainty and variability in decision analysis for food safety
Sanaa M
French Agency for Food, Environmental and Occupational Health & Safety

1:30 PM – 3:00 PM

Marina 3
W3-C Roundtable: Coming of Age of Social Sciences in Risk Research and Future Challenges
Chair: Andreas Klinke

Over many years, risk research and the application of risk analysis in practice have been hampered by a prevailing techno-scientific risk culture that natural-scientific and technical experts are capable to determine mathematically the probability of occurrence, measure potential damages and estimate the consequences of risks. Models and methods have been developed and refined that made hazards and threats look like be predictable and calculable. However, implications drawn from the notion of risk society made increasingly apparent that some human activities in modern societies bear risks which hazardousness might not only produce irrecoverable consequences, but also are not calculable and reasonably foreseeable because of cause-effect relationships that are spatially and timely unleashed as a result of a non-linear and stochastic nature. This led to a gradual paradigm shift and an increasing attraction of social sciences in research and its promise to go beyond the limits of traditional risk analysis. Today, social sciences are widely in use in academic risk research and socio-political practice. The social science perspective has transposed the techno-scientific thinking about risk and uncertainty. It has illuminated the explanatory power and infused interdisciplinary risk research and real world risk management. Far from being merely a social science accommodation to classical approaches of risk research, theories, concepts, analytical approaches and methods of disciplines, such as sociology, psychology, political science, human geography, and economics, create something new and innovative by crossing boundaries and lead to a fuller academic and public discourse, richer understanding, better analysis and deduced interpretations of how society and politics grasp risk and respond to it. The Round Table distills key developments and discourses in major social science domains, such as perception, communication, public participation, trust and governance, and discusses the most important research and practical trends and challenges for the future.

Participants:
• Robert Goble
• Katherine McComas
• Ortwin Renn
• Nick Pidgeon
• Michael Siegrist

1:30 PM – 3:00 PM

Marina 4
W3-D Symposium: Looking Back at the Hazard Analysis and Critical Control Point (HACCP) Revolution
Chair: Travis Minor

1:30 PM W3-D.1
A retrospective analysis of the costs and benefits of USDA’s meat HACCP rule
Restrepo B, Schuttringer E*
US Food and Drug Administration

1:50 PM W3-D.2
A retrospective analysis of procedures for the safe and sanitary processing and importing of fish and fishery products: the seafood HACCP rule
Marasteanu I, Sassi A
U.S. Food and Drug Administration

2:10 PM W3-D.3
A retrospective analysis of the costs and benefits of FDA’s juice HACCP rule
Minor T, Parrett M, Sassi A*, Vardon P
Food and Drug Administration

2:30 PM W3-D.4
Evolution of QMRAs in food safety decision-making: 20 years after the Hazard Analysis and Critical Control Point rule
KAUSE J
Food Safety and Inspection Service-USDA

Sponsored by:
The Economics and Benefits Analysis Specialty Group

1:30 PM – 3:00 PM

Marina 6
W3-E Symposium: Foundational Issues in Risk Analysis IV
Chair: Roger Flage

1:30 PM W3-E.1
Conceptualizing and handling uncertainty in predictive data models for risk analysis
Flage R, Guikema S
University of Stavanger (Roger Flage) and University of Michigan (SD Guikema)

1:50 PM W3-E.2
Robustness to uncertainty: What does it mean and how should we best deal with it in a risk management context?
Sahlin U, Aven T
Lund University, Sweden and University of Stavanger, Norway

2:10 PM W3-E.3
Thoughts on robust uncertainty analysis for infrastructure climate resilience investments
Francis R, Sahlin U, Schmitt K
George Washington University, Lund University, Concordia University

2:30 PM W3-E.4
Ensuring constant risk levels by anticipating the development of risk-increasing gaps between rules and practice
Bjørn K, Aven T
University of Stavanger
### Wednesday

<table>
<thead>
<tr>
<th>Time</th>
<th>Nautilus 1</th>
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<td>1:30 PM</td>
<td>W3-F.1</td>
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<td>W3-I.1</td>
<td>W3-J.1</td>
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<td>Co-chairs: Anne Smith, Tony Cox</td>
<td>Chair: Anne Bichteler</td>
<td>Chair: John Lathrop</td>
<td>Chair: Matthew Mayo</td>
<td>Chair: Piet Sellke</td>
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<td>1:30 PM</td>
<td>Rebuilding consistency between the health risk analyses for a NAAQS review and the rationale for the NAAQS decision</td>
<td>Development of an inhalation unit risk factor for cadmium</td>
<td>This roundtable advances the efforts of the Applied Risk Management Specialty Group to facilitate the transfer of established knowledge in risk management to applied users. At last year’s roundtable, an opportunity was identified to develop risk management “verification and validation” procedures, beginning with a set of core principles by which one can judge the quality of a risk management effort.</td>
<td>When are spatial exposure-response relations meaningful?</td>
<td>Use of indicators in the assessment of the resilience of critical infrastructures</td>
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<td>Statistical and model uncertainty in the estimated risk of lung function decrements due to ozone exposure</td>
<td>A novel benchmark dose estimation approach for continuous endpoints</td>
<td>The Applied Risk Management Specialty Group held an August webinar on this topic and is otherwise beginning a multi-year, SRA collaborative effort to develop Principles and Guidelines for Effective Risk Management. We define risk management as including risk identification, assessment, analysis and communication, all of those functions in the service of effective risk management. We are starting with statements on core values, principles, and contemporary challenges.</td>
<td>Positional uncertainty in imagery analysis: establishing historical site operations and evaluating land cover evolution in support of risk assessment</td>
<td>The crying gap in governance for building regional infrastructure resilience in extreme events</td>
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<td>W3-I.3</td>
<td>W3-J.3</td>
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<td>More objective causal interpretation of exposure-response data</td>
<td>Constrained multiple imputation by chained equations: a case study in estimation and modeling on data missing below the limit of detection.</td>
<td>Testing methods for conveying uncertainty on maps: a synthesis of five studies</td>
<td>Expert involvement in science development: [re-]evaluation of an early screening tool for carbon storage site characterization</td>
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<td>W3-H.4</td>
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<td>W3-J.4</td>
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<td>Approaches to characterizing model uncertainty</td>
<td>Advancing dose-response models to incorporate genetic and epigenetic data: use of Bayesian belief networks</td>
<td>Representing uncertainty in environmental decision support models: progress and illustrative case study in risk based decisionmaking</td>
<td>Resilience and terrorism: how to prepare the public</td>
<td>Resilience and terrorism: how to prepare the public</td>
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### Preliminary Program

**W3-F Symposium: Making Air Pollutant Risk Estimates Policy Relevant...**

*Co-chairs: Anne Smith, Tony Cox*

- **1:30 PM** W3-F.1
  - Rebuilding consistency between the health risk analyses for a NAAQS review and the rationale for the NAAQS decision
  - Smith A
  - NERA Economic Consulting

- **1:50 PM** W3-F.2
  - Statistical and model uncertainty in the estimated risk of lung function decrements due to ozone exposure
  - Glasgow G, Smith A
  - NERA Economic Consulting

- **2:10 PM** W3-F.3
  - More objective causal interpretation of exposure-response data
  - Cox T
  - Cox Associates and University of Colorado

- **2:30 PM** W3-F.4
  - Approaches to characterizing model uncertainty
  - Gray G
  - Department of Environmental and Occupational Health, GWU Milken Institute School of Public Health

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**W3-G Melding Dose-Response Relationships**

*Chair: Anne Bichteler*

- **1:30 PM** W3-G.1
  - Development of an inhalation unit risk factor for cadmium
  - Haney J
  - Texas Commission on Environmental Quality

- **1:50 PM** W3-G.2
  - A novel benchmark dose estimation approach for continuous endpoints
  - Chen Q, Shao K
  - Indiana University Bloomington

- **2:10 PM** W3-G.3
  - Constrained multiple imputation by chained equations: a case study in estimation and modeling on data missing below the limit of detection
  - Bichteler A, Wikoff D, Harris M
  - ToxStrategies, Inc.

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**W3-H Roundtable: Writing a Key Document : Principles and Guidelines for ERM**

*Chair: John Lathrop*

- **1:30 PM** W3-H.1
  - This roundtable advances the efforts of the Applied Risk Management Specialty Group to facilitate the transfer of established knowledge in risk management to applied users. At last year’s roundtable, an opportunity was identified to develop risk management “verification and validation” procedures, beginning with a set of core principles by which one can judge the quality of a risk management effort. The Applied Risk Management Specialty Group held an August webinar on this topic and is otherwise beginning a multi-year, SRA collaborative effort to develop Principles and Guidelines for Effective Risk Management. We define risk management as including risk identification, assessment, analysis and communication, all of those functions in the service of effective risk management. We are starting with statements on core values, principles, and contemporary challenges. Thus far, we have identified eleven domains of application (e.g. finance, governance) and twenty challenges associated with one or more of those domains. While that taxonomy is daunting, the mental discipline of developing principles and guidelines that address all of those challenges across all of those domains forces us to think at a very fundamental level. We will cover as many domains as we can with our current group, then invite others to participate in extending our work to other domains. We will conduct this roundtable as a working session, to acquire as many ideas as we can from all participants. The panelists will each pose key core values, principles, challenges and dilemmas we have thus far identified, then call for ideas and arguments from everyone in the room. One of our underlying agendas is to enlist others in our concept development and writing effort, in particular SRA members outside of our Specialty Group. As this effort grows, we seek to expand collaborations between SRA and allied organizations. All of the panelists have been active in writing the current draft of the document.

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**W3-I Symposium: Incorporating, Mapping, and Communicating Uncertainty in Geospatial Risk Analysis to Support Informed Decisions**

*Chair: Matthew Mayo*

- **1:30 PM** W3-I.1
  - When are spatial exposure-response relations meaningful?
  - Cox T
  - Cox Associates and University of Colorado

- **1:50 PM** W3-I.2
  - Positional uncertainty in imagery analysis: establishing historical site operations and evaluating land cover evolution in support of risk assessment
  - Mayo M, Ikeda S
  - Gradient

- **2:10 PM** W3-I.3
  - Testing methods for conveying uncertainty on maps: a synthesis of five studies
  - Severtson D
  - Edgewood College

- **2:30 PM** W3-I.4
  - Representing uncertainty in environmental decision support models: progress and illustrative case study in risk based decisionmaking
  - Stewart R, Morton A, Dolislager F
  - Oak Ridge National Laboratory

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**W3-J Symposium: Toward Resilient Government**

*Chair: Piet Sellke*

- **1:30 PM** W3-J.1
  - Use of indicators in the assessment of the resilience of critical infrastructures
  - Jovanovic A, Reno O, Linkov I
  - Steinbeis Adv. Risk. Technologies

- **1:50 PM** W3-J.2
  - The crying gap in governance for building regional infrastructure resilience in extreme events
  - McDaniels T
  - University of British Columbia

- **2:10 PM** W3-J.3
  - Expert involvement in science development: [re-]evaluation of an early screening tool for carbon storage site characterization
  - Scheer D, Konrad W, Class H, Kissinger A, Knopf S, Noack V
  - University Stuttgart - ZIRIUS

- **2:30 PM** W3-J.4
  - Resilience and terrorism: how to prepare the public
  - Sellke, Piet P
  - Dialogik
### Wednesday

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<tr>
<td><strong>W4-A Infrastructure Systems Resilience Modeling</strong></td>
<td><strong>W4-B Symposium: Risk-Based Approaches for the Safety of Food and Dietary Supplements</strong></td>
<td><strong>W4-C Recent Topics in Cyber Security</strong></td>
<td><strong>W4-D Public Sector and Transportation Risks</strong></td>
<td><strong>W4-E Managing Risks in Businesses and other Institutions</strong></td>
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<td>Chair: S. Chatterjee</td>
<td>Co-chairs: Eric Dube, Michelle Catlin</td>
<td>Co-chairs: Shaye Friesen, Diane Henshel</td>
<td>Chair: Ali Gungor</td>
<td>Chair: Helen Canjar</td>
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<td>Repair and replace? Protecting aging infrastructure from hazards and threats</td>
<td>Fit-for-purpose food safety risk assessments: leveraging available data to answer agency questions</td>
<td>Stochastic epidemiological model of the risk of malware propagation in heterogeneous networks</td>
<td>Pricing risk in benefit-cost analyses of public sector projects and regulations</td>
<td>A risk-based framework for issues management</td>
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<td>Alderson D, Bredecke J, Lin K Naval Postgraduate School</td>
<td>Catlin M, LaBarre D, Ebel E, Williams M, Golden N Food Safety and Inspection Service</td>
<td>Alexeev A, Henshel D, Cains M, Sun Q Indiana University</td>
<td>Moore M, Boardman A, Vining A, Simon Fraser University, University of British Columbia</td>
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<td>Exploring functional relationships among multiple infrastructure networks</td>
<td>Caffeine in energy drinks: how safe is it?</td>
<td>Modeling cybersecurity as a repeated contest</td>
<td>Challenges in risk-informed rule-making at the U.S. Department of Transportation</td>
<td>Resilience of gantt project schedules to emergent and future conditions</td>
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<td>Bridging sociotechnical networks for critical infrastructure resilience: South Korean case study</td>
<td>Nanoscale substances in food: small materials raise big questions</td>
<td>Modeling cyber security risk contributions from human factors</td>
<td>Challenges in risk-informed rule-making at the U.S. Department of Transportation</td>
<td>SAFER - Sensing Analytics for Emerging Risks</td>
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<td>Optimum post-disruption restoration for enhanced infrastructure resilience under uncertainty</td>
<td>Updating FDA/CFSAN’s guidance on ingredient safety assessment: the path forward for Redbook</td>
<td>Establishing resilient programs: using a risk based approach for informing the distribution of investments in public safety and security science and technology</td>
<td>Evaluation of bicyclist morbidity and mortality mitigation with crash imminent braking technologies</td>
<td>Can risk analysis improve with decision maker education and awareness?</td>
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<td>Fang Y, Sansavini G ETH Zurich</td>
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<td>Risk assessment principles for food ingredient safety</td>
<td>Cyber risk: malicious email attacks at a large organization</td>
<td>How to regulate for ‘black swan’ events? Capturing or illustrating the highly unlikely in a regulatory context</td>
<td>The use of scenarios to improve decision making through a better understanding of cognitive bias and mental models within a corporate environment</td>
<td>University of Northampton</td>
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<td>Pugh G The Coca-Cola Company</td>
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Wednesday

3:30 PM – 5:10 PM

**Nautilus 1**

**W4-F Health Risk Assessment and Decision Analysis**

*Co-chairs: Yun Lu, Francois Eisinger*

3:30 PM **W4-F.1**

From evidence based to preference based medicine

*Eisinger F*

*Paoli-Calmettes Institute Marseille, Aix Marseille Université, INSERM, France*

3:50 PM **W4-F.2**

Cleaning product ingredient safety initiative: development and application of an approach for high-throughput screening-level human health risk assessment for nearly 600 ingredients


*American Cleaning Institute, EA Engineering, Science and Technology, Soleil Consulting, Baylor University*

4:10 PM **W4-F.3**

Quantitative bias analysis for herpes zoster vaccine effectiveness study in the medicare population ages 65 years and older


*Food and Drug Administration, Acumen, Centers for Medicare & Medicaid, Emory University, Boston University*

4:30 PM **W4-F.4**

Supporting the prioritization of emerging animal health threats for the UK Department of Agriculture

*Montibeller G, Franco L*

*Loughborough University*

4:50 PM **W4-F.5**

Scientific criteria for the determination of endocrine-disrupting properties.

*Anyszchenko A*

*University of Copenhagen*

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3:30 PM – 5:00 PM

**Nautilus 2**

**W4-G Dose-Response Modeling for Human Health Risk Assessment (III)**

*Chair: Jessica Kratchman*

3:30 PM **W4-G.1**

Toxicity testing: are species and genders equally sensitive?

*Kratchman J, Wang B, Gray G*

*George Washington University, School of Public Health and Health Services*

3:50 PM **W4-G.2**

Development of an air pollutant dose response model for asthma incidents specific to Philadelphia for triple bottom line modeling

*Weir M, Borine M*

*Division of Environmental Health Sciences, College of Public Health, The Ohio State University*

4:10 PM **W4-G.3**

A Physiologically Based Pharmacokinetic (PBPK) model for PFDoDA in rats and humans

*Chimeddulam D, Wu K, Yu H*

*National Taiwan University*

4:30 PM **W4-G.4**

Case studies for neurotoxic chemicals

*Lynch M, Brown L, Chiger A*

*Abt Associates*

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3:30 PM – 5:10 PM

**Nautilus 3**

**W4-H Risk and Resilience**

*Chair: Alison Cullen, Luis Cifuentes*

3:30 PM **W4-H.1**

Resilient boulder: implementing the 100 resilient cities global network

*Guibert G*

*City of Boulder, CO USA*

3:50 PM **W4-H.2**

Public health co-benefits of climate change mitigation in the Philippines’ wastewater sector

*Belova A, Mills D*

*Abt Associates*

4:10 PM **W4-H.3**

Is social capital an important component of disaster resilience? A taxonomy clarifying inconsistency in empirical results

*MacGillivray B*

*Cardiff University*

4:30 PM **W4-H.4**

Policy implications of gender associated differences in risk attitudes and perceptions among farmers in Mali and Tanzania

*Cullen A, Anderson C, Biscaye P, Lawrence A, Sace R*

*Evans School, University of Washington*

4:50 PM **W4-H.5**

Addressing Sri Lanka’s public health crisis — employing a tiered investigation approach to pinpoint the risk factors associated with Chronic Kidney Disease of Unknown Etiology (CKDu)

*Redmon J, Womack D, Elledge M, Wanigasurya K, Wickremasinghe R, Levine K*

*RIT International, University of Sri Jayewardenepura, and University of Kelanyia*

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3:30 PM – 5:00 PM

**Nautilus 4**

**W4-I Public Engagement and Participatory Approaches to Research**

*Chair: Amanda Boyd*

3:30 PM **W4-I.1**

Scientists’ willingness to partake in public engagement as a function of controversy and riskiness

*Besley J, Yuan S, Dudo A*

*Michigan State University*

3:50 PM **W4-I.2**

Structured decision support for organic farmers: lowering barriers, clarifying trade-offs and linking risk management strategy performance to farmer values.

*Bessette D, Wilson R, Beaudrie C, Doohan D, Culman S*

*The Ohio State University*

4:10 PM **W4-I.3**

Assessing a participatory approach to risk communication: the case of lead exposure and inuit health

*Boyd A, Furgal C*

*Washington State University, Trent University*

4:30 PM **W4-I.4**

Modeling the effectiveness of outreach as a risk management tool

*Wilson R, Zhang W, Irwin E, Aloysius N, Martin J*

*The Ohio State University*

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3:30 PM – 5:10 PM

**Nautilus 5**

**W4-J Symposium: Vaccines and Risk: A Global Perspective on Lessons Learned 2**

*Chair: Kimberly Thompson*

3:30 PM **W4-J.1**

Polio eradication and the role of subpopulations for risk management

*Kratchman J, Wang B, Gray L, Heywood A, Roth B*

*University of Alberta*

3:50 PM **W4-J.2**

Developing an international strategy for determining the immunization risk communication needs of immigrant populations

*Jardine C, Boudor F, Driedger S, Turner N, Gray L, Heywood A, Roth B*

*University of Alberta*

4:10 PM **W4-J.3**

Refugee health — research and communication

*Rath B*

*Vienna Vaccine Safety Initiative*

4:30 PM **W4-J.4**

Will the world eradicate measles and rubella next?

*Thompson K*

*Kid Risk, Inc.*

4:50 PM **W4-J.5**

The effects of audience knowledge and risk perception as moderators for risk communication about vaccine safety

*Yuan S, Besley J*

*Michigan State University*