Society for Risk Analysis Annual Meeting

Risk and Resilience: Viva la Revolución!

Final Program

Sheraton San Diego • San Diego, California, USA
11-15 December 2016

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Sheraton San Diego

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On the cover: San Diego metropolitan area from Mt. Helix, 1971. Photograph courtesy of Dr. Philip R. Pryde, Professor Emeritus of Geography, San Diego State University.

Society For Risk Analysis Annual Meeting
2016 Final Program

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Meeting Highlights

Meeting Events! All events take place at the Sheraton San Diego.
You can start with a continuing education workshop, beginning at 8:00 AM Sunday (see pages 6-9), and then gather with everyone at the opening reception, 6:00-7:30 PM (cash bar), and continue through to the T-Shirt Giveaway on Wednesday (14 December, 5:00 PM). The meeting includes three Plenary Sessions, a complimentary box lunch on Monday, complimentary Awards Banquet luncheon on Tuesday and a sit-down luncheon on Wednesday, for which tickets are available for $25 from the registration desk until Monday afternoon. This luncheon precedes the Wednesday plenary, which is open to all! Join as we honor SRA luminary Paul Slovic and benefit from his unique insights on a deeply compelling topic that anchors the meeting theme.

Meeting Theme – *Risk and Resilience: Viva la Revolución!* highlights the peaceable revolution in science & technology innovation, participation of global citizens, and service – emphasizing advances that positively impact our health and well being, environment, and cultural and social responsibility.

Poster Reception! This year's poster reception with food and a cash bar will be in the Grande Ballroom on Monday evening 6:00-8:00 PM. Poster set up starts at 4:00 PM, and poster presenters will be at their posters for questions and discussion during the reception. Vote for the best poster awards on the App! Don't miss it!!

Oral Presenter Ready Room Reminder - See Page 10 for Hours

If you are presenting an oral presentation, don't forget to upload your presentation in the Speaker Ready Room (Marina 1) at least 24 hours prior to your presentation.
If you have already uploaded your presentation file, come by the Ready Room to ensure it has been received and uploaded correctly.

2016 Specialty Group Winners

Applied Risk Management
Daniel Hudson

Decision Analysis and Risk
Caitlin Hammond

Dose-Response
Qiran Chen

Ecological Risk Assessment
Maas Gardezi

Economics and Benefits Analysis
Meilin He

Emerging Nanoscale Materials
Vignesh Ramchandran

Engineering and Infrastructure
Travis Carless

Exposure Assessment
Hawk Arachy

Foundational Issues in Risk Analysis
Heimir Thorisson
Ricarda Scheele

Microbial Risk Analysis
Abhinav Mishra
Hao Pang

Risk and Development
Doris Jimena Roncancio Benitez

Risk Policy & Law
Caroline Leitschuh

Security & Defense
Jorge González

Student and International Travel Award Winners

Waldo Ahumada
Elizabeth Alves
Artem Anyshchenko
Zoya Banan
Christian Beaudrie
Myriam Beaudry
Djillali Benouar
Viktor Bergion
Sabine Bonneck
Helen Canjar
Travis Carless
Amaury Caruzzo
Alexandre Chabrelie
Kuan Ping Chao
Ann Charles
Kuo-Wei Chen
Yang-Ju Chen
Dalaijamts Chimeddulam
Yu-Chuan Chuang
Zachary Collier
James Ede
Daniel Eisenberg
John Eleblu
Rui Gaspar
Floris Goerlandt
Meilin He
Jason Holley
Hua Hsuan Hsing
Xi Hu
Jialing Huang
Tailin Huang
Shao Zu Huang
Jacqueline Hunke
Marketa Janickova
Khadija Khan
Kelly Klima
Jude Kurniawan
Xue Lei
En-Hsuan Lu
Hang Lu
Henry Lujan
Vineet Madasseri Payyappalli
Theodore Mansfield
Alyssa Mayeda
Abhinav Mishra
Alexis Mraz
Sithembiso Sifiso Msibi
Anne-Marie Nicol
Ali Pala
Shih-Chun Pan
Chengfang Pang
Roxana Prieto Recarey
Barbara Rath
Giovanni Sansavini
Ryan Scott
Piet Sellke
Molly Simis Wilkinson
Hwanseok Song
Elspeth Spence
Scott Thacker
Michele Toledo
Swathi Veeravalli
Nicolas Villalba
Yevheniya Volchko
Sarah Vos
Bairong Wang
Dong Wang
Christopher Wirz
Elizabeth Wooten
Charlene Wu
Fanfan Wu
Siyuan Xian
Kun Yang
Sherri Yeh
Hao Yin
Ming-Chien Yin
An Gie Yong
Shupei Yuan
Nagwan Zahry
Minxiang Zhang
Xiao Zhang
Conrad Zorn

Conference Events, Committee Meetings

Sunday 11 December

SRA Council Meeting
Noon–5:00 PM - *Spinnaker*

Editorial Staff Meeting
4:00–5:30 PM - *Seabreeze 1*

Editorial Board Meeting
5:30–6:30 PM - *Seabreeze 1*

SRA Welcome Reception – (cash bar)
6:00–7:30 PM - *Bayview Lawn*

Monday 12 December

New Member, Students/Young Professionals Breakfast
7:00–8:00 AM - Nautilus Foyer
All SRA Students, Young Professionals, and 2015 and 2016 New Members (badges with a New Member ribbon) are welcome to attend.

Finance Committee
7:00–8:30 AM - *Room 518*

Conferences and Workshops Committee
7:30–8:30 AM - *Room 514*

Publications Committee
8:00–8:30 AM - *Room 515*

Opening Plenary Session
8:30–10:00 AM - *Harbor Island Ballroom*

Specialty Group Meetings
Pick up your box lunch by the SRA registration desk
12:15–1:25 PM - *See page 4*

Membership Committee Meeting
5:00-6:00 PM - *Room 515*

World Congress Planning Meeting 2018 & 2021
5:00-6:00 PM - *Room 514*

Poster Reception
6:00–8:00 PM - *Grande Ballroom*

Tuesday 13 December

Audit Committee
7:00–8:00 AM- *Room 515*

Grad Student Breakfast
7:00–8:00 AM - *Room 514*

Regions Committee
7:30–8:30 AM - *Room 511*

Plenary Session
8:30–10:00 AM - *Harbor Island Ballroom*

SRA Awards Luncheon and Business Meeting
Noon–1:30 PM - *Harbor Island Ballroom*

Communications Committee
5:45–6:30 PM - *Executive Center Boardroom*

SRA Specialty Group Mixers
6:00–7:30 PM - *See page 4*

SRA Council Meeting
6:30–10:00 PM - *Marina 5*

Coordination Meeting: Specialty Group Chairs and Contributors to "Principles, Guidelines & Core Knowledge for Analytic Support of Risk Management"
7:35 PM - *Quinn's Ale House*

Wednesday 14 December

Education Committee Breakfast
7:00–8:00 AM - *Room 518*

DARSG/Springer Environment Systems & Decisions Editorial Board Meeting
7:30–8:30 AM - *Room 515*

Specialty Group Chairs Breakfast
7:30–8:30 AM - *Room 514*

Luncheon
Noon - *Harbor Island Ballroom*
$25, tickets available at the registration desk until Monday afternoon.

Plenary
12:30-1:25 PM - *Harbor Island Ballroom*

T-Shirt Giveaway
Stay until the end of the sessions and receive a T-Shirt
5:00 PM - *Bayview Foyer*

***** Two Lunches Included *****
in your Registration Fees
Monday Box Lunch, Tuesday Awards Banquet
Please see the Regsitration Desk
if you have dietary restrictions

All Meetings Are Open
All meetings announced in this program are open, everyone is welcome and encouraged to attend.

Committee Meetings and Events

Specialty Group Meetings

Monday, 12 December - 12:15-1:25 PM

All Specialty Group Meetings will take place during lunch time today. Pick up your box lunch near the registration desk and attend the meeting(s) of your choice.

12:15-12:35 PM

Dose Response - *Nautilus 2*
Economics & Benefits Analysis - *Marina 2*
Occupational Health & Safety - *Nautilus 5*
Risk Communication - *Nautilus 1*
Security & Defense - *Marina 6*

12:40-1:00 PM

Ecological Risk Assessment - *Nautilus 2*
Exposure Assessment - *Marina 2*
Foundations of Risk - *Nautilus 5*
Risk, Policy & Law - *Marina 6*
Risk & Development - *Nautilus 1*

1:05-1:25 PM

Applied Risk Management - *Nautilus 5*
Decision Analysis & Risk - *Nautilus 2*
Emerging Nanoscale Materials - *Marina 2*
Engineering & Infrastructure - *Marina 6*
Microbial Risk Analysis - *Nautilus 1*

Specialty Group Mixers

Tuesday, 13 December - 6:00-7:30 PM

Mixer 1 - DRSG, MRASG, EASG, ARMSG - *Room 511*
Mixer 2 - SDSG, DARSG, EISG, FRSG - *Room 514*
Mixer 3 - RCSG, OHSG, ERASG - *Room 515*
Mixer 4 - EBASG, ENMSG, RPLSG, RDSG - *Room 518*

Key to Specialty Group Designations

ARM = Applied Risk Management
DARSG = Decision Analysis and Risk
DRSG = Dose-Response
EASG = Exposure Assessment
EBASG = Economics & Benefits Analysis
EISG = Engineering and Infrastructure
ENMSG = Emerging Nanoscale Materials
ERASG - Ecological Risk Assessment
FRSG = Foundations of Risk
MRASG = Microbial Risk Analysis
OHSSG = Occupational Health & Safety
RCSG = Risk Communication
RDSG = Risk & Development
RPLSG = Risk, Policy and Law
SDSG = Security and Defense

Registration Desk Hours

Sunday 11 December	4:00 PM - 6:30 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 - 5:00 PM

Exhibitors

ICF International

9300 Lee Highway
Fairfax, VA 22031
703-934-3000
www.icf.com

ICF (NASDAQ:ICFI) is a global consulting and technology services provider with more than 5,000 professionals focused on making big things possible for our clients. We are business analysts, policy specialists, technologists, researchers, digital strategists, social scientists and creatives. Since 1969, government and commercial clients have worked with ICF to overcome their toughest challenges on issues that matter profoundly to their success. Come engage with us at icf.com.

Society of Benefit-Cost Analysis

c/o Evans School of Public Policy and Governance
University of Washington Box 353055, Parrington Hall, Room 303
Seattle, WA 98195-3055
206-616-4090
www.benefitcostanalysis.org

The Society of Benefit-Cost Analysis is an international, multi-disciplinary association working to promote and improve the theory and practice of benefit-cost analysis. Our members work in government, academia, nonprofits, and the private sector and address a wide range of policy issues.

Springer

233 Spring Street
New York, NY 10013
781-347-1835
www.springer.com

Springer is proud to publish the journal: Environment Systems and Decisions and the new book series: Risk Systems and Decisions. In 2017, ESD in collaboration with the SRA DARSG will be presenting a Best Paper Award. Please stop by our table and pick up more information about these exciting new publications.

Exhibition - Grande Ballroom A

Monday 12 December	12:00 PM -3:30 PM
Poster Reception (Grande Ballroom)	6:00 PM - 8:00 PM
Tuesday 13 December	9:30 AM - 4:00 PM
Wednesday 14 December	9:30 AM - 3:30 PM

UC Center for Risk Science (formerly TERA)

160 Panzeca Way
Cincinnati, OH 45267-0056
513-558-1034; Fax: 513-558-7199
med.uc.edu/eh/centers/tera

The University of Cincinnati's Center for Risk Science (formerly TERA) supports the protection of public health by developing, reviewing and communicating risk assessment values and analyses; improving risk methods through research; and, educating risk assessors, managers, and the public on risk assessment issues.

US EPA\ORD\NCEA

26 West Martin Luther King
Cincinnati, OH 45268
513-569-7697
www.epa.gov

EPA's National Center for Environmental Assessment (NCEA) is a leader in the science of human health and ecological risk assessment. NCEA addresses the needs of stakeholders by preparing technical reports and assessments that integrate and evaluate the most up-to-date research. These products serve as a major component of the scientific foundation supporting EPA's regulations and policies.

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. Reduced workshop costs are available to full-time students who are registered for attendance at the SRA Annual Meeting.

Workshop #	Workshop Title	Day/Time/Location	Cost
WK1S	Monte Carlo Simulation and Probability Bounds Analysis in R with Hardly Any Data	Sunday, December 11th 8:30 AM-5:30 PM Marina 2	$300
WK6S	Categorical Regression Modeling	Sunday, December 11th 8:30 AM-5:30 PM Marina 3	$300
WK7S	Probabilistic Dose-Response Assessment: New Guidance from the World Health Organization	Sunday, December 11th 8:30 AM-5:30 PM Marina 4	$300
WK8S	Cumulative Risk Assessment: Addressing Combined Environmental Stressors Impacts	Sunday, December 11th 8:30 AM-5:30 PM Nautilus 1	$350
WK9S	Methods for Quantifying and Valuing Population Health Impacts	Sunday, December 11th 8:00 AM-12:00 PM Nautilus 2	$275
WK10S	Eliciting Judgments from Experts and Non-experts to Inform Decision-making	Sunday, December 11th 8:00 AM-12:00 PM Nautilus 3	$250
WK11S	Exposure-Response Array Training	Sunday, December 11th 1:00 PM-5:00 PM Nautilus 2	$250
WK12T	Monte Carlo Simulation and Probability Bounds Analysis in R with Hardly Any Data	Thursday, December 15th, 8:30 AM-5:30 PM Marina 2	$300

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

Location: Marina 2; 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.

WK6S: Categorical Regression Modeling

Location: Marina 3; Cost: $300

Instructors: J. Allen Davis, U.S. EPA; Jeff Gift, U.S. EPA; Jay Zhao; U.S. EPA

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.

WK7S: Probabilistic Dose-Response Assessment: New Guidance from the World Health Organization

Location: Marina 4; 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

Location: Nautilus 1; 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.

MORNING WORKSHOPS
SUNDAY 11 December, 8:00 AM-12:00 PM

WK9S: Methods for Quantifying and Valuing Population Health Impacts

Location: Nautilus 2; 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

Location: Nautilus 3; 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 WORKSHOP
SUNDAY 11 December, 1:00-5:00 PM

WK11S: Exposure-Response Array Training

Location: Nautilus 2; 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 WORKSHOP
THURSDAY 15 December, 8:30 AM-5:30 PM

WK12T: Monte Carlo Simulation and Probability Bounds Analysis in R with Hardly Any Data

Location: Marina 2; 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.

In a deadly game of solitaire,
you must rank mortality risks
from small to large.

Do toys or terrorists kill more people?
Murder or suicide?
Radon or nephritis?

WARNING: Play leads to real knowledge
about comparative mortality risk.

Download on the App Store

GET IT ON Google play

Mortality: the Game is an experimental game based on the psychology of gamification and risk communication. It was created by Dan Bacon, a public policy game designer from Harvard, and Arden Rowell, a law professor who works on risk regulation. All research for the game is free and publicly available, including tips for other public policy game designers. Go to SSRN to download "Gamifying Risk Communication: The Game of Mortality."

All comments and questions welcome at
calculated-risk@outlook.com

Society for Risk Analysis (SRA) Membership Drive

Special Offer
2016 Annual Meeting, San Diego, CA
December 11-15, 2016

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*, pariticpate in scientific specialty groups, 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 a free 4 port hub for use with USB ports to all new members (pre-registrations included), as shown below. Pick yours up at the SRA Membership Booth at the Annual Meeting

Sign up Today!

Speaker Ready Hours

Sheraton San Diego - Marina 1

Sunday	3:00 PM - 8:00 PM
Monday	7:00 AM – 5:00 PM
Tuesday	7:00 AM - 5:00 PM
Wednesday	7:00 AM - Noon

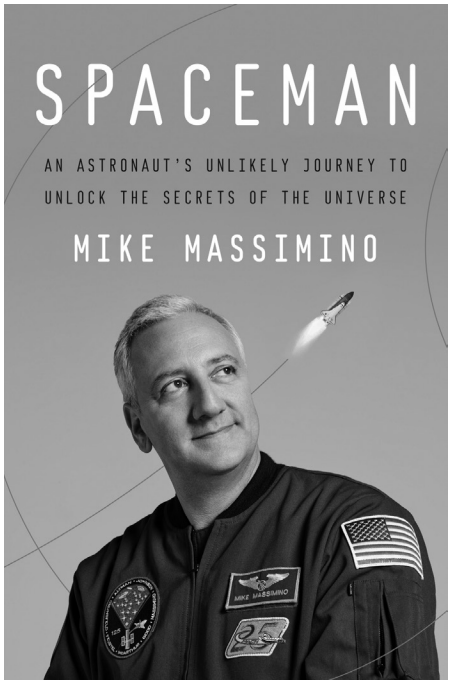
Mark your calendar!

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



PLENARY SESSIONS

All Plenary Sessions are held in the Harbor Island Ballroom

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

Resilience and Impact: Empowering Global Citizens

Millions of volunteers are collecting and synthesizing data for science, to better understand our planet and help address shared risks. And scientists, technologists, and engineers are engaging as global citizens, pursuing innovations that focus on community needs. Together, citizen scientists and scientist citizens are empowering people around the world to make an impact, for good.

Keynote Speakers:

- ★ Heather Fleming, *Founder and CEO, Catapult Design*
- ★ Darlene Cavalier, *Founder, SciStarter and Science Cheerleader, Arizona State University*

Moderator: Weihsueh Chiu, *Texas A&M University*

Tuesday 13 December, Morning Plenary, 8:00 – 9:45 AM

Collaborations and Explorations: From Earthly Challenges to Outer Space

National programs are working with interested communities to develop approaches and share information toward solving challenges such as managing spent fuel from decades of commercial electricity generation, and evaluating new chemicals. And we continue the scientific and social revolution ignited by Galileo, the Hubble, and more as we further explore our home, our universe, and beyond.

Keynote Speakers:

- ★ Andy Griffith, *Deputy Assistant Secretary, Spent Fuel and Waste Disposition, U.S. Department of Energy*
- ★ Gerlinde Knetsch, *Chemical Safety Division, German Environment Agency (Umweltbundesamt)*
- ★ Mike Massimino, *Hubble Astronaut, Extreme Engineering, Columbia University*

Moderator: Frank Hearl, *National Institute for Occupational Safety and Health*

Wednesday 14 December, Afternoon Plenary, 12:40 – 1:25 PM

Moral Deficiencies in the Arithmetic of Compassion

In many human and environmental crises, individuals and their governments exhibit a morally troubling response to the risk of mass casualties that can be described by the phrase "the more who die, the less we care." Three psychological mechanisms underlie this problematic "arithmetic of compassion" — psychic numbing, pseudoinefficacy, and the prominence effect. Ways to counteract these mechanisms are explored, as a roadmap for future research and its application to crisis management.

Keynote Speaker:

- ★ Paul Slovic, *Founder and President, Decision Research, University of Oregon*

Moderator: Margaret MacDonell, *Argonne National Laboratory*

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

8:30 AM-10:00 AM **Morning Plenary Session**, Resilience and Impact: Empowering Global Citizens, Harbor Island Ballroom
Keynote Speakers: Heather Fleming, Darlene Cavalier

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

	Marina 2	Marina 3	Marina 4	Marina 6	Spinnaker
10:30 AM-Noon	M2-A Power System Risk and Resilience	M2-B This is Roquette Science: Microbiological Produce Safety from Satellite Dish to the Dinner Table	M2-C Behavioral Issues in Risk Analytic Modeling for Security and Defense	M2-D Roundtable: Post-Election Prospects and Challenges for Risk Policy	M2-E Symposium: Foundational Issues in Risk Analysis I
Noon-1:30 PM	Pick up your box lunch near the Registration desk and attend the specialty group meeting(s) of your choice. **See page 4 for details.** 12:15 PM-12:35 PM - Dose-Response, Economics & Benefits, Occupational Health & Safety, Risk Communication, and Security & Defense Specialty Groups 12:40 PM-1:00 PM - Ecological Risk Assessment, Exposure Assessment, Risk Policy & Law, and Risk & Development Specialty Groups 1:05 PM-1:25 PM - Decision Analysis and Risk, Emerging Nanoscale Materials, Engineering & Infrastructure, and Microbial Risk Analysis Specialty Groups				
1:30 PM-3:00 PM	M3-A Symposium: Understanding Infrastructure Network Risks at National and Global Scales	M3-B Brave New World: Evolution & Revolution in Salmonella Risk Assessments	M3-C Presidental Roundtable: Cyber Risk Analysis	M3-D Symposium: Climate Change & Economic Analysis	M3-E Risk, Consequences, and Resilience of Cyber Infrastructure
3:00 PM-3:30 PM	**Coffee Break**				
3:30 PM-5:10 PM	M4-A Electric Power Systems Risk, Reliability and Interdependencies	M4-B Integrated Risk Assessment and Emerging Lines of Evidence to Address Uncertainty	M4-C Game Theory and Decision Analysis for Homeland Security and Defense	M4-D Symposium: The Global Burden of Food Borne Risk: Results and Lessons	M4-E Symposium: One Size Fits All? Challenges of Risk Governance

6:00 PM-8:00 PM **Poster Reception**, Grande Ballroom

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10:30 AM-Noon	M2-F Communicating Health Risks: Attitudes, Perceptions and Strategic Messaging	M2-G Low Dose Non-Monotonic Response, Bridging the Gap	M2-H Governing Interconnectedness of Multiple Risks	M2-I Symposium: The NFL As A Workplace: Uncertainties And Opportunities In Assessing And Managing The Health And Safety Risks Of Playing Professional Football	M2-J Poster Platform: Revolutions and Evolutions in Resilience
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1:30 PM-3:00 PM	M3-F Symposium: Can Principles of Risk Analysis Assist in the Development of Recommendations for Nutrient Intakes that Reduce the Risks of Chronic Diseases?	M3-G Exposure Assessment Methods & Models	M3-H Roundtable: Opportunities and Obstacles to More and Better Use of Risk Perspectives in Development Settings	M3-I Contaminants, Food Security, and GM Food Risks	M3-J Poster Platform: Disaster Communication: Terrorism, Flooding and Epidemics

3:00 PM-3:30 PM **Coffee Break**

3:30 PM-5:10 PM	M4-F Symposium: Alternatives Analysis for Safer Consumer Products: Exploring Decision Analytic Approaches to Reducing Risks in California	M4-G Exposure and Risks to Water Contaminants	M4-H Resilience vs Risk-Based Regulatory Approaches	M4-I Symposium: Integrating Cumulative Risk Assessment into Occupational Safety and Health	M4-J Symposium: Relationships between Climate Experiences, Risk Perceptions, and Beliefs around the World

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8:00 AM – 9:45 AM **Morning Plenary Session**, Collaborations and Explorations: From Earthly Challenges to Outer Space, Harbor Island Ballroom
Keynote Speakers: Andrew Griffith, Gerlinde Knetsch, Mike Massimino

9:45 AM-10:30 AM **Coffee Break**

	Marina 2	Marina 3	Marina 4	Marina 6	Spinnaker
10:30 AM-Noon	T2-A Developing Methods for Understanding Infrastructure Risk at Multiple Scales	T2-B Microbial Risks in the Environment: Are We In Hot Water?	T2-C Recent Topics in Homeland Security and Counter-terrorism	T2-D Roundtable: States as Risk Policy Innovators	T2-E Roundtable: The Risk Analysis Field/Science

Noon-1:30 PM **SRA Awards Luncheon and Business Meeting,** Harbor Island Ballroom
Includes all SRA Awards, and the 5 Best Poster Award Winners from Monday's Poster Reception. *(Included in Registration Fee)*

1:30 PM-3:00 PM	T3-A Energy Systems and Risk	T3-B Public Perception of Risk and Stakeholder Input	T3-C Symposium: Hazard Classification and Risk Assessment Frameworks for Nanomaterials	T3-D Symposium: Environment, Health Risk and Cost-Benefit Analysis	T3-E Symposium: Foundational Issues in Risk Analysis II

3:00 PM-3:30 PM **Coffee Break**

3:30 PM-5:10 PM	T4-A Flood Risk Modeling and Analysis	T4-B Would you like a side of Norovirus with that sandwich? Understanding Norovirus Transmission and Risk to Improve Risk Management in Retail Settings	T4-C Understanding Nanomaterial Health Risks	T4-D Revolutions in Benefits Analysis	T4-E Applying Risk Management to Hazards and Disasters

6:00 PM-7:30 PM **Specialty Group Mixers**

8:00 AM – 9:45 AM **Morning Plenary Session**, Collaborations and Explorations: From Earthly Challenges to Outer Space, Harbor Island Ballroom
Keynote Speakers: Andrew Griffith, Gerlinde Knetsch, Mike Massimino

9:45 AM-10:30 AM **Coffee Break**

	Nautilus 1	Nautilus 2	Nautilus 3	Nautilus 4	Nautilus 5
10:30 AM-Noon	T2-F Decision Tools for Managing Environmental Risks and Disasters	T2-G Symposium: To Vape or Not to Vape: Vaping and New Health Risks		T2-I Symposium: Toward a Common Language of Risk in Occupational Health and Safety, Part I	T2-J Predicting Climate Change Support and Action

Noon-1:30 PM **SRA Awards Luncheon and Business Meeting,** Harbor Island Ballroom
Includes all SRA Awards, and the 5 Best Poster Award Winners from Monday's Poster Reception. *(Included in Registration Fee)*

1:30 PM-3:00 PM	T3-F Symposium: Coastal Flood Risk and Resilience: Exploring the Effects of Sea Level Rise and Approaches to Mitigation for Coastal Communities	T3-G Dose-Response Modeling for Human Health Risk Assessment (I)	T3-H Where are Science and Risk Analysis Taking us on Gene Drives	T3-I Symposium: Toward a Common Language of Risk in Occupational Health and Safety, Part II	T3-J All About Energy

3:00 PM-3:30 PM **Coffee Break**

3:30 PM-5:10 PM	T4-F Risk and Resilience in Infrastructure Networks	T4-G Consumer Exposure and Tools	T4-H Policy and Risk Goverance Landscape Around Gene Drives	T4-I Symposium: European Perceptions of Climate Change	T4-J Symposium: US and UK Perceptions on Risk, Resilience, Fairness and Disproportionality in the Case of Fracking

6:00 PM-7:30 PM **Specialty Group Mixers**

	Marina 2	Marina 3	Marina 4	Marina 6	Spinnaker
8:30 AM-10:00 AM	W1-A Critical Infrasturcture Risk Management	W1-B What You Dont' Know Can Kill You: Emerging Disease Risk and Resilience	W1-C Deterrence Analysis in Homeland Security and Defense	W1-D The Economics of Health, Drugs, and Difficult Bugs	W1-E Symposium: Transparency and Uncertainty Analysis: Benefits and Pitfalls
10:00 AM-10:30 AM	**Coffee Break**				
10:30 AM-Noon	W2-A Repeated Hazards and their Influence on the Evolution of Regional Vulnerability	W2-B Hot Topics and Emerging Risks in Ecological Risk Assessment	W2-C Current and Future Global Catastrophic Risks	W2-D Symposium: Burdens From Risk: Valuing Outcomes for Workers and the Public	W2-E Symposium: Foundational Issues in Risk Analysis III
12:40 PM – 1:25 PM	**Afternoon Plenary**, Moral Deficiencies in the Arithmetic of Compassion, Harbor Island Ballroom Keynote Speaker: Paul Slovic				
1:30 PM-3:00 PM	W3-A Risk and Uncertainty Analysis: Applications in Hurricane Modeling and Cyber Security	W3-B Symposium: Decision Making in Food Safety: Perspectives on Decision Analysis Approches	W3-C Roundtable: Coming of Age of Social Sciences in Risk Research and Future Challenges	W3-D Symposium: Looking Back at the Hazard Analysis and Critical Control Point (HACCP) Revolution	W3-E Symposium: Foundational Issues in Risk Analysis IV
3:00 PM-3:30 PM	**Coffee Break**				
3:30 PM – 5:00 PM	W4-A Infrasturcture Systems Resiliense Modeling	W4-B Symposium: Risk-Based Approaches for the Safety of Food and Dietary Supplements	W4-C Recent Topics in Cyber Security	W4-D Public Sector and Transportation Risks	W4-E Managing Risks in Businesses and other Institutions
5:00 PM-5:30 PM	**T-Shirt Giveaway** - Registration Area Stay to receive a free T-Shirt!				

	Nautilus 1	Nautilus 2	Nautilus 3	Nautilus 4	Nautilus 5
8:30 AM-10:00 AM	W1-F Storming the Risk and Decision Analysis Bastille with Information Infantry	W1-G Dose Response Modeling for Human Health Risk Assessment (III)	W1-H Vaccines and Risk: A Global Perspective on Lessons Learned	W1-I Symposium: Risk in the New ISO Regime	W1-J From Seismicity to Pharmaceuticals: The Role of Trust
10:00 AM-10:30 AM	**Coffee Break**				
10:30 AM-Noon	W2-F Symposium: Advances in the use of Mechanistic Data in Evaluating Carcinogenic Risk	W2-G Applied Exposure Assessment	W2-H New Molecular Data Streams as Drivers of Next Gen Risk Assessments	W2-I Maps, Graphs, and Tweets: Geospatial Elements of Risk Communication	W2-I Maps, Graphs, and Tweets: Geospatial Elements of Risk Communication
12:40 PM – 1:25 PM	**Afternoon Plenary**, Moral Deficiencies in the Arithmetic of Compassion, Harbor Island Ballroom Keynote Speaker: Paul Slovic				
1:30 PM-3:00 PM	W3-F Symposium: Making Air Pollutant Risk Estimates Policy Relevant...	W3-G Melding Dose-Response Relationships	W3-H Roundtable: Writing a Key Document: Principles and Guidelines for Applied Risk Management	W3-I Symposium: Incorporating, Mapping, and Communicating Uncertainty in Geospatial Risk Analysis to Support Informed Decisions	W3-J Symposium: Toward Resilient Government
3:00 PM-3:30 PM	**Coffee Break**				
3:30 PM – 5:00 PM	W4-F Health Risk Asessment and Decision Analysis	W4-G Dose-Response Modeling for Human Health Risk Assessment (II)	W4-H Risk and Resilience in Development	W4-I Public Engagement and Participatory Approaches to Research	W4-J Symposium: Vaccines and Risk: A global Perspective on Lessons Learned 2
5:00 PM-5:30 PM	**T-Shirt Giveaway** - Registration Area Stay to receive a free T-Shirt!				

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Technical Program

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

10:30 AM – 12:10 PM

Marina 2

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
Watson J, Staid A, Silva-Monroy C, Bynum M, Arguello B, Singh B, Pierre B
Sandia National Laboratories

10:30 AM – 12:00 PM

Marina 3

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, Kowalcyk B, Van Doren J
FDA, 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, 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, NASA-GSFC, USDA-ARS, Colorado State University

10:30 AM – 12:10 PM

Marina 4

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 6

M2-D Presidential 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:

- Charles Haas, Drexel University
- James K. Hammitt, Harvard University
- Sally Kane, University of New South Wales
- Ragnar Lofstedt, Kings College London
- David Schkade, University of California - San Diego
- Jonathan Wiener, Duke University
- Richard Williams, George Mason University

Sponsored by:

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10:30 AM – 12:00 PM

Spinnaker

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

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
Michigan State University

10:30 AM – 12:00 PM

Nautilus 2

M2-G Low Dose Non-Monotonic Response, Bridging the Gap

Co-chairs: Jacqueline Patterson, Kun Don (Sue) Yi

10:30 AM **M2-G.1**
Concepts of 'low dose' and non-monotonic dose response in toxicological research and regulatory science: harmonization of terminology
Yi K
Syngenta Crop Protection, LLC

10:50 AM **M2-G.2**
The concept of hormesis and application in risk assessment
Dourson M
TERA Center, University of Cincinnati

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**
Strengths and weaknesses of low-dose observations and their relevance to human exposures and risk assessment
Schoeny R
Rita Schoeny 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, 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 – 12:10 PM

Nautilus 4

M2-I Presidential 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 we 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
University of Pennsylvania Law School,University 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: Matthew Wood

M2-J.3
Quantitative evaluation of organized disaster response capacity through functional exercises
Kato T, Koriyama 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-Marthaler L, Nelson K
Vanderbilt University

M2-J.5
Multi-asset protection and resilience assessment
Petit 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
Butler, Verner, Petit, Wall
Argonne National Laboratory

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

1:30 PM – 3:00 PM

Marina 2

M3-A Symposium: Understanding Infrastructure Network Risks at National and Global Scales

Co-chairs: Raghav Pant, Ed Oughton, Jonas Johansson

1:30 PM **M3-A.1**
Understanding risks in global infrastructure systems
*Thacker S, Hall J, Pant, R**
University of Oxford

1:50 PM **M3-A.2**
Societal consequences of multi-infrastructure disruptions: exploring Swedish national critical infrastructures
Johansson J
Lund University

2:10 PM **M3-A.3**
Cyber-attack risk and critical infrastructure: the economic impact of a cyber-attack on London's electricity distribution network
Oughton E, Skelton A, Kelly S, Leverett E, Thacker S, Pant R, Hall J
University of Cambridge

2:30 PM **M3-A.4**
Vulnerability of New Zealand transportation networks to disruptions in electricity supply.
Zorn C, Pant R, Thacker S, Shamseldin A
University of Auckland, University of Oxford

1:30 PM – 3:00 PM

Marina 3

M3-B Brave New World: Evolution & Revolution in Salmonella Risk Assessments

Co-chairs: Janell Kause, Elisabetta Lambertini

1:30 PM **M3-B.1**
Comparing health risk impacts of qualitative and semi-quantitative microbiological criteria for Salmonella in poultry
Lambertini E, Kowalcyk B, Thomas E, Ruzante J
RTI International

1:50 PM **M3-B.2**
The prevalence risk model as an alternative to traditional QMRA: application to estimating human food-borne Salmonella illness reduction after implementing new slaughter inspection
LaBarre D, Ebel E, Williams M, Disney W, Catlin M
Food Safety and Inspection Service

2:10 PM **M3-B.3**
Quantitative microbial risk assessment for Salmonella on sliced tomatoes
Charles A, Wang H, Ryser E, Schaffner D
Rutgers University, The State University of New Jersey

2:30 PM **M3-B.4**
Farm to fork quantitative microbial risk assessment of Salmonella on tomatoes
Todd-Searle J, Danyluk M, Schaffner D
Rutgers University

1:30 PM – 3:00 PM

Marina 4

M3-C Presidential Roundtable: Cyber Risk Analysis

Chair: Elisabeth Pate-Cornell

In this panel we will discuss the status of risk analysis in the field of cyber risk assessment and management. The focus will be not only on methods and techniques but also on the result of the analysis of real cases.

Participants:
- Elisabeth Pate-Cornell
- Marshall Kuypers
- Matt Smith
- Philip Keller

Department of Management Science and Engineering, Stanford University

1:30 PM – 3:00 PM

Marina 6

M3-D Symposium: Climate Change & Economic Analysis

Chair: Elisabeth Gilmore

1:30 PM **M3-D.1**
Benefit cost and distributional effects analysis for solar PV in the United States
Azevedo I, Vaishnav P
Carnegie Mellon University

1:50 PM **M3-D.2**
Using visualization science to diagnose and improve global change indicator understandability
Kenney M, Gerst M, Wolfinger J
University of Maryland

2:10 PM **M3-D.3**
Economic growth, armed conflict and the implications for climate change
Gilmore E, Hegre H
University of Maryland

2:30 PM **M3-D.4**
Markets, morals, and climate change
*Monast J, Murray B, Wiener J**
Duke University

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1:30 PM – 3:00 PM

Spinnaker

M3-E Risk, Consequences, and Resilience of Cyber Infrastructure

Chair: Tony Cheesebrough

1:30 PM **M3-E.1**
Reduced-form modeling of maritime cyber threats
Chen Z, Rose A, Wei D
University of Southern California

1:50 PM **M3-E.2**
Cost of cyber incidents
Livingston O, Shabat M, Cheesebrough T
Department of Homeland Security

2:10 PM **M3-E.3**
Towards modeling time-varying dependencies in cyber-physical infrastructure systems
Chatterjee S, Perkins C, Brigantic R, MacDonald D
Pacific Northwest National Laboratory

2:30 PM **M3-E.4**
Economic consequences of a Silicon Valley earthquake
Sue Wing I, Wei D, Rose A, Wein A*
University of Southern California

1:30 PM – 3:00 PM

Nautilus 1

M3-F Symposium: Can Principles of Risk Analysis Assist in the Development of Recommendations for Nutrient Intakes that Reduce the Risks of Chronic Diseases?

Co-chairs: Debra Kaden, Joseph Rodricks

1:30 PM **M3-F.1**
Nutrition evidence: what you see is not necessarily what you get
Bier D
Baylor College of Medicine

1:50 PM **M3-F.2**
Current realities and future options for using chronic disease endpoints to set Dietary Reference Intake (DRI) values
MacFarlane A
Health Canada

2:10 PM **M3-F.3**
Nutrient risk assessment: context, development and evolution
Taylor C
National Institutes of Health

2:30 PM **M3-F.4**
Modelling U-shaped exposure response curves
Krewski D
Ottawa University, Ontario, Canada

1:30 PM – 3:00 PM

Nautilus 2

M3-G Exposure Assessment Methods & Models

Chair: Chris Greene

1:30 PM **M3-G.1**
Assessing exposure from consumer product use: methods that have been developed to address manufacturer, consumer and agency concerns
Sheehan P, Kalmes R
Exponent

1:50 PM **M3-G.2**
Approaches for refining the assessment of short-term infrequent consumer exposures in a screening level risk assessment
Qian H, Dudzina T, Zaleski R, Foreman J, Adenuga D, Rodriguez C
ExxonMobil Biomedical Sciences, Inc.

2:10 PM **M3-G.3**
Are measured differences in pulmonary function "different"?
Belzer R, Lewis R
Good Intentions Paving Co., Exxon Mobil Biomedical Sciences, Inc.

2:30 PM **M3-G.4**
Improved accuracy for total dietary exposure estimates: estimation of food analyte mean concentrations for exposure assessment using a Dirichlet process.
Pouillot R, Gamalo M, Spungen J, Abt E, Van Doren J
Food and Drug Administration

1:30 PM – 3:00 PM

Nautilus 3

M3-H Presidential Roundtable: Opportunities and Obstacles to More and Better Use of Risk Perspectives in Development Settings

Co-chairs: Rob Goble, Luis Cifuentes

1:30 PM **M3-H.1**
Opportunities and obstacles to more and better use of risk perspectives in development settings
Goble R
Clark University

1:50 PM **M3-H.2**
What does transformative risk assessment practice look like for development?
Francis R
George Washington University

2:10 PM **M3-H.3**
Risk and development perspectives from the Southern Hemisphere
Cifuentes L
Pontificia Universidad Católica de Chile

2:30 PM **M3-H.4**
Managing complexity in socio-technical transitions
Schweizer V, Kurniawan J
University of Waterloo

1:30 PM – 3:00 PM

Nautilus 4

M3-I Contaminants, Food Security, and GM Food Risks

Chair: Louis Rivers III

1:30 PM **M3-I.1**
Genetic engineering, genetic modification, or agricultural biotechnology: does the term matter
Zahry N, Besley J
Michigan State University

2:10 PM **M3-I.2**
Participatory ensemble modeling to study the multiscale social and behavioral dynamics of food security in dryland West Africa
Rivers L, Ligmann-Zielinska A, Schmitt-Olabisi L, Du J, Marquart-Pyatt S
North Carolina State University

2:10 PM **M3-I.3**
Gut reactions to GMO foods: analyzing the interplay of attitudes, trust, and risk perceptions
Rose K, Su L, Wirz C, Brossard D, Scheufele D, Xenos M
University of Wisconsin-Madison

2:30 PM **M3-I.4**
A mental models approach to informing risk communication about contaminants in the Arctic
Furgal C, Boyd A
Trent University, Washington State University

1:30 PM – 3:00 PM

Nautilus 5

M3-J Poster Platform: Disaster Communication: Terrorism, Flooding and Epidemics

Chair: Heather Rosoff

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

3:30 PM – 5:00 PM

Marina 2

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

3:50 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

3:30 PM – 5:10 PM

Marina 3

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
Cains M, Henshel D, Fair P, Scott G, Landis W, Menzie C
Indiana University, NOAA, 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 Department of Agriculture

3:30 PM – 5:10 PM

Marina 4

M4-C Game Theory and Decision Analysis for Homeland Security and Defense

Co-chairs: Jun Zhuang, Vineet Madasseri Payyappalli

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 6

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, DeDevleesschauwer B, Bhavelaar A, Hald T
USDA Economic Research Service

3:50 PM **M4-D.3**
Global perspectives on foodborne chemical exposures
Gibb H, Devleesschauwer B, Bellinger D, Bolger P, Zang J, Carrington C, Cliff J, Zeilmaker M, Ezendam J, Wu F
Gibb Epidemiology Consulting LLC

4:10 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

4:30 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

Spinnaker

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, Danish Technical University

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

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**
Models of alternatives analysis: evaluating the evaluation
Malloy T
University of California, Los Angeles

3:50 PM **M4-F.2**
A toxicologist's view of alternatives assessment: challenges and opportunities
Lewandowski T
Gradient

4:10 PM **M4-F.3**
California's safer consumer products regulations: a regulatory framework that includes nanomaterials
Wong J
California Department of Toxic Substances Control

4:30 PM **M4-F.4**
High throughput screening tool for evaluating chemical toxicity risk based on chemical properties and human factors
Wood M, Larkin S, Linkov I
US Army Engineer Research & Development Center

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**
Addressing Colorado's public health concerns on the potential health risks of hydraulic fracturing through surveillance and science
McMullin T, Bamber A, Flores J, Vigil D, VanDyke M
Colorado Department of Public Health and the Environment

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

3:30 PM – 5:10 PM

Nautilus 3

M4-H Resilience vs Risk-Based Regulatory Approaches

Chair: Igor Linkov

3:30 PM **M4-H.1**
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

3:50 PM **M4-H.2**
Implementing resilience in regulatory law: procedural provisions
Stevens Y
Arizona State University

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

4:30 PM **M4-H.4**
Integrating resilience into mainstream regulation: a thought experiment
Malloy T
University of California, Los Angeles

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

3:30 PM – 5:10 PM

Nautilus 4

M4-I Symposium: Integrating Cumulative Risk Assessment into Occupational Safety and Health

Chair: Scott Dotson

3:30 PM **M4-I.1**
Connecting cumulative risk and total worker health
Chosewood K
National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention

3:50 PM **M4-I.2**
Efforts to address the challenges of integrating occupational risk analysis and cumulative risk assessment
Dotson G
Centers for Disease Control and Prevention (CDC)/National Institute for Occupational Safety and Health (NIOSH)

4:10 PM **M4-I.3**
Drivers for occupationally-focused cumulative risk assessments
Lentz T
National Institute for Occupational Safety and Health

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**
A replication and extension of the socio-psychological model of climate change risk perceptions
Brügger A, Tobias R, Monge F
Cardiff University

3:50 PM **M4-J.2**
Farmer experiences and perceptions of climate change influence adaptive behaviors
Niles M
University of Vermont

4:10 PM **M4-J.3**
Experiences of extreme weather, belief bias and perceived climate change risks
Pidgeon N, Sposato R, Capstick S, Demski C, Spence A
Cardiff University, Alpen-Adria Universität, Austria, University of Nottingham

4:30 PM **M4-J.4**
Flood experience, community involvement and climate change risk perception in coastal and delta communities
Poortvliet P, Ngo C, Feindt P
Wageningen University

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

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
Goerlandt F, Tabri K, Aps R, Höglund A, Lensu M, Rytkönen J
Aalto University

P.5 Estimation of human risks induced by chemical accidents
Murayama T, Toshida 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
Pan S, Huang C, Ho W, Chen B, Guo Y
National Taiwan University

P.7 Creation of REDESASTRE 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
Gradient 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, Guikema 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
Sridharan S, Mangalam S, Wiersma R, Ravindran K, Reid D, Larez J*
Technical Standards and Safety Authority

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, Castellino A, Pham P, Mangalam S*
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 (Aiba) 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

Decision Analysis & Risk

P.22 Prioritizing chemical residue testing in meat, poultry, and egg products
Ward L, LaBarre D, Duverna R, Muniz Ortiz J, Kishore R, Kause J, Catlin M
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, Carmona Holley J*
ITESO University

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

P.26 Race/ethnicity and climate change polarization: evidence from a U.S. survey experiment
Schuldt J, Pearson A
Cornell University

P.27 Putting on your thinking cap: completing a warm-up reasoning task produces critical but biased evaluations of scientific evidence
Drummond C, Fischhoff B
Carnegie Mellon University

P.28 Public perceptions of clean energy technologies
Abdulla A, Vaishnav P
UC San Diego, Carnegie Mellon University

P.29 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, Oak Ridge National Laboratory

P.30 Adversarial hypothesis testing
González-Ortega J, Ríos Insua D, Cano J
Instituto de Ciencias Matemáticas and Universidad Rey Juan Carlos

P.31 Implementation of a decision support tool for sustainable remediation in practice - lessons learned
Norrman J, Söderqvist T, Volchko Y, Rosén L, Franzén F
Chalmers University of Technology, Enveco Environmental Economics Consultancy

P.32 Is sustainable remediation of contaminated land more efficient?
Anderson R, Norrman J, Rosén L, Volchko Y
Chalmers University of Technology

6:00 PM – 8:00 PM

Poster Reception

Grande Ballroom

P.33 Developing a predictive model to detect mishandling in the self-reported water discharge data
Hatami P, Mitchell J, Nejadhashemi A, Gibbs C, Rivers L
Michigan State University, North Carolina State University

P.34 VRAKA — a method for environmental risk assessment of potentially polluting shipwrecks
Landquist H, Rosén L, Lindhe A, Hassellöv I
Chalmers University of Technology

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.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
Brondum 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 D, Lange S, Haney J, Honeycutt M
Texas Commission on Environmental Quality

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

Ecological Risk Assessment

P.53 National-level evaluation of pesticide risks to endangered and threatened species
Rossmeisl 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 toxicology in cetaceans
Rosenstein A, Collier T
Independent Consultant

Economics and Benefits Analysis

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

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, Kärrman 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, Enveco Environmental Economics Consultancy, Geological Survey of Sweden

P.59 The long and winding road: controlling CO_2 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
Zhang W, Zhen G, Chen L, Wang H, Li Y, Ye X, Tong Y, Zhu Y, Wang X*
East Tennessee State University

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

Emerging Nanoscale Materials

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

Engineering and Infrastructure

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

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
Abualfaraj N, Gurian P, Olson 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
Chen C, Wang Y, Wang S, Huang P, Chen M, Hsiung A
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
Lewis R, Singhal A, Gauthier A, Kalmes R, Sheehan P
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, Bolus K, Walker S
University of Tennessee, Oak Ridge National Laboratory, US EPA

P.85 Probabilistic health risk assessment of 2-amino-3,4-dimethylimidazo [4,5-f] quinoline on fish consumption
Msibi 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
*Piotrowski A, De Guidici P, Soledano B, Payre C, Cabanes P**
EDF

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 maliec and fumaric acid in Taiwanese adult population via LC-MS/MS and Bayesian Statistic Markov chain Monte Carlo Simulation
Wu C, Shih I, 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 Paulo

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

Foundational Issues in Risk Analysis

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, Villalba N, Muñoz F
Universidad de los Andes

P.98 Realizing disaster causation: critical realism as an underpinning philosophy for disaster risk analysis
Huang T
Department of Urban Planning, National Cheng Kung University

P.99 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

P.102 Evaluation of Salmonella survival and growth in rehydrated dry pet food
Qu Y, Lambertini 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, Lambertini 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
Tsunemi K, Kato E, Kawamoto A, Kihara 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

Potpourri/Other

P.112 Regulatory risk assessor 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 ciberbullying 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

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

P.119 "Weather Whiplash" — an analysis of alternating hydrologic events 1960 to 2014 and the associated representation of risk.
Trumbo C, Peek L, Laituri M, Schumacher R, Mokry 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, Hamm J, 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.131 Differences in risk perceptions about medical practices among general people and health professionals
Yuko A
Tokaigakuin University

P.132 IPCC reports on climate change and media : comparing media coverage of IPCC AR4 and AR5
Aoyagi M
National Institute for Environmental Studies

P.133 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.134 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.135 Investgating risk communications at Fukushima-Daiichi NPP accident
Tsuchida S
Kansai University

P.136 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.137 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.138 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.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, Pinsent C, 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
Vos S, Sutton J, Olson M
University of Kentucky

P.148 The chronological change of consumer anxieties and concerns related with radioactive contamination of foods in Japan: applying the text mining approach
Yamaguchi H, Shintani K, Hamada 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.155 Social vulnerability and the occurrence of gastrointestinal diseases associated with precipitation seasons in São Paulo, Brazil.
Roncancio Benitez D, Nardocci A
University of Sao 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

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 (GREAT): 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
Kojima N, Tokai A, Machimura T, Xue M, Zhou L, Todoroki A, Ebisudani M
Osaka University

Security and Defense

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
Sam Houston State University

P.166 Water stability index for risk identification within transboundary river basins
Hamilton M, Speight H, Hunke J, Voyadgis D, Veeravalli S, Becker S, Lyon S
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
Richter B, Wilson P, Hawkins B, Winkel D, Whittaker I, Gooding R, Bradley D, Cox J
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 Landingham C, McClellan R**
Private Consultants

Works-In-Progress

P.171 Aviation security: examining the effects of agent and screening procedure on perceptions of risk, safety, and fairness
Nguyen K, John R
University of Southern California

P.173 Factors that influence public perspectives of energy development in canada: Results of a national survey on climate change and energy systems
Joo J, Mayeda A, Chakrabarti K, Wang T, Song X, Hmielowshi J, Boyd A*
Washington State University

P.174 Futuristic risk assessment for coastal flooding in changing climate era: A case of Ernakulam, India
Walia A
Centre For Disaster Management, LBSNAA

P.175 Disaster risk management in India and Iran: Conceptual framework for disable sensitive drm planning
Walia A, Ardalan A, Patrick V, Singh S*
CDM, LBSNAA, TUMS, HHI, Harvard, UNICEF

P.176 Cognitive sophistication and learning about risk from experience
Royal A
Resources for the Future

P.177 Opening the black boxes of sustainability management: How metrics frame decisions?
Stoycheva S
Ca˙ Foscari University of Venice, Italy

P.178 Comparing urban and rural vulnerability to heat-related mortality: A systematic review and meta-analysis
Li Y, Odame E, Zheng S, Silver K
East Tennessee State University

P.179 Modeling growth models of media attention and public attention during disasters
Li J
University of Science and Technology of China

P.180 Analysis of the Corpus Christi refinery row public health assessment
Lange S, Jones L, Haney J, McCant D, Schaefer H, Phillips T, Honeycutt M
Texas Commission on Environmental Quality

P.181 The open data for resilience initiative: Approaches for making risk analysis more transparent, inclusive, and effective
Soden R, Balog S, Deparday V
World Bank

P.182 Air quality and unconventional oil and natural gas development: A systematic review of the literature from a public health perspective
*Naufal Z, Blake U**
American Petroleum Institute

P.183 Guiding versus choosing: The role of life cycle assessment in US state level policymaking
Scott R, Cullen A
University of Washington

P.184 Quantity neglect in judgments of the ecological impact of "green"consumer goods
Kim B, Schuldt J
Cornell University

P.185 The role of systematic review in risk assessment — the missing link between the objectivity and transparency of scientific evidence and confidence of regulatory decisions.
Tsaioun K, Stephens M, Hoffmann S, Maertens A, Busquet F, Hartung T
EBTC and CAAT Johns Hopkins Bloomberg School of Public Health

P.186 Combined incremental lifetime cancer risk for nitrosamines: A comparison of combustible cigarette and e-cigarette emissions
Fiebelkorn S, Meredith C
British American Tobacco, Research and Development, Southampton, Hampshire, United Kingdom

P.187 Accidents risk assessment on China petroleum and chemical enterprises
Zhao Y
Peking University

P.188 Reactions to terror: In the air and on the ground
Baucum M, Rosoff H, John R
University of Southern California

P.189 Integrated microbial risk assessment of infection by Giardia and Cryptosporidium from drinking water delivered by eleven surface water systems in Sao Paulo State, Brazil
Razzolini M, Lauretto M, Sato M, Nardocci A
University of Sao Paulo and CETESB

P.190 Making the case for watches, warnings, and advisories: Results from a case study analysis of NWS forecasters and partners
Eosco G
Eastern Research Group

P.191 Background radiation dose and cleanup criteria
Yu C
Argonne National Laboratory

P.192 An economic lab experiment to compare the risk and productivity between parallel and series production systems
Akai K, Makino R, Takeshita J, Kudo T, Aoki K
Shimane University

P.193 Persistence and stability of large-scale command and control networks
Ganin A, Kitsak M, Eisenberg D, Alderson D, Linkov I
US Army Engineer Research and Development Center, University of Virginia, Northeastern University, Arizona State University, Naval Postgraduate School

P.194 Meta-analysis of cancer in petroleum refinery workers
Schnatter A, DeVilbiss E, Chen M
ExxonMobil Biomedical Sciences, Inc.

P.195 Influence of risk perception on attitudes and norms regarding electronic cigarettes.
Trumbo C
Colorado State University

P.196 Investigating a system-theoretic framework for mitigating complex risks in international transport of spent nuclear fuel
Williams A, Jones K, Osborn D, Kalinina E, Mohagheghi A, Parks J*
Sandia National Laboratories

P.197 A model for coupled population and infrastructure growth
Snell M, Eisenberg D
Arizona State University

P.198 Multilayer command and control networks
Eisenberg D, Kitsak M, Ganin A, Linkov I, Alderson D
Arizona State University

P.199 Developmental toxicity assessment of various sizes of multi-wall carbon nanotubes in mice after repeated intratracheal instillation to initiate grouping and read across
*Kobayashi N, Tanaka S, Ikarashi Y, Hirose A**
National Institute of Health Sciences

P.200 Risk choices of farms under the 2014 farm bill
Liu X, Goodman T
Fort Valley State University

P.201 Probabilistic risk assessment of the exposure to chlorpyrifos from some edible herbal medicine
*Chang B, Chen Y, Wu K, Chiang S**
China Medical University

P.202 Risk perceptions and behavioral adaptations to coupled environmental hazards in Phoenix, AZ
Chakalian P, Larsen L, Gronlund C, Stone B
Arizona State University, University of Michigan, Georgia Institute of Technology

10:30 AM – 12:00 PM

Marina 2

T2-A Developing Methods for Understanding Infrastructure Risk at Multiple Scales

Co-chairs: Cameron MacKenzie

10:30 AM **T2-A.1**
Estimating mean time to failure based on survey data: application to hybrid vehicles
Lei X, MacKenzie C
Iowa State University and IMSE

10:50 AM **T2-A.2**
Modelling systemic criticalities and risks in multi-modal transport networks at the national scale
Pant R, Hall J
University of Oxford

11:10 AM **T2-A.3**
Modeling the risk of interdependent infrastructure systems: an analysis of water and energy systems under climate change uncertainty
Baroud H
Vanderbilt University

11:30 AM **T2-A.4**
Understanding the economic impacts of climate change in China and the implications on the Chinese infrastructure system: a case study of flooding
Hu X, Surminski S, Hall J, Pant R
University of Oxford

10:30 AM – 12:00 PM

Marina 3

T2-B Microbial Risks in the Environment: Are We In Hot Water?

Chair: Emma Hartnett

10:30 AM **T2-B.1**
Exploring climate and climate change impacts on the risks from drinking water
Hartnett E, Wilson M, Comer N, Auld H, Sparling E, Smith B
Risk Sciences International; Public Health Agency of Canada

10:50 AM **T2-B.2**
Development of a combined growth and persistence model for legionella pneumophila in biofilms in drinking water for QMRA models
*Kopeck K, Weir M**
Division of Environmental Health Sciences, College of Public Health, The Ohio State University

11:10 AM **T2-B.3**
Quantitative microbial risk assessment of Legionella and Mycobacterium avium in harvested rainwater
Hamilton K, Haas C, Ahmed W
Drexel University

11:30 AM **T2-B.4**
Modeling risks from VTEC across multiple pathways
*Chapman B, Pintar K, Smith B**
Public Health Agency of Canada

10:30 AM – 12:10 PM

Marina 4

T2-C Recent Topics in Homeland Security and Counter-terrorism

Chair: Henry Willis

10:30 AM **T2-C.1**
Risk reduction via organoleptics?
Brevett C, Cox J
Department of Homeland Security, Chemical Security Analysis Center

10:50 AM **T2-C.2**
Overview of the Explosives Terrorism Risk Assessment (ExTRA)
Gooding R, Bradley D
DHS Chemical Security Analysis Center

11:10 AM **T2-C.3**
Modeling exposures in chemical release in indoor building scenarios using a 3 zone concept
*Wilson P, Hawkins B, Winkel D, Whittaker I, Gooding R, Bradley D, Cox J, Hauser K**
Battelle Memorial Instituite

11:30 AM **T2-C.4**
Quantifying risk of terrorist transfers
Powers D, Howard P
ABS Consulting Inc.

10:30 AM – 12:00 PM

Marina 6

T2-D Roundtable: States as Risk Policy Innovators

Chair: Sandra Hoffmann

The purpose of this roundtable is to discuss the role of states in risk policy innovation. Political scientists studying the role of states as sources of policy innovation have found that California has been a leader in policy innovation for the past century and that that role has only grown stronger in recent years. The roundtable will look at a number of recent risk policy innovations in California and discuss the process of policy innovation and diffusion using recent California examples to provide specific context for discussion, such as climate change (California's carbon cap and trade program), energy efficiency, water resources policy, agricultural use of antibiotics, and air quality. Speakers will include people from state government, NGOs and academia.

Sponsored by:
The Economics and Benefits Analysis Specialty Group

10:30 AM – 12:00 PM

Spinnaker

T2-E Roundtable: The Risk Analysis Field/Science

Chair: Terje Aven

As a professional activity, risk analysis (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?

Participants:

- Aven T
- Guikema S
- Schweizer PJ
- Thompson KM
- McComas K
- Alderson D
- Bouder F

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

Chair: Tee Guidotti

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 beween speaking technical and hearing personal
Boelter F
RHP Risk Management Inc

Co-sponsored by:
Occupational Health and Safety Specialty Group, Risk Communication Specialty Group, Foundational Issues in Risk Analysis Specialty Group

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
*Crosman 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

1:30 PM – 3:00 PM

Marina 2

T3-A Energy Systems and Risk

Chair: Kristen Schell

1:30 PM **T3-A.1**
Incorporating renewable generation risk and reliability measures into electricity system planning
Schell K, Guikema S
University of Michigan

1:50 PM **T3-A.2**
Evaluating the cost, safety and proliferation risks of small floating nuclear reactors
Ford M, Abdulla A, Morgan M
Carnegie Mellon University, UC San Diego

2:10 PM **T3-A.3**
Critical assessment of the foundations of power transmission and distribution reliability metrics and standards
Nateghi R, Guikema S, Wu Y, Bruss B*
University of Michigan

2:30 PM **T3-A.4**
Correlated power plant failures in North America
Murphy S, Apt J
Carnegie Mellon University

1:30 PM – 3:10 PM

Marina 3

T3-B Public Perception of Risk and Stakeholder Input

Chair: Patricia Nance

1:30 PM **T3-B.1**
Perceptions of environmental and social-psychological risk on the periphery of the Bakken Shale
Junod A, Jacquet J
The Ohio State University

1:50 PM **T3-B.2**
Stakeholder perceptions of water systems and hydro-climate information in Guanacaste, Costa Rica
Babcock M, Wong-Parodi G, Small M, Grossmann I
Carnegie Mellon University

2:10 PM **T3-B.3**
Upper Midwestern conventional farmers' perceived vulnerability to extreme precipitation event: a spatial analysis
Gardezi M, Arbuckle J
Iowa State University

2:30 PM **T3-B.4**
Improving invasive species management using risk analysis: the case of Asian carp
Kokotovich A, Andow D
University of Minnesota

2:50 PM **T3-B.5**
The tragedy of the anti-commons: a solution for coordination failures in for a "NIMBY" post-industrial world
Palma-Oliveira J, Trump B, Wood M, Linkov I
University of Lisbon

1:30 PM – 3:00 PM

Marina 4

T3-C Symposium: Hazard Classification and Risk Assessment Frameworks for Nanomaterials

Co-chairs: Jo Anne Shatkin, Christie Sayes

1:30 PM **T3-C.1**
Tiered testing of Nano-TiO2 release potential from self-cleaning concrete under a modeled scenario
*Kennedy A, Diamond S, Poda A, Weiss C, Brame J, Torres Cancel K, Melby N, Lackey T, Harrison D, Moser R, Rycroft T**
Army Engineer Research and Development Center

1:50 PM **T3-C.2**
Developing DoD guidance for evaluation of engineered nano materials during the systems acquisition process
Rak A, Underwood P, Shatkin J
Noblis, Department of Defense, Vireo Advisors

2:10 PM **T3-C.3**
Evaluating the current evidence for hazard- and risk-based OEL categories of nanomaterials
Kuempel E
National Institute for Occupational Safety and Health

2:30 PM **T3-C.4**
State-of-the-art nano risk assessment frameworks and their relevance for decision making
Ede J, Shatkin J
Vireo Advisors, LLC

1:30 PM – 3:00 PM

Marina 6

T3-D Symposium: Environment, Health Risk and Cost-Benefit Analysis

Chair: Amber Jessup

1:30 PM **T3-D.1**
The value of enhancing consumer confidence in the food supply
Hammitt J, Hoffmann S
Harvard University

1:50 PM **T3-D.2**
Exploring quantitative links between competing summaries of population health impact
Brand K, Campino-Ferrada E
Telfer School of Management, University of Ottawa

2:10 PM **T3-D.3**
Benefits of air pollution abatement across gender and socioeconomic position
Cifuentes L, Borchers N
Pontificia Universidad Católica de Chile

2:30 PM **T3-D.4**
Racial disparities in access to community water service in Wake County, North Carolina: public health risks and costs of interventions
MacDonald Gibson J, Stillo F
University of North Carolina at Chapel Hill

Co-sponsored by:
The Economics and Benefits Analysis Specialty Group

1:30 PM – 3:00 PM

Spinnaker

T3-E Symposium: Foundational Issues in Risk Analysis II

Co-chairs: Floris Goerlandt, Jon Selvik

1:30 PM **T3-E.1**
Finding fault with system safety risk analysis: a typology for criticism
Goerlandt F
Aalto University

1:50 PM **T3-E.2**
Wolf in sheep's clothing? A conceptual and empirical reconsideration of the value of 'plausibility' as assessment criterion in scenario planning
Scheele R
Stuttgart Research Center for Interdisciplinary Risk and Innovation Studies, University of Stuttgart

2:10 PM **T3-E.3**
On the uncertainty definition given in the new ISO 14224
Selvik J
University of Stavanger

2:30 PM **T3-E.4**
Reflections on hazard / threat identification in complex systems: inductive versus deductive approaches
Jensen A, Aven T
University of Stavanger

1:30 PM – 3:00 PM

Nautilus 1

T3-F Symposium: Coastal Flood Risk and Resilience: Exploring the effects of sea level rise and approaches to mitigation for coastal communities

Chair: Christian Beaudrie

1:30 PM **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.
Lyle T
Ebbwater Consulting

1:50 PM **T3-F.2**
Managing coastal flood risks: a Structured Decision Making (SDM) approach to mitigating the impacts of sea-level rise in Vancouver, British Columbia
Beaudrie C, Lyle T, Long G, Mills T
Compass Resource Management Ltd. and University of British Columbia

2:10 PM **T3-F.3**
Educational tools for risk recognition and awareness of disaster mitigation as needed to lessen damage from tsunamis
Yasuda M, Rui N
Tohoku University

2:30 PM **T3-F.4**
Incorporating more than the weather: differentiating reservoir operations based on seasonally varying opportunity costs and value at risk
Bates M, Linkov I
US Army Corps of Engineers, Engineer Research & Development Center

1:30 PM – 3:00 PM

Nautilus 2

T3-G Dose-Response Modeling for Human Health Risk Assessment (I)

Co-chairs: Ingrid Druwe, Lauren Brown

1:30 PM **T3-G.1**
Can short-term toxicity studies inform BMD estimation of long-term studies?
Shao K
Indiana University Bloomington

1:50 PM **T3-G.2**
Bayesian re-analysis of lung tumor incidences in CD1 mice resulting from 'whole life' exposure to inorganic arsenic
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

2:10 PM **T3-G.3**
Assessing the relationship between adult blood lead levels and cardiovascular disease related mortality
Brown L, Lynch M
Abt Associates

2:30 PM **T3-G.4**
Global extrapolations of fine particulate matter mortality impacts: a comparison of two widely used concentration-response functions
Belova A, Greco S, Burnett R
Abt Associates, Public Health Ontario, Health Canada

1:30 PM – 3:00 PM

Nautilus 3

T3-H Where are Science and Risk Analysis Taking us on Gene Drives

Chair: Todd Kuiken

1:30 PM **T3-H.1**
The biological basis of gene drive technologies: Beyond the hype
Gould F
North Carolina State University

1:50 PM **T3-H.2**
Comparative risk analysis for agricultural genetic pest management technologies
Elsensohn J, Burrack H, Brown Z, Kuzma J
North Carolina State University

2:10 PM **T3-H.3**
Contrasting ecological risks and benefits of genetic biocontrol for invasive rodents
Leitschuh C
North Carolina State University and Genetic Engineering and Society Center at NCSU

2:30 PM **T3-H.4**
Scientific risk assessment for synthetic gene drives: What does this mean and how do we achieve it?
Hosack G, Hayes K
CSIRO

1:30 PM – 3:00 PM

Nautilus 4

T3-I Symposium: Toward a Common Language of Risk in Occupational Health and Safety, Part II

Chair: Megan Canright

1:30 PM **T3-I.1**
Risk perception, risk communication and human language
O'Reilly M
SUNY School of Public Health and ARLS Consultants

1:50 PM **T3-I.2**
Perspectives of a risk communication specialist
Jardine C
University of Alberta

2:10 PM **T3-I.3**
A behavioral perspective on risk
Cunningham T
National Institute for Occupational Safety and Health

2:30 PM **T3-I.4**
Is harmonization possible? solutions and looking at ISO
Redinger C
Redinger 360, Inc.

Co-sponsored by:
Occupational Health and Safety Specialty Group, Risk Communication Specialty Group, Foundational Issues in Risk Analysis Specialty Group

1:30 PM – 3:00 PM

Nautilus 5

T3-J All About Energy

Co-chairs: Darnick Evensen, Chris Clarke

1:30 PM **T3-J.1**
Ethical foundations of paying for energy transitions
Evensen D, Demski C, Pidgeon N
Cardiff University

1:50 PM **T3-J.2**
A meta-analytic review of factors influencing public attitudes toward nuclear energy
Ho S, Leong X, Looi J, Chen L, Pang N, Tandoc E
Nanyang Technological University

2:10 PM **T3-J.3**
How geographic distance and political ideology interact to influence public perception of unconventional oil/natural gas development
Clarke C, Budgen D, Hart P, Stedman R, Jacquet J, Evensen D, Boudet H
George Mason University, Cornell University, University of Michigan, South Dakota State University, Cardiff University, Oregon State University

2:30 PM **T3-J.4**
Building informed and stable preferences in communities affected by new energy developments: the role of fact sheets and deliberation
Volken S, Hanus N, Trutnevyte E
Swiss Federal Institute of Technology Zurich and Carnegie Mellon University

3:30 PM – 5:10 PM

Marina 2

T4-A Flood Risk Modeling and Analysis

Co-chairs: Janey Camp, Hiba Baroud

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
Benouar 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 hazus and regional climate models to identify vulnerable transportation infrastructure due to future extreme precipitation events
Camp J, Shaw A, Whyte D
Vanderbilt University

3:30 PM – 5:10 PM

Marina 3

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, Soller 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
Duret S, Pouillot R, Fanaselle W, Papafragkou E, Williams L, Liggans G, Van Doren J
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, Pouillot R, Papafragkou E, Liggans G, Williams L, Van Doren J
Food and Drug Administration

3:30 PM – 5:10 PM

Marina 4

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
Pang C, Hristozov D, Zabeo A, Pizzol L, Tsang M, Sayre P, Marcomini A
Ca' Foscari University of Venice, Italy

Co-sponsored by:
The Economics and Benefits Analysis Specialty Group and the Society for Benefit-Cost Analysis

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, Lujan H**
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 – 5:00 PM

Marina 6

T4-D Revolutions in Benefits Analysis

Chair: Kevin Brand

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.3**
Using FDA adverse event data to estimate the avoided risk of allergic reactions from bakery products through recalls
Estrin A, Lasher A, Nolan N, Levine J, Willig J, Brewer V, Chen Parker C, Markon A, Nsubuga J, Wolpert, BJ; Grant E
Federal government

4:10 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
University of Pennsylvania Law School, University of Michigan School of Public Health

4:30 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
Claremont Graduate University

3:30 PM – 5:10 PM

Spinnaker

T4-E Applying Risk Management to Hazards and Disasters

Chair: Patrick Gurian

3:30 PM **T4-E.1**
Natural hazards and preparedness: a multi-hazard scenario
*Bronfman N, Cisternas P**
National Research Center for Integrated Natural Disaster Management

3:50 PM **T4-E.2**
Consequences of biological hazards: a systematic mapping of the literature
Cogger N
Massey University

4:10 PM **T4-E.3**
A hypervolume approach for assessing risk under uncertainy
Yemshanov D, Koch F, Lu B, Cook G, Fournier R, Turgeon J
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, Gurian P, Daley J, Elwell H, Matsil M, Montalto F*
Drexel University

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.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

3:50 PM **T4-F.3**
Risk analysis and systems integration of fleet electric vehicles with the power grid
Thorisson H, Almutairi A, Alsultan M, Collier Z, Slutzky D, Wheeler J, Lambert J*
University of Virginia

4:10 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

4:30 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 Guiseppie-Elie

3:30 PM **T4-G.1**
Advancing models and data for characterizing exposures to chemicals in consumer products
Guiseppi-Elie A, Isaacs K, Dionisio K, Phillips K, Wambaugh J, Price P
US Environmental Protection Agency

3:50 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

4:10 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
Cowan-Ellsberry C, Greggs W
CE2 Consulting, Soleil Consulting

4:50 PM **T4-G.5**
Creating a web portal to facilitate access to 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 Goverance 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
Pidgeon N, Steentjes K, Poortinga W, Corner A, Bohm G, Tvinnereim E, Arnold A, Sonnberger M, Mays C, Poumadere M
Cardiff University, University Bergen, University Stuttgart, Symlog Paris

3:50 PM **T4-I.2**
Risky transitions — how public perceptions of the energy transitions differ across countries and cultures
Annika A, Scheer D, Sonnberger M
University of Stuttgart

4:10 PM **T4-I.3**
Hope or fear, outrage or guilt — which emotions do people feel in response to climate change? A comparison across four countries
Böhm G
Unversity of Bergen

4:30 PM **T4-I.4**
The role of social processes in shaping perceptions of climate change: a comparison across four european countries
Steentjes K, Pidgeon N, Poortinga W, Corner A
Cardiff University

4:50 PM **T4-I.5**
Death or taxes? Explaining what people associate with climate change in four countries
Tvinnereim E
Uni Research Rokkan Center for Social Studies

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**
Place-based hazard risk perception: spatial disproportionalities in the context of fracking
Collins M, Harthorn B, Satterfield T, Copeland L
SUNY-ESF

3:50 PM **T4-J.2**
Is fracking morally wrong? How to answer the question.
Evensen D
Cardiff University

4:10 PM **T4-J.3**
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

4:30 PM **T4-J.4**
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

4:50 PM **T4-J.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

8:30 AM – 10:00 AM

Marina 2

W1-A Critical Infrastructure Risk Management

Co-chairs: Hiba Baroud, Naleghi, R

8:30 AM **W1-A.1**
Reducing risk magnification in infrastructure failures
Zimmerman R
New York University

8:50 AM **W1-A.2**
Critical infrastructure protection and weather-related events in Brazil and Canada: an overview
Caruzzo A, Santos L, Gyakum J, Joe P
McGill University

9:10 AM **W1-A.3**
Probabilistic modeling of water supply safety measures in drinking water systems in arid areas
Lindhe A, Rosen L, Johansson P, Norberg T
Chalmers University of Technology

8:30 AM – 10:00 AM

Marina 3

W1-B What You Don't Know Can Kill You: Emerging Disease Risk and Resilience

Co-chairs: Charles Haas, Sanaa Moez

8:30 AM **W1-B.1**
Risks from Ebola virus discharge from hospitals to sewer workers
Haas C, Rycroft T, Casson L, Bibby K
Drexel University and University of Pittsburgh

8:50 AM **W1-B.2**
Geographic risk assessment of variant Creutzfeldt-Jakob disease and evaluation of blood donor deferral and risk mitigation options
Huang Y, Bui-Klimke T, Gregori L, Asher D, Forshee R, Anderson S, Yang H
Food and Drug Administration

9:10 AM **W1-B.3**
Modeling the risk of human toxoplasma gondii infection through consumption of meat products in the United States
Pradhan A, Guo M
University of Maryland, College Park

9:30 AM **W1-B.4**
Risk assessment for Transfusion-Transmission of ZIKA Virus (TTZIKV) in Puerto Rico
Yang H, Chada K, Huang Y, Forshee R, Anderson S
US Food and Drug Administration

8:30 AM – 10:00 AM

Marina 4

W1-C Deterrence Analysis in Homeland Security and Defense

Co-chairs: Richard John, Jinshui Cui

8:30 AM **W1-C.1**
Deterrence: exploiting the connection between affect, risk perception and self-efficacy to demotivate an adversary
Burns W
Decision Research

8:50 AM **W1-C.2**
Defender-user coordination and attacker deterrence in a three-way behavioral cyber security game
Cui J, John R, Rosoff H
University of Southern California

9:10 AM **W1-C.3**
An interactive real-time behavioral game for cyber security
Kusumastuti S, Rosoff F, John R
University of Southern California

9:30 AM **W1-C.4**
Behavioral experimentation of cyber attacker deterrence with deter testbed
Rosoff H, Blythe J, Kusumastuti S, John R
University of Southern California

8:30 AM – 10:00 AM

Marina 6

W1-D The Economics of Health, Drugs, and Difficult Bugs

Chair: Nellie Lew

8:30 AM **W1-D.1**
Protecting patients from "Innocuous Drugs": medical marketplace vs. FDA
Abdukadirov S
Mercatus Center, George Mason University

8:50 AM **W1-D.2**
As software eats the world, what happens to risk regulation?
Thierer A
George Mason University

9:10 AM **W1-D.3**
Behavioral responses to health information and warnings
Lew N, Lavaty R, Wolff C, Peckham J, Wood D, Muth M, Karns S, Brophy J
U.S. Food and Drug Administration

9:30 AM **W1-D.4**
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)
Jessup A, Sertkaya A, Wong H*
HHS Office of the Assistant Secretary for Planning and Evaluation, Eastern Research Group, Inc.

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8:30 AM – 10:00 AM

Spinnaker

W1-E Symposium: Transparency and Uncertainty Analysis: Benefits and Pitfalls

Chair: George Gray

8:30 AM **W1-E.1**
Uncertainty analysis – a necessity for transparency
Foreman J
ExxonMobil Biomedical Sciences, Inc.

8:50 AM **W1-E.2**
Evidence based uncertainty analysis: what should Europe do?
Lofstedt R
Kings College London

9:10 AM **W1-E.3**
Uncertainty analysis to inform risk management
O'Connor R
National Science Foundation

9:30 AM **W1-E.4**
Uncertainty according to EFSA
Sahlin U
Lund University, Sweden

8:30 AM – 10:00 AM

Nautilus 1

W1-F Storming the Risk and Decision Analysis Bastille with Information Infantry

Chair: Philip Howard

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

9:10 AM **W1-F.4**
Strategic-level cybersecurity risk assessment for decision-makers
Howard P, Arimoto C
ABS Group

8:30 AM – 10:00 AM

Nautilus 2

W1-G Dose Response Modeling for Human Health Risk Assessment (III)

Co-chairs: John Lipscomb, Kenneth Bogen

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 – 10:00 AM

Nautilus 3

W1-H Vaccines and Risk: A global Perspective on Lessons Learned

Chair: Gary Marchant

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, Bouder F
Maastricht University

8:30 AM – 10:10 AM

Nautilus 4

W1-I Symposium: Risk in the New ISO Regime

Chair: Charles Redinger

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

9:50 AM **W1-I.5**
Roundtable Discussion
Redinger C
Redinger 360, Inc.

8:30 AM – 10:00 AM

Nautilus 5

W1-J From Seismicity to Pharmaceuticals: The Role of Trust

Chair: Christina Demski

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, Bouder 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, Trutnevyte 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 2

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
Logan T, Guikema S, Zaitchik B, OMeara K, Liberman K, Zou C, Nichols R
University of Michigan

10:50 AM **W2-A.2**
Agent based modeling of repeated hazards: modeling to enhance interdisciplinary 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
OMeara 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, Igusa T, Garzon J, Ferreira C*
Dewberry, Johns Hopkins University, George Mason University

10:30 AM – 12:00 PM

Marina 3

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
Vieglais 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.
Landis W, Sawyer K
Western Washington University, The National Academies of Sciences, Engineering, and Medicine

10:30 AM – 12:10 PM

Marina 4

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
Lathrop J
Decision Strategies, LLC

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

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

10:30 AM – 12:10 PM

Marina 6

W2-D Symposium: Burdens From Risk: Valuing Outcomes for Workers and the Public

Chair: Frank Hearl

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

11:30 AM **W2-D.4**
Valuing quality-adjusted life years for benefit-cost analysis
*Hammitt J, Robinson L**
Harvard University

11:50 AM **W2-D.5**
Estimating future costs of the world trade center health program from cancer risk data
Asfaw A
Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health

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10:30 AM – 12:10 PM

Spinnaker

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
Instutute 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 M, Aven T
INERIS

11:10 AM **W2-E.3**
Current changes in risk perspectives and understanding: implications for risk regulation
Røyksund 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

10:30 AM – 12:00 PM

Nautilus 1

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

Co-chairs: Mary Manibusan, 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
*Smith M, Guyton K, Gibbons C, Fritz J, Portier C, Rusyn I, DeMarini D, Caldwell J, Kavlock R, Cogliano V**
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

10:30 AM – 12:00 PM

Nautilus 2

W2-G Applied Exposure Assessment

Chair: Tenaille Walker

10:30 AM **W2-G.1**
Why do we need exposure to inform an integrated approach for assessing alternatives?
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

10:30 AM – 12:00 PM

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

10:30 AM – 12:00 PM

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
Demuth J, Morss R, Palen L, Anderson K, Watts J, Barton M
National Center for Atmospheric Research

11:30 AM **W2-I.4**
Shale gas and hydrofracking in the US: analyzing conversations on Twitter
De Marcellis-Warin N, Backus A, Warin T, N
Harvard Center for Risk Analysis, Harvard T. Chan School of Public Health, Polytechnique Montreal, HEC Montreal and CIRANO

10:30 AM – 12:00 PM

Nautilus 5

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

Co-chairs: Sara Goto, Joe Arvai

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
University of Wisconsin-Madison

1:30 PM – 3:00 PM

Marina 2

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 management 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, Nozick L, Blanton B, Blanton C
University of Delaware

1:30 PM – 3:00 PM

Marina 3

W3-B Symposium: Decision Making in Food Safety: Perspectives on Decision Analysis Approches

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, Pouillot 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 4

W3-C Presidential 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 henpecked 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 to 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 irremediable 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 risk 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 discernments 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 6

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

Spinnaker

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
Bjørnsen K, Aven T
University of Stavanger

1:30 PM – 3:00 PM

Nautilus 1

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
GWU Milken Institute School of Public Health

1:30 PM – 3:00 PM

Nautilus 2

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.

2:30 PM **W3-G.4**
Advancing dose-response models to incorporate genetic and epigenetic data: use of Bayesian belief networks
*Zabinski J, MacDonald Gibson J**
University of North Carolina at Chapel Hill

1:30 PM – 3:00 PM

Nautilus 3

W3-H Roundtable: Writing a Key Document: Principles and Guidelines for Applied Risk Management

Chair: John Lathrop

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.

1:30 PM – 3:00 PM

Nautilus 4

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

Chair: Matthew Mayo

1:30 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

1:50 PM **W3-I.3**
Testing methods for conveying uncertainty on maps: a synthesis of five studies
Severtson D
Edgewood College

2:10 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

1:30 PM – 3:00 PM

Nautilus 5

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, Renn 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

3:30 PM – 5:00 PM

Marina 2

W4-A Infrasturcture Systems Resilience Modeling

Chair: S. Chatterjee

3:30 PM **W4-A.1**
Repair, rebuild, or replace? Protecting aging infrastructure from hazards and threats
Alderson D, Brendecke J, Lin K
Naval Postgraduate School

3:50 PM **W4-A.2**
Exploring functional relationships among multiple infrastructure networks
Chopade P, Chatterjee S
North Carolina A&T State University,Pacific Northwest National Laboratory

4:10 PM **W4-A.3**
Bridging sociotechnical networks for critical infrastructure resilience: South Korean case study
Eisenberg D, Park J, Kim D, Seager T
Arizona State University, Hongik University

4:30 PM **W4-A.4**
Optimum post-disruption restoration for enhanced infrastructure resilience under uncertainty
Fang Y, Sansavini G
ETH Zurich

3:30 PM – 5:10 PM

Marina 3

W4-B Symposium: Risk-Based Approaches for the Safety of Food and Dietary Supplements

Co-chairs: Eric Dube, Michelle Catlin

3:30 PM **W4-B.1**
Fit-for-purpose food safety risk assessments: leveraging available data to answer agency questions
Catlin M, LaBarre D, Ebel E, Williams M, Golden N
Food Safety and Inspection Service

3:50 PM **W4-B.2**
Caffeine in energy drinks: how safe is it?
Beyer L, Hixon M, Kerper L
Consulting Company

4:10 PM **W4-B.3**
Nanoscale substances in food: small materials raise big questions
Cohen J
Gradient

4:30 PM **W4-B.4**
Updating FDA/CFSAN's guidance on ingredient safety assessment: the path forward for Redbook
Fasano J
U.S. Food and Drug Administration

4:50 PM **W4-B.5**
Risk assessment principles for food ingredient safety
Pugh G
The Coca-Cola Company

3:30 PM – 5:10 PM

Marina 4

W4-C Recent Topics in Cyber Security

Co-chairs: Shaye Friesen, Diane Henshel

3:30 PM **W4-C.1**
Stochastic epidemiological model of the risk of malware propagation in heterogeneous networks
Alexeev A, Henshel D, Cains M, Sun Q
Indiana University

3:50 PM **W4-C.2**
Modeling cybersecurity as a repeated contest
*Alexeev A, Krutilla K**
Indiana University

4:10 PM **W4-C.3**
Modeling cyber security risk contributions from human factors
Henshel D, Cains M, Alexeev A, Hoffman B
Indiana University and Army Research Laboratory

4:30 PM **W4-C.4**
Establishing resilient programs: using a risk based approach for informing the distribution of investments in public safety and security science and technology
Friesen S, Bayne I, Poursina S
Government of Canada

4:50 PM **W4-C.5**
Cyber risk: malicious email attacks at a large organization
Kuypers M
Stanford University

3:30 PM – 5:10 PM

Marina 6

W4-D Public Sector and Transportation Risks

Chair: Ali Gungor

3:30 PM **W4-D.1**
Pricing risk in benefit-cost analyses of public sector projects and regulations
Moore M, Boardman A, Vining A
Simon Fraser University, University of British Columbia

3:50 PM **W4-D.2**
Modelling the risk from railroad tank car spills for use in policy making
Homan A
U.S. Department of Transportation

4:10 PM **W4-D.3**
Challenges in risk-informed rule-making at the U.S. Department of Transportation
Aiken D
U.S. Department of Transportation

4:30 PM **W4-D.4**
Evaluation of bicyclist morbidity and mortality mitigation with crash imminent braking technologies
Good D, Krutilla K
Indiana University

4:50 PM **W4-D.5**
How to regulate for 'black swan' events? Capturing or illustrating the highly unlikely in a regulatory context
Gungor A
U.S. Coast Guard

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3:30 PM – 5:10 PM

Spinnaker

W4-E Managing Risks in Businesses and other Institutions

Chair: Helen Canjar

3:30 PM **W4-E.1**
A risk-based framework for issues management
Barton C, Bingman T
DuPont

3:50 PM **W4-E.2**
Resilience of gantt project schedules to emergent and future conditions
Collier Z, Lambert J
University of Virginia

4:10 PM **W4-E.3**
SAFER - Sensing Analytics for Emerging Risks
Pho Y, Suryanarayan S, Cascone J*
Deloitte & Touche, LLP

4:30 PM **W4-E.4**
Can risk analysis improve with decision maker education and awareness?
Canjar H

4:40 PM **W4-E.5**
The use of scenarios to improve decision making through a better understanding of cognitive bias and mental models within a corporate environment
Hall I
University of Northampton

4:50 PM **W4-E.6**
Risk based scheduling of safety performance audits – a regulatory approach to reviewing and influencing safety behaviours
Wiersma R, Mangalam S
Technical Standards and Safety Authority

3:30 PM – 5:10 PM

Nautilus 1

W4-F Health Risk Asessment 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
DeLeo P, Ciarlo M, Pacelli C, Greggs W, Williams E, Brooks B, Scott C, Wang Z
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
Lu Y, Izurieta H, Wernecke M, Kelman J, Wong S, Worrall C, Lash T, Fox M, Forshee R
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
Anyshchenko A
University of Copenhagen

3:30 PM – 5:00 PM

Nautilus 2

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

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
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

3:30 PM – 5:10 PM

Nautilus 3

W4-H Risk and Resilience in Development

Co-chairs: 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

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, Wanigasariya K, Wickremasinghe R, Levine K
RTI International, University of Sri Jayewardenepura, and University of Kelaniya

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

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
Duintjer Tebbens R, Thompson K, R
Kid Risk, Inc.

3:50 PM **W4-J.2**
Developing an international strategy for determining the immunization risk communication needs of immigrant populations
Jardine C, Bouder F, Driedger S, Turner N, Gray L, Heywood A, Rath 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

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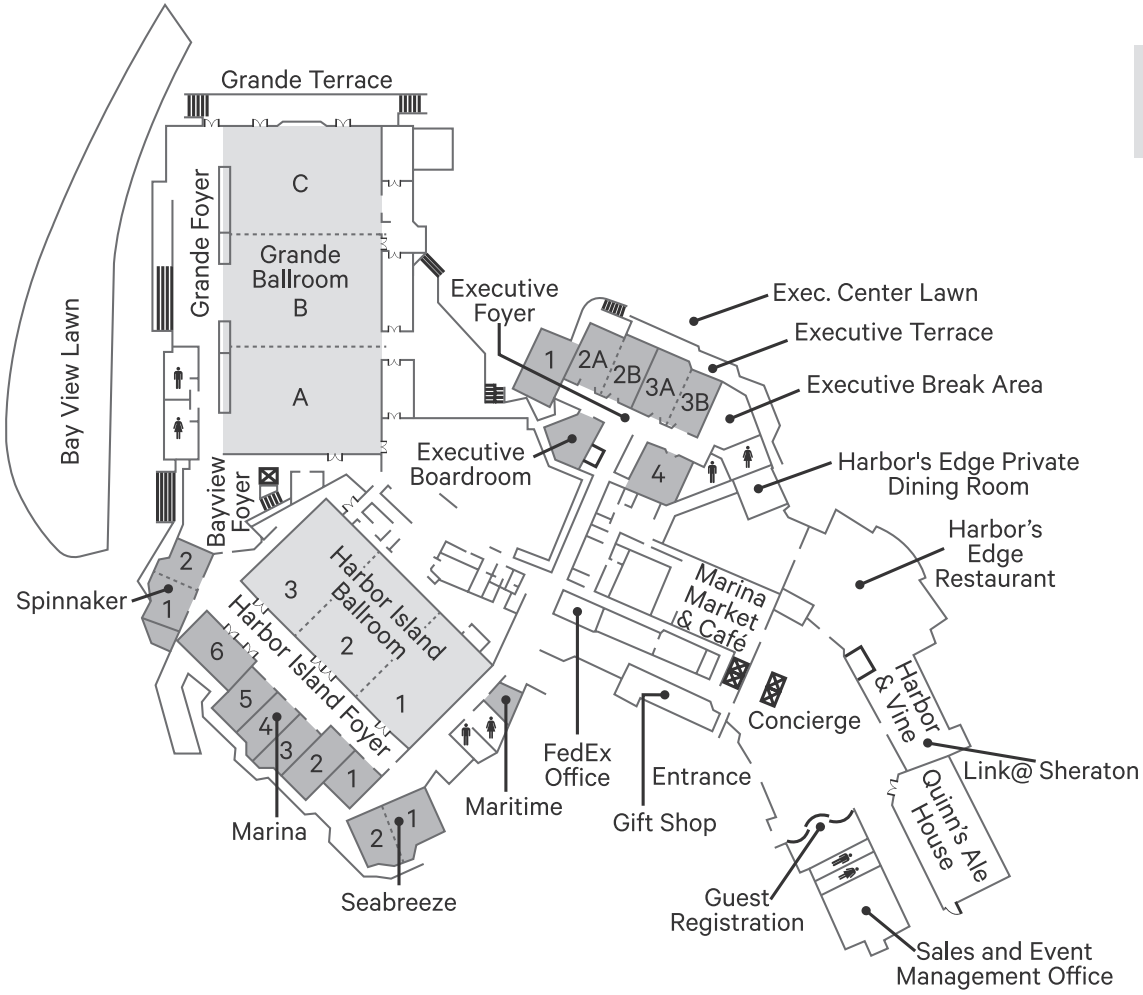
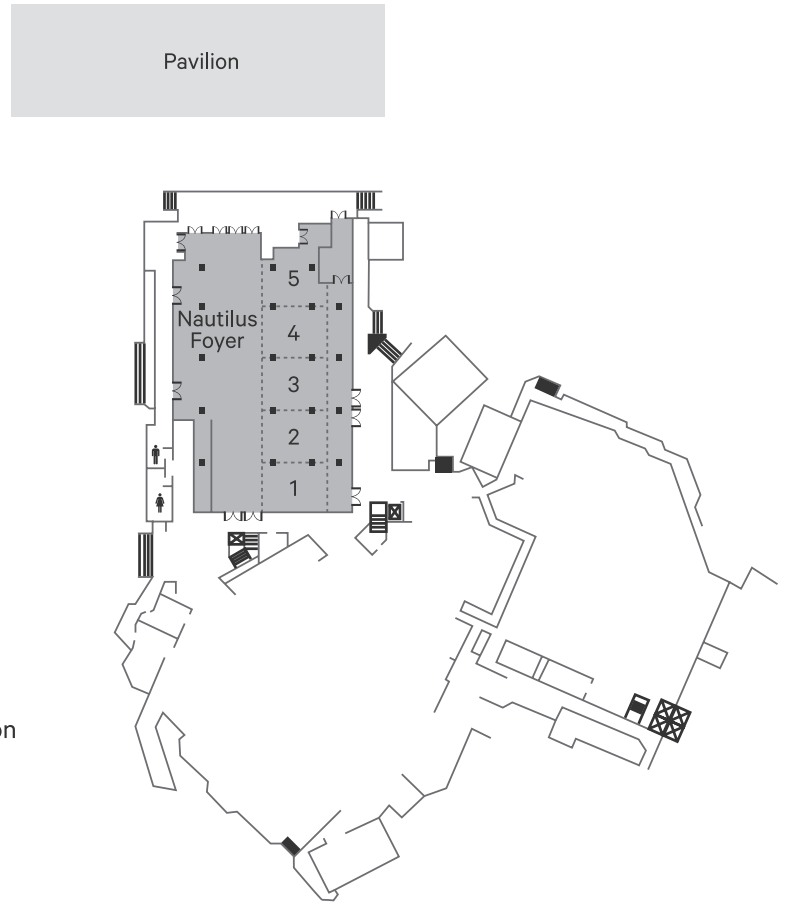
Sheraton San Diego – Floorplans



Marina Tower Lobby Level



Marina Tower Lower Level