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2023 Council
President: Katherine von Stackelberg
President-Elect: Felicia Wu
Secretary: Janet Yang
Treasurer: Jonathan Welburn
Past President: Ragnar Lofstedt
Ex-Officio Students and Young Professionals Chair:
  Ben Rachunok
Executive Secretary: Brett Burk
Managing Director: Jill Drupa

2023 Program Committee
Program Co-Chair: Felicia Wu
  Nancy Beck
  David Johnson
  Fabio Massacci
  Allison Reilly
  Jun Zhuang
  Adam Zwickle

Councilors
Sandra Alday
  Douglas Bessette
  Peg Coleman
  Rui Gaspar
  James Hammitt
  Jade Mitchell
  Roshanak Nateghi
  Louie Rivers
  Marja Ylonen

SRA Worldwide Headquarters
950 Herndon Parkway, Suite 450
Herndon, VA USA 20170
+1.703.790.1745; FAX: 703.790.2672
www.SRA.org, SRA@BurkInc.com

Venue and Room Information
Westin Washington DC
(formerly the Renaissance DC)
999 Ninth Street NW
Washington, DC 20001
2023 Award Winners

Distinguished Achievement Award
Terje Aven

Outstanding Practitioner Award
Alliya Sassi

Chauncey Starr Award
Roshanak Nateghi Zachary Collier

Distinguished Educator Award
Jun Zhuang

Richard J Burk Outstanding Service Award
Seth Guikema

Fellow
Robin Dillon-Merrill Jack Fowle Rui Gasper Cindy Jardine Richard John Robin Keller Stanley Levinson Kara Morgan

2023 Specialty Group Winners

Advanced Materials and Technologies
Kora Kukk

Applied Risk Management
Kairui Feng

Decision Analysis and Risk
Patrick Curran

Dose Response
En Yu Chen

Economics and Benefits Analysis
Brianna Bace

Engineering and Infrastructure
Zhiyuan Wei

Exposure Assessment
Po-Han Lin

Foundational Issues in Risk Analysis
Christopher Doehring

Justice, Equity and Risk
Fatima Umar

Microbial Risk Analysis
Kayla Shorter Shuyi Feng Syed Anjerul Islam

Occupational Health and Safety
Pei-Yi Chen

Resilience Analysis
Andrew Jin

Risk Policy and Law
Kasia Klasa

Security and Defense
Madison Smith

Student and International Travel Award Winners

Emma Anyika
Robert Baker
Logan Brunner
Katie Byrd
Chia Fen Chen
Stefano Chiaradonna
Vijay Chiluveru
Yu-Chan Chiu
Pamela Cisternas
Patrick Curran
Andrii Davydiuk
Francesco De Pretis
Christopher Doehring
Xinxia Dong
Michael Eber
Kairui Feng
Yihan Gao
Erica Goto
ChoongHee Han
Qian He
Ronnie E. Hill Jr.
Madison Horgan
Patricia Hsu
Wan-Ting Hsu
Maho Ishibashi
Elmo Juanara Rajesh Kandel Mahek Karamchandani Maksim Kitsak Seyram Pearl Kumah Po-Han Lin Megan Marcellin Joshua McDuffie Negin Moghadasi Rachid Ouache Zaira Pagan Cajigas Chuanshen Qin Rubait Rahman Celine Robinson Anca Rusu Jose Scott Prema Shah Olga Shashkina Behnam Tahmasbi Zhiyuan Wei Shuo Yao Yun Zhou
## Committee Meetings and Events

### Sunday, December 10
- **12:00 PM – 5:00 PM**
  - Council Meeting and Lunch
    - Meeting Room 8/9
- **3:30 PM – 4:30 PM**
  - Area Editors Meeting
    - Hickory
- **5:00 PM – 6:00 PM**
  - Editorial Board Meeting
    - Hickory
- **6:00 PM – 7:30 PM**
  - Welcome Reception
    - Potomac Ballroom Salon I & II

### Monday, December 11
- **7:00 AM – 8:00 AM**
  - New Member, Student/Young Professionals Breakfast
    - Red Bud
- **12:10 PM – 1:25 PM**
  - Specialty Group Meetings
    - See page 5
- **3:30 PM – 5:00 PM**
  - Meeting for people interested in revising the Social Amplification of Risk Framework
    - Meeting Room 6
- **5:00 PM – 6:00 PM**
  - World Congress Meeting
    - Hickory

### Tuesday, December 12
- **7:00 AM – 8:00 AM**
  - Grad Student Breakfast
    - Hickory
- **8:00 AM – 10:00 AM**
  - Regional Organization Meeting
    - Meeting Room 6
- **12:00 PM – 1:30 PM**
  - Business Meeting and Awards Lunch
    - Potomac Ballroom
- **5:00 PM – 6:00 PM**
  - World Congress Meeting
    - Hickory
- **6:00 PM – 9:00 PM**
  - World Congress Meeting
    - Hickory

### Wednesday, December 13
- **7:30 AM – 8:30 AM**
  - Specialty Group Chair Meeting
    - Meeting Room 6
- **12:00 PM – 1:30 PM**
  - Plenary Keynote and Lunch
    - Potomac Ballroom
- **12:00 PM – 1:00 PM**
  - SRA Endowment Meeting
    - Hickory

### Speaker Ready Room Hours
- **Sunday, December 10**: 2:00 PM – 5:00 PM
- **Monday, December 11**: 7:00 AM – 5:00 PM
- **Tuesday, December 12**: 7:00 AM – 5:00 PM
- **Wednesday, December 13**: 7:00 AM – 12:00 PM

### Registration Desk Hours
- **Sunday, December 10**: 4:30 PM – 6:00 PM
- **Monday, December 11**: 7:30 AM – 4:00 PM
- **Tuesday, December 12**: 8:00 AM – 3:00 PM
- **Wednesday, December 13**: 8:00 AM – 3:00 PM
Committee Meetings and Events

Specialty Group Meetings

Monday, December 11

All specialty group meetings will take place during lunch time. Pick up your box lunch near the registration desk and attend the meeting(s) of your choice.

**12:10 PM – 12:45 PM**
- Dose Response (DRSG)  
  *Rock Creek Ballroom*
- Economics & Benefits Analysis (EBASG)  
  *River Birch A*
- Occupational Health & Safety (OHSSG)  
  *River Birch B*
- Risk, Policy & Law (RPLSG)  
  *Meeting Room 2*
- Security & Defense (SDSG)  
  *Meeting Room 3*
- Foundational Issues in Risk Analysis (FRASG)  
  *Meeting Room 16*
- Justice, Equity and Risk (JERSG)  
  *Meeting Room 4*

**12:50 PM – 1:25 PM**
- Exposure Assessment (EASG)  
  *Rock Creek Ballroom*
- Risk Communication (RCSG)  
  *River Birch A*
- Applied Risk Management (ARMSG)  
  *River Birch B*
- Decision Analysis and Risk (DARSG)  
  *Meeting Room 2*
- Advanced Materials and Technologies (AMTSG)  
  *Meeting Room 3*
- Engineering & Infrastructure (EISG)  
  *Meeting Room 5*
- Microbial Risk Analysis (MRASG)  
  *Meeting Room 16*
- Resilience Analysis (RASG)  
  *Meeting Room 4*

Specialty Group Mixers

Tuesday, December 12

**6:00 PM – 7:30 PM**
- Mixer 1: Dose Response, Exposure Assessment, Occupational Health and Safety, Advanced Materials & Technologies  
  *Meeting Room 15*
- Mixer 2: Ecological Risk Assessment, Resilience Analysis, Microbial Risk Analysis and Engineering and Infrastructure  
  *Meeting Rooms 8/9*
- Mixer 3: Decision Analysis and Risk, Foundational Issues in Risk Analysis, Advanced Risk Management, Risk Communication  
  *Meeting Rooms 10/11*
- Mixer 4: Economics and Benefits Analysis, Justice, Equity and Risk, Risk, Policy and Law, Security and Defense  
  *Ren Club Lounge, 3rd Floor*

<table>
<thead>
<tr>
<th>Networking Lounge</th>
<th>Childcare</th>
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<tr>
<td>Meeting Room 7</td>
<td>Meeting Room 1</td>
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</table>

Monday, December 11 7:30 AM – 5:00 PM
Tuesday, December 12 7:30 AM – 5:00 PM
Wednesday, December 13 7:30 AM – 5:00 PM
Workshops

Sunday, December 10

8:00 AM – 12:00 PM

Workshop 4: Eliciting Judgments from Experts and Non-experts
Aylin Sertkaya, Frank Hearl, and Cristina McLaughlin
Meeting Room 6

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 nonexperts, then plays a critical role in the interpretation and characterization of those data as well as in the completion of information gaps. But how experts or non-experts are selected, and their judgments elicited matters – they can also strongly influence the opinions obtained and the analysis on which they rely. Several approaches to eliciting judgments have evolved. The workshop will cover topics ranging from recruitment, elicitation protocol design, different elicitation techniques (e.g., individual elicitations, Delphi method, nominal group technique, and focus groups) 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 way they were resolved. The class will also include two hands-on exercises where participants will 1) learn about calibration of experts using a mobile application and 2) apply the Delphi and nominal group techniques to examine risk management issues associated with a popular topic.

8:00 AM – 12:00 PM

Workshop 5: Introduction to Chemical Mixtures Risk Assessment
Linda Teuschler and Richard Hertzberg
Meeting Room 16

This problems-based, half-day, introductory workshop focuses on methods to assess health risks posed by exposures to chemical mixtures in the environment. The workshop will present key concepts and terminology used in chemical mixtures risk assessment. This workshop will discuss component methods that utilize assumptions of response addition and dose addition, including the following dose-additive methods: the hazard index, the interaction-based hazard index, relative potency factors, and toxicity equivalence factors. The integrated additioPlanned format (introductory lectures, methods tutorial with exercises, general discussion)?
Workshops

Sunday, December 10

**Workshop 1: Approaches to Assessing Environmental Justice: Perspectives from the Scientific, Regulatory and Regulated Communities**

Uni Blake, Anna White, Valerie Washington, Amina Wilkins, Ann Verwiel, Kelsea Best, and Jacqueline Gibson

Meeting Room 3

The environmental justice (EJ) movement arose from community concerns surrounding how people of color and/or low-socioeconomic status have borne the disproportionate impacts of environmental hazards, contributing to disease and health disparities. Risk assessors, risk modelers, and regulatory analysts are tasked with addressing these concerns and finding solutions to address environmental injustice. This workshop explores how the regulators, the scientific community, and the regulated community navigate the complex EJ landscape.

**Workshop 3: Bayesian benchmark dose (BMD) analysis for toxicological and epidemiological data using the BBMD Platform**

Kan Shao

Meeting Room 5

This full-day workshop will begin with an introduction on the benchmark dose modeling in a Bayesian framework and then provide participants with hands-on experience of using the Bayesian Benchmark Dose modeling (BBMD) system to perform dose-response assessment using toxicological and epidemiological data. The workshop will cover a number of important topics in Bayesian BMD modeling, including using Markov Chain Monte Carlo (MCMC) algorithm to fit dose-response models, using appropriate statistics to evaluate goodness of fit, estimating the distributions of model parameters and quantities of interest (e.g., BMD), calculating model averaged BMD estimates to take model uncertainty into account, and employing the Monte Carlo simulation for probabilistic low-dose extrapolation, etc. More importantly, the workshop will extensively explore the major functionalities of the BBMD system for dose-response assessment through case studies: (1) for toxicological data, BMD analysis of single and multiple datasets for dichotomous, continuous, and categorical data will be discussed and practiced; (2) for epidemiological data, BMD modeling with quantification for exposure uncertainty will be explored. In short, the workshop will provide participants with both theoretical and practical skills of using the BBMD system for dose-response assessment.
Workshops

Sunday, December 10

1:00 PM – 5:00 PM

Workshop 7: Community Based Resilience Analysis Using the Resilient Node Cluster Analysis Tool (ReNCAT)

Amanda Wachtel and Olga Epshtein Hart
Meeting Room 16

Moving from the theoretical to the practical, workshop attendees will be trained on and use the ReNCAT software to develop a model of the community from the case study. They will run an optimization to understand potential locations for microgrids throughout the community that minimize both cost and the burden on residents to acquire critical services. The workshop will end with a deep dive into results from the model, what they mean, and how to talk through the tradeoffs of different resilient investment options with community stakeholders.

Thursday, December 14

8:00 AM – 12:00 PM

Workshop 10: Cybersecurity Vulnerabilities: The new standards from assessment to prediction

Fabio Massacci, Sasha Romanosky
Meeting Room 16

The world standard for the assessment of cybersecurity software vulnerabilities (CVSS – Common Vulnerabilities Scoring System) is a pillar for security risk assessment for both government and industry. A new version has been proposed this June after 10 years and we are moving forward from assessment to prediction with a recent follow-up (EPSS – Exploit Prediction Scoring System). This tutorial, from the people behind these works, describes to interested policy makers, managers, researchers and graduate students the high level concepts behind the design of assessment, scoring and prediction of cybersecurity vulnerabilities.
### Workshop 9: Responsible communication on Emerging Technologies: A Risk Governance Tool
**Anca Georgiana Rusu**  
Meeting Room 5

The influence of technology utilization can be moderated through communication, which entails both the method (form) and the content (substance) of the conveyed message. In the context of technology usage, there’s a direct correlation between communication and informed decision-making, as the distribution of information regarding the technology (both in form and substance) enables thorough decision-making.

Given that responsible communication serves as a tool for risk governance, this workshop aims to outline the processes and characteristics of such communication.

After a few introductory lectures where the communication regarding a few examples of emerging technologies will be made, participants will be divided into stakeholder groups, and following this, common elements will be identified. These elements will subsequently be utilized by risk governance practitioners.

### Workshop 8: Dose-response modeling – benchmark dose modeling approaches using online and desktop versions of EPA's Benchmark Dose Software (BMDS) and NIEHS' ToxicR
**J. Allen Davis, Matthew Wheeler, Andy Shapiro, Todd Blessinger, and Jeff Gift**  
Meeting Room 4

In 2022, EPA released BMDS Online (bmdsonline.epa.gov), a browser-based version of BMDS to allow users to run BMDS on any computer with access to the internet. Recently, EPA has released BMDS Desktop (a Python-based graphic user interface) to replace the Excel-based BMDS 3.3. Additionally, NIEHS has further expanded dose-response capabilities through the release of the R-based ToxicR Bayesian modeling platform that “untethers” BMDS and other models from standard parameterizations, expanding its capabilities for research applications.

This workshop will cover dose-response analyses (frequentist and Bayesian); participants will learn and practice (through demos and hands-on exercises) dose-response modeling of dichotomous, continuous, cancer, and developmental toxicity response data using BMDS Online and BMDS Desktop. Following these introductory analyses, participants will learn and practice the use of Bayesian models, including the application of a Bayesian framework for model averaging using ToxicR. Participants will explore model averaging approaches for dichotomous and continuous data, including new model averaging capabilities for continuous data that include the European Food Safety Authority’s (EFSA) suite of continuous models currently only available in ToxicR. The research functionality and modeling capacity of the ToxicR platform will be demonstrated. Hands-on exercises in ToxicR will be provided. Participants will be shown how to modify prior assumptions and perform sensitivity analyses to investigate the default prior’s effect on a given analysis. Additional features of the package that allow for scripted batch processing, advanced graphics, and custom BMD analysis will also be highlighted.
Microbial Risk Analysis is proud to sponsor SRA 2023

Microbial Risk Analysis considers articles dealing with the study of risk analysis applied to microbial hazards.

Editor-in-Chief
Donald Schaffner
Rutgers The State University of New Jersey, USA

Co-Editor in Chief
Maarten Nauta
State Serum Institute, Denmark
How Climate Change Will Affect the Safety and Security of our Food, and Unique Solutions
Rock Creek Ballroom

Maintaining a reliable and safe food supply globally is one of the major challenges associated with climate change, as identified in the most recent Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). We will cover two distinct areas of challenges: (1) how climate change compromises food safety all over the world, and (2) how we can implement solutions using existing supply chains to improve distribution of food and other means to counteract climate change impacts on food security.

Speakers
Michael Ferrari, Climate Alpha
Felicia Wu, Michigan State University

Risk Management of AI: How Should We Prepare?
Rock Creek Ballroom

Artificial intelligence (AI) is entering every sphere of life, from workplaces to homes to retail to online interactions. There are multiple risks involved with AI; yet at the same time, AI could help policymakers and researchers to manage risks. This plenary panel will focus on both these aspects of risk: the most crucial risks we should understand associated with the widespread use of AI, as well as how AI can be a tool for risk analysts, managers, and communicators in the future.

Speakers
Seth Guikema, University of Michigan
Ann Bostrom, University of Washington
Hayley Falk, University of Michigan
Tony Cox, Cox Associates

Root Cause Analysis to Reduce and Communicate Risks: Lessons from an Astronaut and Engineer in Healthcare Management – Plenary Lunch
Potomac Ballroom

This plenary luncheon begins with a deep dive into lessons learned as a US astronaut in the 1970s. It then moves to root cause analysis applied to understanding risks in our current health care system, such as those associated with patient safety breaches – and how understanding root causes of surgical and other health care problems can help prevent their occurrence and improve health care across the lifespan.

Speaker
Jim Bagian, University of Michigan
The Center for Truth in Science works to promote an environment in which legal and regulatory decisions are made using the best available scientific evidence and methods to interpret and use that information responsibly. Our mission is to ensure science is honestly and objectively portrayed and utilized to make decisions.

DREAM Tech, LLC is a technology-based scientific consulting company specialized in providing customized solutions to support quantitative chemical risk assessment. Our vision is to provide efficient and effective risk assessment services through advanced technology. Company’s Bayesian benchmark dose (BBMD®) modeling system is the most comprehensive and scientifically rigorous dose-response modeling platform currently available.

Celebrating 15 years of excellence, the Ph.D. in Business Administration at Kennesaw State University is designed for accomplished professionals looking to advance to leadership positions. Students in the AACSB-accredited, STEM-designated program earn their terminal degree while keeping their full-time jobs. Our newest concentration is Risk & Decision Analytics.

The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND’s research and analysis address issues that impact people everywhere, including security, health, education, sustainability, growth, and development.
Exhibitors

**Springer Nature**
Van Godewijckstraat 30
Dordrecht, Zuid Holland 3311 GX
The Netherlands
www.springer.com
+31 (0)78 6576000

Springer Nature is a global publisher that serves and supports the research community. Springer Nature aims to advance discovery by publishing robust and insightful science, supporting the development of new areas of research and making ideas and knowledge accessible around the world.

**Toxicology Excellence for Risk Assessment (TERA)**
1250 Ohio Pike, Suite 197
Cincinnati, Ohio 45102
tera.org
5135427475

Toxicology Excellence for Risk Assessment (TERA) is organized for scientific research, and educational purposes, and has provided sponsors with independent, transparent science since 1995. TERA solves human health risk challenges for diverse government and private sponsors through research and collaboration that emphasizes partnership building across scientific expertise and multiple perspectives. Examples include the World Trade Center disasters, the Elk River spill, the International Toxicity Estimates for Risk (ITER) and the Alliance for Risk Assessment (ARA).

**US Environmental Protection Agency**
1200 Pennsylvania Avenue NW
Washington, DC 20460
www.epa.gov

The Environmental Protection Agency is built upon a commitment to protect public health and the environment. From tackling the climate crisis to advancing environmental justice, what happens in EPA changes the world.
### Monday

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>7:00 AM-8:00 AM</td>
<td><strong>New Member, Student/Young Professional Breakfast</strong>&lt;br&gt;Red Bud</td>
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<tr>
<td>8:30 AM-10:00 AM</td>
<td><strong>Keynote Session</strong> – How Climate Change Will Affect the Safety and Security of our Food, and Unique Solutions&lt;br&gt;Rock Creek Ballroom</td>
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<td>10:00 AM-10:30 AM</td>
<td><strong>Coffee Break</strong></td>
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<tr>
<td>10:30 AM -12:00 PM</td>
<td><strong>M2-A</strong>: Environmental Justice and Marginalized Communities&lt;br&gt;<strong>M2-B</strong>: Poster Platform: Risk Perception &amp; Communication&lt;br&gt;<strong>M2-C</strong>: Artificial Intelligence and Risk Analysis 1&lt;br&gt;<strong>M2-D</strong>: Symposium: Infrastructure Resilience at Local and Regional Scales</td>
<td>Rock Creek Ballroom</td>
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<td>10:30 AM -12:00 PM</td>
<td>Pick up your box lunch near the registration desk and attend the specialty group meeting(s) of your choice.</td>
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<td><strong>Dose Response (DRSG), Economics &amp; Benefits Analysis(EBASG), Occupational Health &amp; Safety (OHSSG), Risk, Policy &amp; Law (RPLSG), Security &amp; Defense (SDSG), Foundational Issues in Risk Analysis (FRASG), Justice, Equity and Risk (JERSG)</strong>&lt;br&gt;<strong>Exposure Assessment (EASG), Risk Communication (RCSG), Applied Risk Management (ARMSG), Decision Analysis and Risk (DARSG), Advanced Materials and Technologies (AMTSG), Engineering &amp; Infrastructure (EISG), Microbial Risk Analysis (MRASG), Resilience Analysis (RASG)</strong></td>
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<td>12:00 PM –1:30 PM</td>
<td><strong>M3-A</strong>: Roundtable: Risk Communication Inequalities and Inequities&lt;br&gt;<strong>M3-B</strong>: Poster Platform: Health Risks in Healthcare, Occupational, and Environmental Settings&lt;br&gt;<strong>M3-C</strong>: Artificial Intelligence and Risk Analysis 2&lt;br&gt;<strong>M3-D</strong>: Water, Infrastructure and Sea-Level Rise</td>
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<td>1:30 PM-3:00 PM</td>
<td><strong>Coffee Break</strong></td>
<td>Potomac Ballroom Foyer</td>
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<td>1:30 PM-3:00 PM</td>
<td><strong>M4-A</strong>: Roundtable: Federal Activities to Address Needs of Overburdened Communities&lt;br&gt;<strong>M4-B</strong>: Roundtable: New Frontiers in Risk Analysis at the Intersection of ESG, Capitals Assessment, Valuation, and Human Health&lt;br&gt;<strong>M4-C</strong>: Symposium: Sustainable Food Systems: Risks and Perceptions&lt;br&gt;<strong>M4-D</strong>: Infrastructure Resilience</td>
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<td>3:30 PM – 5:00 PM</td>
<td><strong>Poster Reception</strong>&lt;br&gt;Potomac Ballroom</td>
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<tr>
<td>10:30 AM -12:00 PM</td>
<td>Meeting Room 3: M2-E: Roundtable: Risk science and politics: What is and should be the relationship?</td>
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<td>10:30 AM -12:00 PM</td>
<td>Meeting Room 4: M2-F: Symposium: How to build a microbial profile for a Salmonella quantitative microbial risk assessment; data analyses from the front lines</td>
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<td>10:30 AM -12:00 PM</td>
<td>Meeting Room 5: M2-G: Symposium: Applying the Quantitative Microbial Risk Assessment Framework Across Alternative Exposure Scenarios</td>
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<td>10:30 AM -12:00 PM</td>
<td>Meeting Room 16: M2-H: Roundtable: Communicating effectively about attenuated risks: Where are we now and where are we going?</td>
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<td>12:00 PM –1:30 PM</td>
<td>12:50 PM-1:25 PM - Exposure Assessment (EASG), Risk Communication (RCASG), Applied Risk Management (ARMSG), Decision Analysis and Risk (DARSG), Advanced Materials and Technologies (AMTSG), Engineering &amp; Infrastructure (EISG), Microbial Risk Analysis (MRASG), Resilience Analysis (RASG)</td>
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<td>1:30 PM-3:00 PM</td>
<td>Meeting Room 3: M3-E: Foundations of Risk Analysis 1</td>
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<td>1:30 PM-3:00 PM</td>
<td>Meeting Room 4: M3-F: Roundtable: Interdisciplinary Perspectives on the U.S. Executive Order on Biotechnology</td>
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<td>Meeting Room 5: M3-G: Risk Resilience at the Community Level</td>
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<td>1:30 PM-3:00 PM</td>
<td>Meeting Room 16: M3-H: Symposium: Climate Change Countermeasures and Risk</td>
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<td>3:00 PM-3:30 AM</td>
<td><strong>Coffee Break</strong>, <em>Potomac Ballroom Foyer</em></td>
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<td>3:00 PM-3:30 AM</td>
<td>Meeting Room 3: M4-E: Roundtable: Resilience at Country Scale: Case of Ukraine</td>
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<td>Meeting Room 4: M4-F: Risk Analysis in Agriculture</td>
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<td>3:00 PM-3:30 AM</td>
<td>Meeting Room 5: M4-G: Communicating Science</td>
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<tr>
<td>3:00 PM-3:30 AM</td>
<td>Meeting Room 16: M4-H: Advancements in Modelling: Dose-Response and Exposure</td>
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<tr>
<td>6:00 PM-8:00 PM</td>
<td><strong>Poster Reception</strong>, <em>Potomac Ballroom</em></td>
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### Tuesday

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<td><strong>8:30 AM-10:00 AM</strong></td>
<td><strong>Keynote Session</strong> – Risk Management of AI: How Should We Prepare? <strong>Rock Creek Ballroom</strong></td>
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<td>9:00 AM</td>
<td>T2-A: Food Safety Policies: Update on Recent Risks and Regulations</td>
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<td>10:30 AM</td>
<td>T2-C: Foodborne Microbial Risks</td>
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<td>10:45 AM</td>
<td>T2-D: Advances in Natural Hazards Modeling</td>
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<td><strong>10:30 AM-12:00 PM</strong></td>
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<td>12:00 PM-1:30 PM</td>
<td><strong>SRA Business Meeting and Awards Lunch, Potomac Ballroom</strong></td>
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<td>12:30 PM</td>
<td>T3-A: Roundtable: THE FUTURE OF The Democratic Process and the Clean Energy Transformation in a Post-Truth Society</td>
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<td>12:30 PM</td>
<td>T3-B: Roundtable: Improving Communication of Risk and Uncertainty Across Federal Agencies</td>
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<td>T3-C: International Food Security Risks</td>
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<td>T3-D: Risk impacts of tropical cyclones</td>
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<td>3:30 PM</td>
<td>T4-A: Roundtable: Does risk analysis have a future? A transatlantic perspective</td>
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<td>3:30 PM</td>
<td>T4-B: Symposium: Watershed Resilience for Low-Capacity Communities</td>
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<td>4:00 PM</td>
<td>T4-C: Symposium: Food Safety and Security Measures</td>
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<td>4:45 PM</td>
<td>T4-D: Natural Hazards Infrastructure Resilience</td>
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<td>10:30 AM - 12:00 PM</td>
<td>T2-E: Roundtable: Hierarchy of Use: Risk Decision-making and Integrated Thinking</td>
<td>Meeting Room 3</td>
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<td>10:30 AM - 12:00 PM</td>
<td>T2-F: Roundtable: Understanding the Potential of Wastewater-Based Epidemiology for Risk Management</td>
<td>Meeting Room 4</td>
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<td>10:30 AM - 12:00 PM</td>
<td>T2-G: Security and Disaster Management</td>
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<td>10:30 AM - 12:00 PM</td>
<td>T2-H: Symposium: New Approaches to Measure Perceptions and Decision-Making Regarding Risks and Technologies: A Methodological Exchange</td>
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<td>12:00 PM-1:30 PM</td>
<td>T3-E: The Economics of Risk: Theory and Global Applications</td>
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<td>T3-F: Roundtable: The Test of Risk Analysis Practice: Quality, Fit for Purpose, or Both?</td>
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<td>T3-G: Symposium: Integrated Disaster Risk Management: Joint Session with the International Society for Integrated Disaster Risk Management</td>
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<td>12:00 PM-1:30 PM</td>
<td>T3-H: Lightning Talks: Risk Assessment Potpourri: microbial, dermal, epidemiologic, and metal modelling</td>
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<td>T4-E: Risk in Critical Industrial Sectors</td>
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<td>1:30 PM-3:00 PM</td>
<td>T4-F: Roundtable: Integrated Engineering, Public Health, and Data Analytics: A Holistic Approach towards Crisis Mitigation, Response, and Recovery</td>
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<td>T4-G: Risk Communication and Perception for Social Systems</td>
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<td>T4-H: Symposium: Risk Communication in the Public Sector: Challenges and Successes in Applying Science Across Government</td>
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## Wednesday

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<th>Time</th>
<th>Rock Creek Ballroom</th>
<th>River Birch A</th>
<th>River Birch B</th>
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<tr>
<td><strong>8:30 AM-10:00 AM</strong></td>
<td><strong>W1-A: Symposium: Water Security and Systems Analysis for Infrastructure Development</strong></td>
<td><strong>W1-B: Symposium: Resilience in Transportation Systems</strong></td>
<td><strong>W1-C: Symposium: Innovative Approaches to the Risk Assessment and Risk Management of Emerging Substances</strong></td>
<td><strong>W1-D: Symposium: Computational applications in Sustainability, Resilience, Equity, &amp; Engineering</strong></td>
<td><strong>W1-E: Statistical Models for Engineering and Infrastructure System</strong></td>
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<td><strong>10:30 AM – 12:00 PM</strong></td>
<td><strong>W2-A: Symposium: Cost-Benefit Analysis for Critical Infrastructure Cybersecurity</strong></td>
<td><strong>W2-B: Symposium: Exploring Multi-Faceted Impacts of Climate Change on Energy Infrastructure</strong></td>
<td><strong>W2-C: Renewable energy and climate change mitigation</strong></td>
<td><strong>W2-D: Natural Hazards Perception &amp; Communication</strong></td>
<td><strong>W2-E: Foundations of Risk Analysis 2</strong></td>
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<td><strong>12:00 PM – 1:30 PM</strong></td>
<td><strong>Keynote Session – Root Cause Analysis to Reduce and Communicate Risks: Lessons from an Astronaut and Engineer in Healthcare Management, Potomac Ballroom</strong></td>
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<td><strong>1:30 PM-3:00 PM</strong></td>
<td><strong>W3-A: Roundtable: Space Risk: Planetary Protection against Contamination and Planetary Defense against Asteroids</strong></td>
<td><strong>W3-B: Climate Change and Public Health</strong></td>
<td><strong>W3-C: Adaptive Capacity and Preparedness</strong></td>
<td><strong>W3-D: Environmental Justice, Hazards, and the Built Environment</strong></td>
<td><strong>W3-E: Symposium: Exploring the Role of Psychological Factors in Shaping Judgments and Decisions on Societal Issues</strong></td>
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<td><strong>W4-A: Roundtable: Taking [some of] the Wicked out of the Cyber Problem</strong></td>
<td><strong>W4-B: Roundtable: Overview of Proposed SRA Bylaws Changes and Q&amp;A</strong></td>
<td><strong>W4-C: Roundtable: New Developments in Economic Impact Assessments of Risk Reducing Policies</strong></td>
<td><strong>W4-D: Symposium: Wildland Fire – Managing Risk and Impacts</strong></td>
<td><strong>W4-E: Risk Visualization, Perception, and Communication</strong></td>
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<td>Meeting Room 4</td>
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<td>Meeting Room 16</td>
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<td>1:30 PM - 3:00 PM</td>
<td>W3-F: Symposium: Bringing Sex Toys Out of the Dark – A Convergent Approach to Identifying and Mitigating Potential Health Risks</td>
<td>W3-G: Antecedents to Trust and Behavior</td>
<td>W3-H: Cyber: Indicators vs Regulators</td>
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Monday

Technical Program

10:30 AM – 12:00 PM

M2-A: Environmental Justice and Marginalized Communities
Rock Creek Ballroom
Chair: Andrew Hardwick

10:30 am M2-A.1
Ghosts in the built microbiome: the negative influence of racism and sexism on accurate built microbiome engineering and policy making
Andrew Hardwick, Joe Graves, Jennifer Kuzma, Christopher Cummings, Joe Brown
North Carolina State University, North Carolina Agricultural and Technical State University, USACE, The University of North Carolina at Chapel Hill

10:35 am M2-A.2
Potential human health risks associated with the use of cosmetics and personal care products in minority populations.
Abdel-Razak Kadry, Babasaheb Sonawane
University of Maryland, Georgetown University, TRACS, LLC

10:40 am M2-A.3
Fact check your health: Improving health research literacy among females using a podcast-based intervention
Katie Byrd, Sydney Miller
University of Southern California

10:45 am M2-A.4
Housing affordability and disproportionate flood risk exposure of economically insecure residents in Canada
Liton Chakraborty, Jason Thistlethwaite, Daniel Henstra
University of Waterloo

10:30 AM – 12:00 PM

M2-B: Poster Platform: Risk Perception & Communication
River Birch A
Chair: Amanda Boyd

10:30 am M2-B.1
Trauma-informed risk communication and community engagement
Amelia Hertzberg
ORISE EPA

10:35 am M2-B.2
Social-psychological factors influencing risk perceptions of chronic wasting disease on social media
Alisius Leong, Bruce Lauber, William Siemer, Jeremy Hurst, Richard Stedman, Krysten Schuler, Katherine McComas
Cornell University, New York State Department of Environmental Conservation

10:40 am M2-B.3
Understanding and Tolerance in Communication about COVID-19 in Japan
Maho Ishibashi, Naoya Sekiya
The University of Tokyo

10:45 am M2-B.4
Numeracy and Stated Preference Valuation
Michael Eber
Harvard University

10:50 am M2-B.5
An analysis of public’s risk perception toward the offshore release of ALPS treated water at TEPCO’s Fukushima Daiichi Power Station and its causes
Midori Aoyagi, Ikuma Ogura
National Institute for Environmental Studies, Ibaraki University

11:00 AM – 12:00 PM

M2-C: Artificial Intelligence and Risk Analysis 1
River Birch B
Chair: Seth Guikema

10:30 am M2-C.1
Perception and enjoyment of AI-generated narratives in the age of artificial intelligence
Haoran Chu, Sixiao Liu
University of Florida, University of Pennsylvania

10:50 am M2-C.2
Tracking risks of AI in healthcare applications: a multi-layer risk register approach
Negar Moghadasi, Rupa S. Valdez, Misagh Piran, Negar Moghadasi, Thomas L. Polmateer, Davis Loose, James H. Lambert
University of Virginia, Western University of Health Sciences

11:10 am M2-C.3
Machine learning to predict total and pathogenic Vibrio parahaemolyticus concentrations in seawater and oysters
Shuyi Feng, Shradhha Karanth, Esam Almuhaideb, Salina Parveen, Abani Pradhan
University of Maryland College Park, University of Maryland Eastern Shore

11:30 am M2-C.4
Forecaster perceptions of trustworthiness, explainability, and interpretability in the context of AI-derived guidance
Mariana Cains, Christopher Wirz, Julie Demuth, Ann Bostrom
National Center for Atmospheric Research, NCAR, University of Washington

11:45 am M2-C.5
Enhancing FDA’s communication on foodborne illness outbreaks and food recalls through consumer research: An overview of a research program
Fanfan Wu, Amy Lando, Linda Verrill, Lindsay Walerstein
U.S. Food and Drug Administration (FDA)

11:50 am M2-C.6
The Role of Political Identity Matching in Predicting Climate Change Attitudes and Risk Perceptions
Raphaela Martins Velho, Janet Yang
University at Buffalo

11:55 am M2-C.7
Misinformation and Digital Health Literacy Among American Indian and Alaska Native People
Amanda Boyd, YingChia Hsu, Erin Morgan, Magdalena Haakenstad, Juliana Garcia, Lucas Gillespie, Denise Dillard
Washington State University

12:00 AM – 02:00 PM

M2-D: Special Session: Risk Communication Fundamentals
River Birch C
Chair: Andrew Hardwick

11:00 AM – 12:00 PM

M2-D.1
Evolving risk communication: Past, present and future
Andrew Hardwick
North Carolina State University

11:30 AM – 12:00 PM

M2-D.2
Using games for risk communication
Lynne Devine
University of California, Berkeley

12:00 AM – 02:00 PM

M2-D.3
Risk communication and narrative: A comparison of two case studies
Lutz Kuklinsky
University of California, Berkeley

12:30 AM – 02:00 PM

M2-D.4
The role of social media in risk communication
Seth Guikema
University of Michigan
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<td><strong>10:30 AM – 12:00 PM</strong></td>
<td>M2-D: Symposium: Infrastructure Resilience at Local and Regional Scales</td>
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<td><strong>Meeting Room 2</strong></td>
<td>Chair: Andrew Pfluger</td>
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<td><strong>10:30 am</strong></td>
<td>Increasing Infrastructure Resilience through Optimization Scalability Heuristic</td>
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<td>Kelsey Stoddard</td>
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<td>US Army Corps of Engineers – ERDC</td>
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<td><strong>10:50 am</strong></td>
<td>Infrastructure Resilience to Mold for Military Installations</td>
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<td>Margaret Kurth, Matthew Joyner</td>
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<td>USACE ERDC</td>
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<td><strong>11:10 am</strong></td>
<td>Resilience of wastewater treatment facilities to individual and compound stressors</td>
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<td>Andrew Pfluger</td>
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<td>USMA</td>
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<td><strong>11:30 am</strong></td>
<td>A Geospatial MCDA Tool for Distributed Emergency Response Resources</td>
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<td>Andrew Jin, Leonardo Bautista, Igor Linkov, Kelly Sanders</td>
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<td>University of Southern California, Engineer Research and Development Center, U.S. Army Corps of Engineers</td>
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<td><strong>10:30 AM – 12:00 PM</strong></td>
<td>M2-E: Roundtable: Risk science and politics: What is and should be the relationship?</td>
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<td><strong>Meeting Room 3</strong></td>
<td>Chair: Terje Aven</td>
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| **10:30 am**   | Risk science can be seen as the most updated and justified knowledge—in the form of concepts, principles, approaches, methods and models—for understanding, assessing, characterizing, communicating and handling risk, with applications. It is also about the practice that gives us this knowledge. It is commonly stated that it should be a goal for risk science to be politically neutral. This panel will discuss the meaning and appropriateness of this goal. In particular, the panel will debate the position of the Society for Risk Analysis (SRA) on this matter. Recently, an SRA policy has been formulated on promoting risk science in decision-making (SRA 2022). The policy states that SRA’s charge is to promote the role of risk science in decision-making and be actively engaged in translating risk science to policy and other decision makers. It highlights that SRA should not make policy recommendations or recommend specific solutions to societal problems. It is, however, mentioned that, in rare cases, SRA may endorse a specific policy or solution. The cases are defined in the following way:
|               | Such endorsement would be appropriate only when the complex participatory process of engaging the full range of experts, stakeholders, and citizens for consensus building has taken place and a specific solution is supported by analysis that is consistent with the best practices of risk analysis. In such cases, care should be taken to provide a platform for dialogue that incorporates a diverse range of views to minimize potential biases (SRA 2022) As all professional societies, SRA builds its existence and activities on certain values and policies. Historically, SRA has been clear on being politically neutral in the sense of not making policy recommendations or recommending specific solutions to societal problems. It can be discussed if the SRA (2022) statement is in line with this historical SRA perspective. |
|               | Panelists • Felicia Wu  
|               | Marja Ylonen  
|               | Seth Guikema  
|               | Robyn Wilson |
| **10:30 AM – 12:00 PM** |                                                                       |
| **10:30 AM – 12:00 PM** | M2-F: Symposium: How to build a microbial profile for a Salmonella quantitative microbial risk assessment; data analyses from the front lines  |
| **Meeting Room 4** | Chair: Joanna Zablotsky Kufel                                               |
| **10:30 am**   | Overview of the Food Safety and Inspection Service’s Salmonella in Poultry Initiative and Risk Assessments. Joanna Zablotsky Kufel USDA FSIS  |
| **10:45 am**   | Deep dive on the data: Analysis of FSIS serotype data  |
|               | Drew Posny  
|               | United States Department of Agriculture, Food Safety and Inspection Service  |
| **11:00 am**   | Concentration and Prevalence: Duality or Tautology  |
|               | Michael Williams, Iva Bilanovic*  
|               | United States Department of Agriculture, Food Safety and Inspection Service  |
| **11:15 am**   | Beyond 100 Grams: What the NHANES Data Can Tell Us About Poultry Consumption  |
|               | Davia LaBarre, Drew Posny*  
|               | United States Department of Agriculture, Food Safety and Inspection Service  |
| **11:30 am**   | Why Metadata Matters: Lessons For Public-Private Data Partnerships  |
|               | Iva Bilanovic  
|               | United States Department of Agriculture, Food Safety and Inspection Service  |
| **10:30 AM – 12:00 PM** |                                                                       |
| **10:30 AM – 12:00 PM** | M2-G: Symposium: Applying the Quantitative Microbial Risk Assessment Framework Across Alternative Exposure Scenarios  |
| **Meeting Room 5** | Chair: Ainsley Otten                                                    |
| **10:30 am**   | How DNA Extraction Techniques Affect QMRA Results in Occupational, Recreational, and Drinking Water Exposures of Cryptosporidium Alexs Mraz, Kayla Shorter*  
|               | The College of New Jersey  |
| **10:45 am**   | Applying QMRA to Inform Mpox Risk Management  |
|               | Jade Mitchell  
|               | Michigan State University  |
| **11:00 am**   | Exposures to Legionella and Mycobacterium Avium Complex (MAC) from Indoor Water Uses  |
|               | Ryan Julien  
|               | Michigan State University  |
| **11:15 am**   | Decision Support for Economic Valuation of Food Safety Risk Reduction  |
|               | Carly Gomez  
|               | Michigan State University  |
| **11:30 am**   | Case Study and Review of Risk Factors for Aerosol Exposure to Coccidioides Spp.  |
|               | David Kahn  
|               | Drexel University  |
This roundtable brings together a multidisciplinary panel of experts to discuss their latest thinking and research on so-called attenuated risk issues. In contrast with amplified risks, attenuated risks refer to those risks which experts judge to be serious, but receive disproportionately little concern, sociopolitical activity, and/or attention from society. While oft-cited examples include naturally occurring radon, automobile accidents, and tobacco smoking, panelists will discuss contemporary contexts relating to electronic cigarettes, lead ammunition poisoning, dioxin, alcohol use, opioids pre-2010, and aquaculture facility siting. This will lay the foundations for a broader discussion addressing the current state and future directions of research and practice on attenuated risk issues. The central purpose of the roundtable is to stimulate a lively debate on a class of risk issues that are all too often overlooked. Along with opening-up the discussion to audience contributions, panelists will be asked to consider at least three key questions. What do we really mean when we classify something as an attenuated versus amplified risk issue? What are the mechanisms, processes, and effects of risk attenuation in the context of the social amplification of risk framework? To what extent and how should risk communicators vary their approaches when communicating about attenuated risk issues?

Panelists
- Katherine McCornas
- Robin Cantor
- Laura Rickard
- Jeff Niederdeppe
- Adam Zweckle
- Nick Pidgeon
Monday

1:30 PM – 3:00 PM

M3-C: Artificial Intelligence and Risk Analysis 2

River Birch B

Chair: Christopher Wirz

1:30 pm M3-C.1
The use of artificial intelligence in the instrumentalization of disaster classifiers
Samir Batista Fernandes, Marcelo Luciano Vieira, Rodrigo Werner da Silva, Wagner Dos Anjos Carvalho Instituto Científico e Tecnológico em Defesa Civil, Faculdade Presbiteriana Mackenzie Rio

1:45 pm M3-C.2
Quantum chemistry and machine learning to predict environmental fate of polymers
Kevin Hickey, Jeremy Feinstein, Cheng Wang, Margaret MacDonell Argonne National Laboratory

2:00 pm M3-C.3
A foggy forecast: Expert perceptions of new AI guidelines for operational decision making
Christopher Wirz, Julie Demuth, Miranda White, Mariana Cains, Philippe Tissot, Jacob Radford, Hamid Kamangir, Evan Krell, Ann Bostrom, Scott King, John Williams National Center for Atmospheric Research, Texas A&M University, Cooperative Institute for Research in the Atmosphere, University of Washington, The Weather Company, National Weather Service

2:15 pm M3-C.4
Resilience Stress Testing Using a Digital Twin at Dallas Fort-Worth Airport (DFW)
Robert Horton, Gregory Kiker, Ben Trump, Evangelina Agapaki, Igor Linkov Dallas Fort Worth International Airport, University of Florida

2:30 pm M3-C.5
Open-source data pipeline for street-view images: a case study on community mobility during COVID-19 pandemic
Matthew Martell, Nick Terry, Ribhu Sengupta*, Christopher Salazar, Nicole Errett, Scott Miles, Youngjun Choe, Joseph Wartman University of Washington

1:30 PM – 3:00 PM

M3-D: Water, Infrastructure and Sea-Level Rise

Meeting Room 2

Chair: Gina Tonn

1:30 pm M3-D.1
Functional Isolation: The compounding burden amidst cascading infrastructure network failures and disrupted supply chains
Mitchell Anderson, Tom Logan, Logan Brunner University of Canterbury

1:50 pm M3-D.2
Engineering analysis for climate resilience of highway bridges
Gina Tonn Verdantas

2:10 pm M3-D.3
Analyzing the impact of sea level rise and increased flooding on coastal septic system failure
Emily Speierman, Allison Reilly University of Maryland, College Park

2:30 pm M3-D.4
How do Hurricanes and Federal Aid Affect Eviction Risk? Decade-Long Evidence from the United States
Qian He, Kelsea Best, Allison Reilly, Deb Niemeier Rowan University, University of Maryland

1:30 PM – 3:00 PM

M3-E: Foundations of Risk Analysis 1

Meeting Room 3

Chair: Maksim Kitsak

1:30 pm M3-E.1
Strategic risk analysis
Elisabeth Pate-Cornell, Marc Eskew Stanford

1:50 pm M3-E.2
On the use of the term “real risk”
Roger Flagle, Terje Aven, Ingrid Glette-Versen University of Stavanger

2:10 pm M3-E.3
Uncertainty in relation to risk: How can the risk field and policymakers’ views be aligned?
Sanja Mrksic Kovacevic, Frederic Bouder University of Stavanger

2:30 pm M3-E.4
Are Civilizations Destined to Collapse? Lessons from the Mediterranean Bronze Age

1:30 PM – 3:00 PM

M3-F: Roundtable: Interdisciplinary Perspectives on the U.S. Executive Order on Biotechnology

Meeting Room 4

Chair: Khara Grieger

Innovative biotechnologies applied across sectors present enormous potential to help address societal goals and to design and achieve more sustainable and resilient societies. Biotechnology broadly refers to innovations in the life sciences, including application of genetic engineering and genome editing to insert or modify specific gene sequences in living organisms, and the use of biological systems to develop products. Recent innovations in genome editing show particular promise in improving food and nutrition security, enabling sustainable agricultural practices, and supporting resilient supply chains, among other benefits in the bioeconomy. Some benefits have already been proven in human health applications, including in the development of vaccines. To realize the potential of biotechnology safely and sustainably, processes are needed to identify and mitigate potential risks and unintended impacts.

The Biden Administration issued an Executive Order (EO) on “Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy” on September 12, 2022 that included sections on Biotechnology Regulation Clarity and Efficiency (Section 8) and Reducing Risk by Advancing Biosafety and Biosecurity (Section 9). Combined, these parts of the EO task the federal government with developing an enabling environment for innovation while ensuring appropriate risk mitigation throughout research, development, and commercialization. In addition, the EO requires development of strategies to grow the U.S. bioeconomy, including setting research priorities, data for the bioeconomy, workforce development, and international engagement, as well as actions to protect national security. The EO also opens a window for policy discussion between stakeholders and regulatory agencies regarding oversight of biotechnologies and resulting products.

Panelists
- Christopher Cummings
- Zachary Brown
- Nick Loschin
- Ilaria Cimadori
### Monday

#### 1:30 PM – 3:00 PM

**M3-G: Risk Resilience at the Community Level**  
**Meeting Room 5**  
Chair: Laura Rickard

- **1:30 pm**  
  Using Twitter to evaluate wildfire smoke risk communications in Oregon and Washington  
  Catherine Slavik, Alex Segre Cohen, Daniel Chapman, Nahla Bendefaa, Ellen Peters  
  University of Oregon

- **1:45 pm**  
  Trust, sense of place, risk perception and their effects on cooperation with recirculating aquaculture system developments  
  Nathan Smith, Laura Rickard, Branden Johnson  
  University of Maine, Decision Research

- **2:00 pm**  
  Government’s Disaster Recovery Efforts and Disaster Reconstruction: Human-Centered Approach following 2015 Nepal Earthquake Recovery Process  
  Jungwon Yeo  
  University of Central Florida

- **2:15 pm**  
  Prioritization of Hazard Mitigation Projects in the State of Illinois  
  Mia Renna  
  University of Maryland College Park

#### 1:30 PM – 3:00 PM

**M3-H: Symposium: Climate Change Countermeasures and Risk**  
**Meeting Room 16**  
Chair: Yasonobu Maeda

- **1:30 pm**  
  Climate change and plastic ban  
  Yasonobu Maeda, Pooja Pragati Suresh  
  Shizuoka University, Boeing Commercial Airplanes

- **1:45 pm**  
  Challenges of groundwater management and its associated risks in Taiwan under climate change  
  Shih-Yao Lee, Tailin Huang, Hwa Lung Yu  
  National Taiwan University, National Cheng Kung University

- **2:00 pm**  
  Risk and public perception of hydrogen utilization technology as a climate change countermeasure: a case study of hydrogen refueling stations in Japan  
  Kyoko Ono  
  RISS, AIST

- **2:15 pm**  
  Consideration on land use optimization for coexistence of disaster prevention, climate change and biodiversity  
  Satoru Yusa, Yuichiro Usuda  
  National Research Institute for Earth Science and Disaster Resilience

- **2:30 pm**  
  Exploring public risk perceptions of climate change and carbon dioxide removal in Malaysia  
  Elspeth Spence, Nick Pidgeon, Melissa Payne, Emily Cox  
  Cardiff University, South East Asia Rainforest Research Partnership

#### 3:30 PM – 5:00 PM

**M4-A: Roundtable: Federal Activities to Address Needs of Overburdened Communities**  
**Rock Creek Ballroom**  
Chair: Chris Frey

The U.S. Federal Government is engaged in a whole-of-government approach to address the needs of overburdened and underserved communities in response to Executive Orders 13985, 14008, 14091, and 14096. This roundtable will provide an overview of what several Federal agencies are doing to address the needs of over-burdened communities in a variety of decision contexts. These decision contexts include, but are not limited to, promoting community health, wellbeing, and quality of life, improving climate readiness and resilience to changing climate, identifying interventions related to aging infrastructure, and ensuring decision processes that promote participatory justice by supporting community-engaged activities. In addition to intramural and extramural research activities to expand and develop the science to inform decisions to improve outcomes for overburdened communities, Federal agencies are developing and implementing policies and programs to deliver resources and solutions to such communities.

**Panelists**  
- Igor Linkov  
- Gretchen Goldman

#### 3:30 PM – 5:00 PM

**M4-B: Roundtable: New Frontiers in Risk Analysis at the Intersection of ESG, Capitals Assessment, Valuation, and Human Health**  
**River Birch A**  
Chair: Fred Boelter

This session explores the turbulent ESG, capitals, and valuation space in terms of risk analysis and risk management contexts, and how the perceptions, views, etc. of stakeholders come together in decision-making in managing risk. The speakers bring occupational health and safety expertise in science, regulatory development, executive management, and consensus standards development to this inquiry; and, posit that there is an imperative to apply Risk Analysis: Fundamental Principles (SRA, 2018) to these topics.

An overview of ESG and capitals-thinking frameworks sets the stage for addressing how stakeholders and shareholders are navigating these spaces, how they are assessing risk, and how integrated decision-making is being done around business, operating decisions, and the ability to attract capital investment. Speakers will engage in discussions on ESG frameworks (e.g., GRI, SASB, ISSB), integrated capitals assessment (e.g., Capitals Coalition), conformity assessment (e.g., rating agencies and regulators), and valuation methods.

ESG’s originating focus is fiduciary (e.g., finance, investment) and for many the hard currency is carbon. Many others view ESG as creating an opportunity to improve global and human health, including worker and environmental health.

Is it not a fallacy to be forced to choose between creating wealth and jobs or creating healthier workplaces and a healthier world? U.S. Senator from Illinois Paul Douglas (b.1892-d.1976) saw such fallacies as a false-choice and pressed for answers on how to obtain both. From this centering perspective, a premise put forth in this session is to follow the money while putting human health at the center of ESG-related analysis and decision-making.

**Panelists**  
- Frank Hearl  
- Chia-Chia Chang  
- Silvia Maberti  
- Paul Harper  
- Fred Boelter
Monday

3:30 PM – 5:00 PM

M4-C: Symposium: Sustainable Food Systems: Risks and Perceptions
River Birch B
Chair: Adam Zwickle

3:30 pm M4-C.1
Leveraging a Systems Approach to Environmental Health
Adam Zwickle, Latifa Salangi, Rachel Szczykto, Joe Hamm
Michigan State University

3:50 pm M4-C.2
Incorporating Superorganisms in OneHealth Approaches
Margaret Coleman, D. Warner North Coleman Scientific Consulting, Northworks

4:10 pm M4-C.3
Don’t say “vegan” or “plant-based”: Food without meat and dairy is more likely to be chosen when labeled as “healthy” and “sustainable”
Patrycja Sleboda, Wandi Bruine de Bruin, Tania Gutsche, Joe Árvai
University of Southern California

4:30 pm M4-C.4
Oilfield produced water for crop irrigation: Is it a sustainable and safe solution?
Jennifer Hoponick Redmon, Donna Womack, Ted Lillys, Ayner Vengoshi, AJ Kondash
RTI International, Duke University

3:30 PM – 5:00 PM

M4-D: Infrastructure Resilience
Meeting Room 2
Chair: Logan Brunner

3:30 pm M4-D.1
Sensitivity analysis on the vulnerability of interdependent infrastructure
Logan Brunner, Tom Logan
University of Canterbury

3:45 pm M4-D.2
Critical Interdependencies Assessment for Resilience of Facilities
Rachid Ouache, David Bristow
UVIC, University of Victoria

4:00 pm M4-D.3
Serious gaming for teaching complex human-technical systems experiencing shocks: An application to interdependent infrastructure recovery
Mohammad Reza Yazdi-Samadi, Allison Reilly, Matthew Gabb, Michele Gerst, Melissa Kenney
University of Maryland, City of Edina’s Sustainability Division, University of Minnesota

4:15 pm M4-D.4
The resilience curve is a poor model of resilience
Daniel Eisenberg, Thomas Seager, David Alderson
Naval Postgraduate School, Arizona State University

4:30 pm M4-D.5
Prediction Markets for Critical Infrastructure Risk Assessment
Benjamin Bonin, Cyrus Bonyadi*, Nathan Clough, Elizabeth McCarthy, Megan Nyre-Yu, Nick Winstead
Sandia National Laboratories, Zeichner Risk Analytics

3:30 PM – 5:00 PM

M4-E: Roundtable: Resilience at Country Scale: Case of Ukraine
Meeting Room 3
Chair: Igor Linkov

3:30 pm M4-E.1
Digital Transformation at the time of war
Yegor Dubinsky
Ministry of Digital Transformation, Ukraine

3:50 pm M4-E.2
USA/Ukraine Cybersecurity Collaboration
Brandon Wales
DHS/CISA

4:10 pm M4-E.3
Impact of Ukraine/Russia Conflict on Global Food Security
Olga Shashkina
Independent Consultant

4:30 pm M4-E.4
bridgeUkraine Initiative (www.bridgeUkraine.org)
Stergios-Aristoteles Mitoulis
University of Birmingham

3:30 PM – 5:00 PM

M4-F: Risk Analysis in Agriculture
Meeting Room 4
Chair: Gregory Kiker

3:30 pm M4-F.1
Exploring weather information seeking and processing among Illinois Farmers
Shupei Yuan
Northern Illinois University

3:45 pm M4-F.2
The key factors for engaging small farmers in effective risk management
Xuanli Liu
Fort Valley State University

4:00 pm M4-F.3
A data-driven approach to assess the impact of climate change on the agriculture sector in Jordan
Yingqiang Yu
Vanderbilt University

4:15 pm M4-F.4
Assessing Climate Change Effects on Global Rangeland Dynamics and Livestock Productivity
Gregory Kiker, Savannah Morgan, Eric Pitts, Kate Vaiknoras, Jayson Beckman, Randall Boone, Ephraim Nkonya
University of Florida, United States Department of Agriculture Economic Research Service, Colorado State University

4:30 pm M4-F.5
Preventing Chagas disease through promoting hygienic processing of acai berries: A case study of a successful risk communication program for two communities in the Brazilian Amazon
Ben Rhodan Pereire, Bret Shaw, Dominique Brossard, Walter Lima Junior
Rutgers University, University of Wisconsin – Madison, Universidade Federal do Para
Monday

### 3:30 PM – 5:00 PM

**M4-G: Communicating Science**

*Meeting Room 5*

Chair: John Besley

- **3:30 pm M4-G.1**
  Credible communications: scientific integrity, transparency and knowledge mobilization
  Steven Gibb
  IAFNS

- **3:50 pm M4-G.2**
  Environmental Scientists Have Limited Experience Receiving Communication Support
  John Besley
  Michigan State University

- **4:10 pm M4-G.3**
  Uncertainty and HIV-cure science: a message experiment
  Sebastiaan Gorissen, Yi Liao, Jakob Jensen, Joshua Barbour, Kevin John*, Dallin Adams, Chelsea Ratcliff
  Minot State University, University of Utah, University of Texas at Austin, Brigham Young University, The University of Georgia

- **4:30 pm M4-G.4**
  Communicating Emerging Energy Research to the Public: A Message Experiment Examining Uncertainty, Source, and Bandwagon Cues
  Kevin John, Jakob Jensen, Yi Liao, Sebastiaan Gorissen, Camilla Owens, Dallin Adams, Manu Pokharel, Chelsea Ratcliff
  Brigham Young University, University of Utah, Minot State University, Texas State University, The University of Georgia

### 3:30 PM – 5:00 PM

**M4-H: Advancements in Modelling: Dose-Response and Exposure**

*Meeting Room 16*

Chair: Tony Cox

- **3:30 pm M4-H.1**
  What is an exposure-response curve?
  Tony Cox
  Cox Associates

- **3:50 pm M4-H.2**
  Utilization of life expectancy losses as a risk assessment metric: the case of crystalline silica
  Andrey Korchevskiy
  Chemistry & Industrial Hygiene, Inc.

- **4:10 pm M4-H.3**
  Increasing scientific confidence in exposure models to accelerate the pace of their application for chemical assessments
  Richard Becker, Elke Jensen, Paul Deleo, Rosemary Zaleski, Jon Arnot
  American Chemistry Council, Dow, Lumina Consulting, L.L.C., ARC Arnot Research & Consulting
Monday

6:00 PM – 8:00 PM

Poster Session
Potomac Ballroom

P.1 Nomophobia among university students in five Arab countries in the Middle East: prevalence and risk factors
Abdallah Naser, Hassan Alwafi, Mohamed Bahlool, Amer Abuhalaf, Sami Qadus
Isra University, Umm Al-Qura University, Egyptian Russian University, University of Florida

P.7 Measuring Resilience Across Multiple Dimensions: Strategies for Expert Elicitation
Victoria Kraemer, Casey Canfield
Missouri University of Science and Technology

P.8 Occupational health risk assessment for Indium phosphide and Indium compounds
Pei-Yi Chen, Kuen-Yuh Wu
National Taiwan University

P.9 Whose opinions should be heard? Comparison of newspaper coverage of children's health check-ups
Midori Aoyagi
National Institute for Environmental Studies

P.10 March 2023 Arkansas Tornadoes: social media use by public organizations
Rejina Manandhar
Arkansas Tech University

P.11 Linking risk and sustainability through rational decision-making
Sandra Seno Alday, Anca Hanea
The University of Sydney Business School, The University of Melbourne

P.12 Effects of social determinants of health on perception of environmental health risk
Rachel Szczytko, Adam Zwickle, Joe Hamm, Latifa Salangi
Michigan State University

P.13 How narrative and framing in risk communication change public risk responsive behavior: evidence from a survey experiment
Chuanshen Qin, Zhuling Liu
Shanghai Jiao Tong University

P.14 Work remotely or work from the office? Efficiency versus resilience in collaborating teams
Maksim Kitsak, Igor Linkov, Benjamin Trump
Delft University of Technology, US Army Engineer Research and Development Center, US Army Corps of Engineers

P.15 Examining psychological distance and construal level effects on people’s disease barrier perception about online health consultation
Shuo Yao, Haoran Chu
University of Florida

P.16 Machine learning-based prediction of Salmonella genetic patterns associated with different stages of chicken production
Shraddha Karanth, Abani Pradhan
University of Maryland, College Park

P.17 Using bayesian statistical methods to interpret clinical trial data for gossypol dose-response assessments
EnYu Chen, Su-Yin Chiang, Kuen-Yuh Wu
National Taiwan University, China Medical University

P.18 Advancing health equity by addressing dioxin risks
Latifa Salangi, Adam Zwickle, Rachel Szczytko, Joe Hamm
Michigan State University

P.19 Application of quantitative microbial risk assessment to respiratory pathogens and implications for uptake in policy
Lizhan Tang, Timothy Julian, Kerry Hamilton
Swiss Federal Institute of Aquatic Science and Technology, Arizion State University

P.20 Impacts of Psychoactive Drugs on the Survival and Locomotion of C. virginica Oyster Larvae
Gustavo Salcedo, Sheree Pagsuyoin
University of Massachusetts, UMass Lowell

P.21 Public pathways to net zero: mapping the landscape of attitudes towards decarbonised heating technologies among the UK public
William Smith, Christina Demski, Nick Pidgeon
Cardiff University, University of Bath

P.22 Our Shot to Improve Vaccine Uptake: Evaluating Gain-Loss Framing in the Bivalent COVID-19 Vaccine Context
Kyle Chambers, Haoran Chu
University of Florida

P.23 Proposal to develop assessment framework for extractables and leachables in pharmaceuticals taking into account skin sensitization risk
Asaka Fukushima, Tae Hayashi, Masahiro Takeyoshi, Akiko Hirose
Chemical Evaluation and Research Institute, Japan

P.24 Analysis of Factors Affecting Legal Immigration in the United States Using Data and Predictive Analytics
Mahek Karamchandani, Puneet Agarwal, Nika Mahdavi, Boaz Nakhrimovsky, Katrina Apiado
Cal Poly San Luis Obispo, California Polytechnic State University

P.25 Optimizing resource allocation in multi-layered defense systems against probabilistic and strategic risks
Zhiyuan Wei, Jun Zhuang
University at Buffalo
Poster Session
Potomac Ballroom

6:00 PM – 8:00 PM

P.26 Managing occupational health risks in an automated workplace design: a pilot study in artificial intelligence
Pei-Yi Chen, Shao-Zu Huang, Kuen-Yuh Wu
National Taiwan University

P.27 It’s the intensity, not the average: The risk perception gap between scientists and the public on fine dust pollution
Ho Young Yoon
Ewha Womans University

P.28 Per- and polyfluoroalkyl Substances (PFAS) in community water systems in Minnesota
Christopher Greene, Jane de Lambert
Minnesota Department of Health

P.29 Prevalence of Escherichia coli O157:H7 and Salmonella serovars in microgreens grown from contaminated seeds
Ashwarya Rao, Abani Pradhan, Jitendra Patel
University of Maryland, USDA

P.30 Gauging misinformation about COVID-19: types, sources, and risks
Nagwan Zahry, Hong Qin, Azad Hossain
The University of Tennessee-Chattanooga

P.31 Estimating the contribution of private well water to PFAS exposure using a probabilistic modeling approach
Banks Grubbs, Jacqueline MacDonald Gibson
North Carolina State University

P.32 From bioreactors to hospitals: incorporating bench scale studies in mechanistic models to reduce legionellosis outbreaks in healthcare facilities
Kayla Shorter, Alexis Mraz, Nikhil Parab
The College of New Jersey

P.33 Understanding Food Insecurity in Los Angeles County During the COVID-19 Pandemic and its Aftermath: A Qualitative Interview Study
Jose Scott, Wandi Bruine de Bruin, Lila Rabinovich, Kayla de la Haye
University of Southern California

P.34 Distribution of stress response and virulence genes across salmonella enterica isolates from poultry processing
Edmund Benefo, Abani Pradhan
University of Maryland

P.35 Comparative Risk Assessments of Arsenic, Cadmium, Lead, and Mercury in Chinese Herbal Medicines Before and After the Promulgation of Limit Standards
Po-Han Lin, Yun-Yu Wu, Bao-Suei Chang, Kuen-Yuh Wu, Su-Yin Chiang
China Medical University, National Taiwan University

P.36 Evaluating Impacts to the U.S. Department of Defense (DoD) Mission from Changing Regulations and Toxicity Values for Vanadium and Cobalt
Kelsey Hendrixson, Emily Barrett
Nobilis, Inc.

P.37 Projecting the viability of ecological based coastal defense in the US Atlantic coast
Henry Hausmann
University of Maryland College Park

P.38 Positioning risk in secondary education in England
Sarah Duckett
King’s College London

P.39 Disaster risk literacy: an educational approach to building disaster resilient communities
Joshua McDuffie
Vanderbilt University

P.40 Toward a better understanding of the effects of communicating uncertainty: explicating the uncertainty information processing model
Chelsea Ratcliff, Rebekah Wicke, Helen Lillie, Jakob Jensen
The University of Georgia, Cornell University, University of Iowa, University of Utah

P.41 Climate Change Communication for Urban Residents in Southeast Michigan
Sandaruwan Pradeep Kumara Subasinghe Mudiyanselage
Wayne State University

P.42 Title: Exploring Pluralistic Ignorance in Republican Support for Climate Mitigation Policies
Graham Dixon, Christopher Clarke, P. Sol Hart, Jeffrey Jacquet, Darrick Evensen
Ohio State University, George Mason University, University of Michigan, University of Edinburgh

P.43 Air pollution and the risks to public health in the United Arab Emirates: A systematic literature review
Grace Kibroy, Samrin Ahmed Kusum, Jacqueline MacDonald Gibson
North Carolina State University

P.44 Dose-response assessment of dioxin-like mixtures via a Bayesian framework of mechanism-based data integration
Yun Zhou, Kan Shao
Indiana University Bloomington

P.45 A cost-benefit perspective for assessing alternative approaches to lead prevention among homes relying on private wells
Timothy Leung, Jacqueline MacDonald Gibson
North Carolina State University

P.46 Analyzing the redistribution of federal disaster aid through machine learning
Adriana Bryant, Allison Reilly, Deb Niemeier
University of Maryland

P.47 Organic vs nonorganic farming: food safety and risk assessment of glyphosate residues in chicken.
Aleem Waris, Maria Chiesa, Sylvia Costa, Rachel Dubbs
University of Maryland

P.48 Does transparency in fact-checking improve correction acceptance?
Jamie Gentry
University of Florida

P.49 Handling Risks of Catastrophic Cyber Attacks: A Red-Teaming Analysis from Insurance Perspective
Omer Keskin
University of Albany
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<td>Cumulative Impact Assessment: Science and Uncertainty</td>
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<td>P.51</td>
<td>Implementing Environmental Justice in NAAQS: The Perspective of the Regulated community</td>
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<td>Omobola A, American Petroleum Institute</td>
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<td>P.52</td>
<td>Range of the Perfluorooctanoate (PFOA) Safe Dose for Human Health: An International Collaboration</td>
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<td>Michael Dourson, TERA</td>
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<td>P.53</td>
<td>Calibration and evaluation of PFAS toxicokinetics and implementation in a community-facing tool to estimate individual serum levels</td>
<td></td>
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<td>Meghan Lynch, Weihhsueh Chiu, Claire Lay, Rachel Rogers, Abt Associates, Texas A&amp;M University, Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry</td>
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<td>P.55</td>
<td>Engaging Stakeholders and Researchers to Co-Create Sustainable Phosphorus Solutions</td>
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<td>Corieander Griebel, Khara Griebel, North Carolina State University</td>
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<td>P.57</td>
<td>Stakeholder Views and Needs for Decreasing Risk and Increasing Sustainability of Phosphorus Management</td>
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<td>Khara Griebel, Ashton Merck, Corieander Griebel, North Carolina State University, NC State University</td>
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<td>P.59</td>
<td>A picture says thousands of words: unlock the dermal exposure information from pictures using a hybrid deep learning method to support product safety assessment (a proof of concept)</td>
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<td>Hua Qian, Manisha Kotha, Tuan A Tran, Hassan Chuhtai, Haining Zheng, ExxonMobil Biomedical Sciences, Inc., Exxon Mobil, ExxonMobil Technology and Engineering Company</td>
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<td>P.60</td>
<td>Risk-benefit analysis for dioxin and its compounds</td>
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<td>Yongjin Lee, Youngwook Lim, Kyungjun Jung, Yonsei University, Yonsei University, Yonsei University</td>
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<td>P.61</td>
<td>Individual exposure assessment of daily inhaled PM2.5 dose in micro-environments</td>
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<td>Yongjin Lee, Min Ji Park, Dongjun Lee, Taeyeong Yu, Kyungjun Jeong, Yonsei University, Yonsei University, Institute of Environmental Research, Department of Preventive Medicine, Yonsei University</td>
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<td>P.62</td>
<td>Quantitative microbial risk assessment of raw milk for multiple foodborne pathogens in raw milk in the US</td>
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<td>Angelica Godinez Oviedo, Naim Montazeri, Minho Kim, Mohan Li, Gabriela K. Betancourt-Barszcz, Natasha Ng, Olufemi Olatoye, Alexis Mraz, Scott Meschke, UAQ, University of Florida, Illinois State University, University of Nebraska-Lincoln, Texas Tech University, Arizona State University, Morgan State University, University of Ibadan, The College of New Jersey, University of Washington</td>
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<td>Methods used for rapid risk assessments of public health events: a scoping review</td>
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<td>Dima Ayache, Linda Vrbova, Lisa Waddell, Sai Priya Anand, Melanie Cousins, Lisa Slywchuk, Katja Sling, Emilie Peron, Jan Trumble Waddell, Public Health Agency of Canada, World Health Organization, WHO</td>
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<td>P.64</td>
<td>A refinement of a quantitative microbial risk assessment model for Salmonella enterica by the consumption of chicken in the central region of Mexico using whole genome sequencing</td>
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<td>Angelica Godinez Oviedo, Adrián Gómez-Baltazar, Montserrat Hernández Iurrutia, UAQ, Universidad Autónoma de Querétaro</td>
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<td>P.67</td>
<td>Game Theory Analysis of US-Canada Collaboration in Mitigating Canada's Wildfires and Smoke Health Risks</td>
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<td>Mirna Sarriei Nasab, Jun Zhuang, University at Buffalo</td>
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<td>P.69</td>
<td>Human health risk assessment tools and risk assessments for abandoned mine lands (AML)</td>
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<td>Natasha Ng, Arizona State University</td>
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<td>P.70</td>
<td>NOx as a Surrogate for Gaseous Oxides of Nitrogen</td>
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<td>Qingyu Meng, Adam Reff, Stephen McDow, USEPA</td>
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<td>Poster Session</td>
<td>Investigating the tension between risk governance recommendations and technical uncertainty modelling in practice: a study of four mathematical models for offshore wind farms</td>
<td>Solene Huynh, University of Strathclyde</td>
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<td>Poster Session</td>
<td>Partisan winds: reframing new windfarm developments to overcome identity-protective cognition</td>
<td>Aitor Marcos Diaz, Patrick Hartmann, Joe Arvai, University of Southern California, University of the Basque Country UPV/EHU</td>
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<td>Poster Session</td>
<td>Interactive map of risk indicators for critical infrastructure systems: a case study of Greater-Houston power infrastructure</td>
<td>Ada Novak, Paul Johnson, Hiba Baroud, Vanderbilt University</td>
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<td>Poster Session</td>
<td>An Impact of System Down Risk Disclosure on Maintenance Service Personnel Effort and System Liability: An Experimental Economic Analysis with Student Subjects</td>
<td>Ryoji Makino, Jun-Ichi Takanori, Takanori Kudo, Keiko Aoki, Kenju Akai, National Institute of Advanced Industrial Science and Technology, Setsunan University, Saitama University, Shimane University</td>
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<td>Poster Session</td>
<td>Assessment of antibiotic-resistant infection risks associated with reclaimed wastewater irrigation in intensive tomato cultivation</td>
<td>Hunter Quon, University of California, Irvine</td>
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<td>Poster Session</td>
<td>Modeling interdependent transit network resilience under future flooding scenarios</td>
<td>Jack Watson, Samrat Chatterjee, Auroop Ganguly, Northeastern University, Pacific Northwest National Laboratory, Northwestern University</td>
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<td>Poster Session</td>
<td>Quantitative microbial risk assessment of viral infection in exposed children at public parks fertilized with recycled urine</td>
<td>Syed Arjenul Islam, Julia Harrison, Jade Mitchell, Kerry Hamilton, University of North Carolina at Chapel Hill, North Carolina State University, Michigan State University, Arizona State University</td>
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<td>Poster Session</td>
<td>Integrating pharmaceutical reduction strategies with wastewater-based epidemiology</td>
<td>Julie Barnett, Scott Watkins, Megan Robertson, Ruth Barden, Barbara Kaspryzk-Hordern, University of Bath, University of the West of England, Wessex Water</td>
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<td>Poster Session</td>
<td>Mapping public safety power shutoffs: intersections of outage risk, community vulnerability, and energy resilience cost</td>
<td>Bethany Kwoka, Patrick Murphy, Yunus Kinkhabwala, Yanelli Nunez, Elena Krieger, PSE Healthy Energy</td>
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<td>Poster Session</td>
<td>Dose-Response Analysis for SARS-CoV-2</td>
<td>Shaista Shah, Student</td>
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<td>Poster Session</td>
<td>What is process risk?</td>
<td>Samuel Denard, Empirical Products</td>
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<td>Poster Session</td>
<td>Assessing the impact of culvert failure from an equity lens.</td>
<td>Joshua Govina, University Of Massachusetts, Amherst</td>
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<td>Poster Session</td>
<td>European blackouts: key lessons and insights from operational experience</td>
<td>Andrej Stankovski, Blazhe Gjorgiev, Leon Locher, Giovanni Sansavini, ETH Zurich</td>
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<td>Poster Session</td>
<td>Decision-making and Risk-Mitigating Behaviors against Heat Stress among Secondary School Students</td>
<td>Masahiko Haraguchi, Harvard University</td>
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<tr>
<td>10:30 am</td>
<td>T2-A: Food Safety Policies: Update on Recent Risks and Regulations</td>
<td>Rock Creek Ballroom</td>
<td>Sandra Hoffmann</td>
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<tr>
<td>T2-A.1</td>
<td>2022 Cost of Foodborne Illnesses in the U.S.</td>
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<td>Sandra Hoffmann, Elaine Scallan, Walter, Alice White, Robert McQueen,</td>
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<td>Jae-Wan Ahn, USDA Economic Research Service, Colorado School of Public</td>
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<td>10:45 am</td>
<td>Assessing the Association between Dietary Exposure to Lead, Arsenic, and</td>
<td>T2-A.2</td>
<td>RichardWilliams</td>
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<td>Cadmium and Adverse Health Effects: A Comprehensive Evaluation Using</td>
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<td>Bradford Hill Criteria</td>
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<td>Bradford Hill Criteria</td>
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<td>Patrice Hsu, Felicia Wu, Michigan State University</td>
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<td>11:00 am</td>
<td>Cancer burden from dietary exposure to inorganic arsenic in the United</td>
<td>T2-A.3</td>
<td>R lubai Rahman, Felicia Wu, Michigan State University</td>
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<td>States: Risk assessment and policy implications</td>
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<td>11:15 am</td>
<td>A Solution for FDA’s Human Foods Program</td>
<td>T2-A.4</td>
<td>Richard Williams, RichardAWilliams.com</td>
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<td>11:30 am</td>
<td>The science behind FSIS’ proposal that Salmonella is an adulterant in</td>
<td>T2-A.5</td>
<td>Janell Kause, Food Safety and Inspection Service</td>
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<td>not-ready-to-eat breaded stuffed chicken products</td>
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<td>10:30 am</td>
<td>T2-B: Symposium: Updating the Social Amplification of Risk Framework for</td>
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<td>T2-B.1</td>
<td>Risk Science and Practice in the 21st century</td>
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<td>10:45 am</td>
<td>Social Amplification and Attenuation: The Role of Trust and Expectations</td>
<td>T2-B.2</td>
<td>Thomas Webler, Social and Environmental Research Institute</td>
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<td>11:00 am</td>
<td>Dispelling myths about the social amplification of risk I: amplified</td>
<td>T2-B.3</td>
<td>Terje Aven, Rob Goble, Ortwin Renn, University of Stavanger, Clark</td>
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<td>risks are real risks</td>
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<td>University, Research Institute for Sustainability, Helmholz Center</td>
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<td>Potsdam (RPS)</td>
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<td>11:15 am</td>
<td>Dispelling myths about the social amplification of risk II: the public</td>
<td>T2-B.4</td>
<td>Rob Goble, Lisbet Fjaeran, Kenneth Pettersen, Clark University, University</td>
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<td>are not the only parties engaged in amplification</td>
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<td>of Stavanger</td>
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<td>11:30 am</td>
<td>Visualising the interactive and dynamic nature of the social amplification</td>
<td>T2-B.5</td>
<td>Lisbet Fjaeran, Kenneth Pettersen, University of Stavanger</td>
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<td>and attenuation of risk</td>
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<td>10:30 am</td>
<td>T2-C: Foodborne Microbial Risks</td>
<td>River Birch A</td>
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<td>T2-C.1</td>
<td>Trends in Salmonella Infantis human illness incidence and chicken</td>
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<td>carcass prevalence in the USA, 1996-2019</td>
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<td>10:45 am</td>
<td>Understanding the limit: a reverse quantitative microbial risk assessment</td>
<td>T2-C.2</td>
<td>Tyler Stump, Kara Dean, Jade Mitchell, Michigan State University</td>
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<td>to investigate low-level concentration of Listeria monocytogenes in</td>
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<td>apple packinghouses from epidemiological data</td>
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<td>11:00 am</td>
<td>A meta-analysis of conditions effecting decay and growth of</td>
<td>T2-C.3</td>
<td>Joshua Owade, Jade Mitchell, Teresa Bergholz, Michigan State University</td>
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<td>Escherichia coli O157:H7 in leafy greens</td>
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<td>11:15 am</td>
<td>Quantitative risk assessment-epidemic curve prediction model for</td>
<td>T2-C.4</td>
<td>Hao Fang, Food and Drug Administration</td>
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<td>leafy green outbreak investigation</td>
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<td>11:30 am</td>
<td>Implementation of gene editing into the food system: opportunities and</td>
<td>T2-C.5</td>
<td>Gulbanu Kaptan, Huw Jones, Edgar Meyer, Joshua Weller, Baruch Fischhoff,</td>
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<td>barriers</td>
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<td>University of Leeds, Aberyswyth University, Carnegie Mellon University</td>
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<td>10:30 am</td>
<td>T2-D: Advances in Natural Hazards Modeling</td>
<td>Meeting Room 2</td>
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<td>T2-D.1</td>
<td>Machine Learning Algorithm for Early Warning System for Tsunami</td>
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<td>Triggered by the Volcanic Activity: Case of Anak Krakatau Volcano</td>
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<td>10:45 am</td>
<td>Criteria-based visualization design for hazard maps</td>
<td>T2-D.2</td>
<td>Pia-Johanna Schweizer, Max Schneider, Fabrice Cotton</td>
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<td>Research Institute for Sustainability – Helmholz Centre Potsdam,</td>
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<td>U.S. Geological Survey, German Research Institute for Geoscience –</td>
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<td>Helmholz Centre Potsdam</td>
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<td>11:00 am</td>
<td>Surrogate Models to Predict Flood Hazard under Evolving Coastal</td>
<td>T2-D.3</td>
<td>David Johnson, Purdue University</td>
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<td>Conditions</td>
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<td>11:15 am</td>
<td>A framework for modelling the probability of flooding under leeve</td>
<td>T2-D.4</td>
<td>Thomas Wallace, Tom Logan, Kaley Crawford-Flett, Matthew Wilson</td>
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<td>University of Canterbury, University of Auckland</td>
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<td>11:30 am</td>
<td>Hybrid Decision Support by Combining Economic Assessment and Bayesian</td>
<td>T2-D.5</td>
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<td>Networks for Multi Criteria Decision Analysis: A Case Study of</td>
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<td>Adaptation Measures for Hurricane Risk</td>
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<td>Bona Ryan, David Bristow, Agil Darmawan*</td>
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<td>University of Victoria, PT Perusahaan Listrik Negara Indonesia</td>
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Panelists
- Fred Boelter
- Frank Hearn
- Regina Pana-Cryan
- Margaret MacDonell

Panelists
- Charles Haas
- Mark Weir
- Raul Gonzalez
- Kyle Curtis

Wastewater serves as a collective pool of biological and chemical markers shed by individuals in a community. By analyzing these markers, such as viral RNA, metabolites, and pharmaceuticals, researchers can estimate the prevalence and transmission of diseases. This information aids policymakers and public health authorities in designing targeted interventions to curb the spread of the disease, allocate resources, and implement targeted interventions to protect vulnerable populations.

One of the most significant advantages of WBE is its potential for early detection and monitoring of pandemics. By analyzing wastewater samples from specific locations, researchers can identify the presence of viral pathogens, such as SARS-CoV-2, even before clinical cases are reported. This timely information can help public health authorities take proactive measures to contain the spread of the disease. By analyzing these markers, researchers can estimate the overall health status of the population, an approach referred to as waste-water-based epidemiology (WBE).

WBE provides a holistic perspective, capturing both symptomatic and asymptomatic cases, allowing for the identification of diseases that might otherwise go undetected. This insight aids in early intervention, targeted public health measures, and improved population health management.

One of the most significant advantages of WBE is its potential for early detection and monitoring of pandemics. By analyzing wastewater samples from specific locations, researchers can identify the presence of viral pathogens, such as SARS-CoV-2, even before clinical cases are reported. This timely information can help public health authorities take proactive measures to curb the spread of the disease, allocate resources, and implement targeted interventions to protect vulnerable populations.

WBE enables the evaluation of the effectiveness of various public health interventions and control measures. By monitoring wastewater samples before and after the implementation of interventions like vaccination campaigns or lockdown measures, researchers can assess their impact on disease prevalence and transmission. This data-driven approach provides valuable insights into the efficacy of public health strategies, facilitating evidence-based decision-making.

Wastewater surveillance also provides a unique opportunity to monitor drug consumption patterns and public health trends. By analyzing wastewater for the presence of drug metabolites, researchers can estimate drug use within a population, identify emerging drug trends, and evaluate the efficacy of substance abuse prevention programs. This information aids policymakers and public health agencies in designing targeted interventions to address drug-related challenges.

Chair: Mary O’Reilly
Meeting Room 3

Chair: Patrick Gurian
Meeting Room 4

Chair: Ronnie E. Hill Jr.
Meeting Room 5

Chair: Sabine Lange
Meeting Room 16

10:30 AM – 12:00 PM
T2-E: Roundtable: Hierarchy of Use: Risk Decision-making and Integrated Thinking
Meeting Room 3
Chair: Mary O’Reilly

- Occupational and environmental risk is most often described as a combination of severity of the outcome and likelihood of its occurrence. For chemical exposures that typically means toxicity of the material and duration/frequency of exposure. Focusing primarily on these two parameters usually precludes evaluating why the chemical is used. For most chemicals, however, there is a hierarchy of use. For example, using PFAS in chip manufacturing may be assessed to be of higher priority than using PFAS on frying pans, skis, and dental floss. Ethylene oxide is used primarily to sterilize medical plastic items. Many of those plastic items, however, could be made from glass that can be autoclaved. Other examples include asbestos, PCBs, and bisphenol A.

A hierarchy of use would value a chemical based on its society-wide negative impacts as well as its society-wide benefits and could aid ESG reporting. Howard Glickman in “Buying Power” has documented American consumer activism that has certainly played a part in the removal of asbestos, PCBs, and bisphenol A from some plastics, especially baby products, due to its ability to bind to estradiol receptors and mimic estrogen effects. Disposing of toxic but useful chemicals and their breakdown products results in harm to neighboring communities around the world. A hierarchy of use, in contrast to a ban, would provide a systematic way to limit the production and use of toxic chemicals and their effects on both workers and downstream communities.

Evaluating risk from a hierarchy of use perspective raises valuable questions. When are adverse effects first recognized? At what point do adverse effects outweigh beneficial use? Whose responsibility is it to clearly and transparently communicate risks associated with a useful product? And to whom? What is the role of regulators, investors in the ESG movement, educators, consumers, and the general public? How should companies address these topics in ESG-related disclosures? Integrating a hierarchy of use into human health risk assessment would enable more judicious use of toxic chemicals by balancing society-wide harmful effects and society-wide benefits.

10:30 AM – 12:00 PM
T2-F: Roundtable: Understanding the Potential of Wastewater-Based Epidemiology for Risk Management
Meeting Room 4
Chair: Patrick Gurian

Chair: Sabine Lange
Meeting Room 16

10:30 AM – 12:00 PM
T2-G: Security and Disaster Management
Meeting Room 5
Chair: Ronnie E. Hill Jr.

10:30 am
Cybersecurity Requirements for a Connected World
ChoongHee Han, Naresh Adhikari
Korea Power Exchange, Slippery Rock University

10:50 am
Cyber Risk Loss Distribution of Drone Delivery Systems: A Study of Amazon Drone Deliveries in College Station, TX
Petar Jevtic, Nicolas Lanchier, Stefano Chiaradonna
Arizona State University

11:10 am
Pandemic and other Stressors Disrupt Investments for Disaster Mitigation
Ronnie E. Hill Jr., Davis Loose, Barry Ezell, James H. Lambert, DeAndre Johnson
University of Virginia, Old Dominion University

10:30 am
T2-G.1
Sabit Cakmak, Kimberly Mitchell, Anna Lukina, Jeffrey Brook, Subramanian Karthikeyan, Robert Dales
Health Canada, University of Toronto

10:50 am
T2-G.2
Derivation and application of comparison values and action levels for use in mobile air monitoring
Sabine Lange
Texas Commission on Environmental Quality

11:10 am
T2-G.3
Health and climate benefits of electric school bus adoption in the United States
Ernani Choma
Harvard University
The urgency of climate change and the threat of misinformation via social media require that we revisit the sufficiency of tools to engage publics and stakeholders in risk decision making. Climate change due to fossil fuel combustion is imposing significant and rapidly increasing costs on people and institutions worldwide. To mitigate these harms there is an urgent need to decarbonize energy systems, however a major impediment is public and stakeholder opposition. Opposition is met at national and subnational policymaking venues and in communities where renewable energy infrastructure is proposed. Opposition is fueled in a large part by misinformation campaigns that are growing more sophisticated and effective and threaten to balloon with the increased use of deep fakes and other techniques enabled by artificial intelligence. This roundtable reconsiders the need and direction for public and stakeholder participation in risk decision making by focusing on this question: Are the technologies, strategies, and laws for public and stakeholder participation in risk and uncertainty communication into best practices; increase translation of social and behavioral evidence on risk and uncertainty to the public; and ensure meaningful engagement of community stakeholders in these efforts. To address these many challenges, a federal inter-agency workgroup (IWG) on Communicating Hazard Information and Other Types of Uncertainty was convened by the National Science and Technology Council (NSTC) Subcommittee on Social, Behavioral and Economic Sciences. This goal of this IWG is to improve the quality, consistency, timeliness, and appropriateness of efforts to communicate the risks and uncertainties of various hazards to the general public. Toward this end, the IWG is identifying key needs, available resources, and potential strategies to promote a more intentional and coordinated approach to communicating risk and uncertainty across federal agencies; increase translation of social and behavioral evidence on risk and uncertainty communication into best practices; and ensure meaningful engagement of community stakeholders in these efforts. In this Roundtable discussion, IWG members from different federal agencies (e.g., DHS, EPA, NIH, NPS, NOAA) will discuss the initiative and the key challenges it involves, and identify opportunities for moving this work forward.

**Panelists**
- Madeline Beal
- Tom Fish
- Rik Legault
- Hank Jenkins-Smith

**T3-A: Roundtable: The Future of the Democratic Process and the Clean Energy Transformation in a Post-Truth Society**

**Rock Creek Ballroom**

**Chairs:** Bonnie Ram, Pia-Johanna Schweizer

The urgency of climate change and the threat of misinformation via social media require that we revisit the sufficiency of tools to engage publics and stakeholders in risk decision making. Climate change due to fossil fuel combustion is imposing significant and rapidly increasing costs on people and institutions worldwide. To mitigate these harms there is an urgent need to decarbonize energy systems, however a major impediment is public and stakeholder opposition. Opposition is met at national and subnational policymaking venues and in communities where renewable energy infrastructure is proposed. Opposition is fueled in a large part by misinformation campaigns that are growing more sophisticated and effective and threaten to balloon with the increased use of deep fakes and other techniques enabled by artificial intelligence. This roundtable reconsiders the need and direction for public and stakeholder participation in risk decision making by focusing on this question: Are the technologies, strategies, and laws for public and stakeholder participation in risk and uncertainty communication into best practices; increase translation of social and behavioral evidence on risk and uncertainty to the public; and ensure meaningful engagement of community stakeholders in these efforts. To address these many challenges, a federal inter-agency workgroup (IWG) on Communicating Hazard Information and Other Types of Uncertainty was convened by the National Science and Technology Council (NSTC) Subcommittee on Social, Behavioral and Economic Sciences. This goal of this IWG is to improve the quality, consistency, timeliness, and appropriateness of efforts to communicate the risks and uncertainties of various hazards to the general public. Toward this end, the IWG is identifying key needs, available resources, and potential strategies to promote a more intentional and coordinated approach to communicating risk and uncertainty across federal agencies; increase translation of social and behavioral evidence on risk and uncertainty communication into best practices; and ensure meaningful engagement of community stakeholders in these efforts. In this Roundtable discussion, IWG members from different federal agencies (e.g., DHS, EPA, NIH, NPS, NOAA) will discuss the initiative and the key challenges it involves, and identify opportunities for moving this work forward.

**Panelists**
- Madeline Beal
- Tom Fish
- Rik Legault
- Hank Jenkins-Smith

**T3-B: Roundtable: Improving Communication of Risk and Uncertainty Across Federal Agencies**

**River Birch A**

**Chair:** Paul Han

Federal agencies tasked with safeguarding the wellbeing of the US public face the common challenge of effectively communicating the risks of various hazards, as well as the nature and extent of scientific uncertainty about these risks. Effective communication of risk and uncertainty enables the public to understand the likelihood of important hazards, assess the strength of available risk information, and take appropriate action to mitigate and respond to these hazards. Yet effective communication of risk and uncertainty to the public raises key questions about what information to communicate, why, when, how, and to whom. Effective risk and uncertainty communication is also challenging due to human factors including limitations in literacy and numeracy, cognitive biases and heuristics (mental shortcuts), the spread of misinformation and disinformation, and limited access to information among different communities and stakeholders. To address these many challenges, a federal inter-agency workgroup (IWG) on Communicating Hazard Information and Other Types of Uncertainty was convened by the National Science and Technology Council (NSTC) Subcommittee on Social, Behavioral and Economic Sciences. This goal of this IWG is to improve the quality, consistency, timeliness, and appropriateness of efforts to communicate the risks and uncertainties of various hazards to the general public. Toward this end, the IWG is identifying key needs, available resources, and potential strategies to promote a more intentional and coordinated approach to communicating risk and uncertainty across federal agencies; increase translation of social and behavioral evidence on risk and uncertainty communication into best practices; and ensure meaningful engagement of community stakeholders in these efforts. In this Roundtable discussion, IWG members from different federal agencies (e.g., DHS, EPA, NIH, NPS, NOAA) will discuss the initiative and the key challenges it involves, and identify opportunities for moving this work forward.

**Panelists**
- Madeline Beal
- Tom Fish
- Rik Legault
- Hank Jenkins-Smith

**T3-C: International Food Security Risks**

**River Birch B**

**Chair:** Wayne Landis

1:30 pm T3-C.1

FIRE, the Food Import Risk Explorer, a tool for the comparative risk assessment of imported foods in the Canadian food supply.

Ashwani Tiwari, Cory Lindgren, Christina Sparre, Justin Falardeau, Mohamed Affi, Alia Ghiba, Catherine Semple, Emma Hartnett, Gregory Paoli

Canadian Food Inspection Agency, Risk Sciences International

1:50 pm T3-C.2

Do blood metals influence lipid profiles? Findings of a cross-sectional population-based survey

Sabit Cakmak

Health Canada

2:10 pm T3-C.3

Risk assessment of gene drive constructs as an approach for controlling populations of pests and disease bearing hosts.

Wayne Landis, Steven Eikenberry, Ethan Brown

Western Washington University, Integral Corporation, University of Notre Dame

**T3-D: Risk impacts of tropical cyclones**

**Meeting Room 2**

**Chair:** Zaira Pagan Cajigas

1:30 pm T3-D.1

Broadcast meteorologist and emergency manager interpretations of a redesigned hurricane threats and impacts visualization

Robert Prestley, Rebecca Morris, Kenneth Broad, Alberto Cairo, Scott Evans, Sharanya Majumdar, Brian McNoldy, Barbara Millet

National Center for Atmospheric Research, University of Miami

1:50 pm T3-D.2

Estimating Tropical Cyclone induced Power Outages in Future Climate Scenarios’ Impact on Socio-economically Vulnerable Populations and Racial Minorities

Zaira Pagan Cajigas, Seth Guikema, Charles Fant, Brent Boehlert

University of Michigan, Industrial Economic Inc.

2:10 pm T3-D.3

Adaptive strategies for flooding risk management under climate change: A reinforcement learning application for NYC

Kairui Feng, Ning Lin, Michael Oppenheimer

Princeton University

2:30 pm T3-D.4

The Use of Parametric Insurance via Blockchain to Improve Hurricane Event Outcomes

Steven Haynes

University of Texas at Dallas
Tuesday

1:30 PM – 3:00 PM
T3-E: The Economics of Risk: Theory and Global Applications
Meeting Room 3
Chair: Emma Hartnett

1:30 pm T3-E.1
The Effect on the Poor of Near-Zero Discount Rates
Richard Belzer
Good Intentions Paving Co.

1:50 pm T3-E.2
Preparing for High Impact, Low Frequency Events with RaCER.
Emma Hartnett, Todd Ruthman, Paul Stanish, Hong Duan, Amy McNeely
Risk Sciences International, Transport Canada

2:10 pm T3-E.3
Assessing Inherent Risks in Taxation for Wealth Creation
Emma Anyika
The Co-operative University of Kenya

2:30 pm T3-E.4
An Empirical Illustration of Tri-Players Cyber Risk Model using Game Theory
Madhu Acharya, John Houston*
GCU, University of Stirling

1:30 PM – 3:00 PM
T3-F: Roundtable: The Test of Risk Analysis Practice: Quality, Fit for Purpose, or Both?
Meeting Room 4
Chair: Robert Waller

The Applied Risk Management Specialty Group and the Risk Policy and Law Specialty Group are jointly seeking to enhance understanding between risk analysts and risk managers to the benefit of both and of society at large. Over the past five years the exploration of understandings, and misunderstandings, between analysts and decision makers has been structured through development and publication of the Risk Analysis Quality Test Release 1.0 (RAQT1.0). This was intended to be a first attempt at codifying expectations of quality in technical risk assessments done in the service of risk decision makers. It comprises 76 questions. As expected, there was not universal agreement that the RAQT1.0 captured all the important characteristics of what would consider ‘quality’ risk assessment in every field, discipline, and application. Of particular concern was a charge that a risk assessment could satisfy all questions in the RAQT1.0 but still not be “fit for purpose”.

Seeking to understand how the RAQT1.0 might include the fit for purpose concept has led to wanting to better understand whether “analysis quality” and “fit for purpose” are synonymous or, if not, how they differ. Can fitness for use be codified in any way that would be useful across a variety of disciplines and applications. This roundtable explores these questions as they apply in fields ranging from health risks to infrastructure risks. The addition of insights and perspectives from a diverse audience is sought.

Our objective is to understand how to enhance the mutual understandings between technical risk analysts and risk management decision makers about quality and suitability of risk assessments.

Panelists
- Zachary Collier
- Michael Dourson
- Samuel Denard
- Kara Morgan

1:30 PM – 3:00 PM
T3-G: Symposium: Integrated Disaster Risk Management: Joint Session with the International Society for Integrated Disaster Risk Management
Meeting Room 5
Chair: Adam Rose

1:30 pm T3-G.1
Behavioral, Environmental, Health and Other Systemic Trends Disrupting Priorities of First Responders
James H. Lambert
University of Virginia

1:50 pm T3-G.2
An entropy-centered approach to assessing resistance deterioration for time-based resilience
Bilal Ayyub, Lance Curtis*
University of Maryland

2:10 pm T3-G.3
Climate change and disaster risk: Current situation and public policy challenges
Myriam Merad
Paris Dauphine University – PSL

2:30 pm T3-G.4
The IDRiM initiative to develop an implementation science
Rob Goble
Clark University
Tuesday

1:30 PM – 3:00 PM

T3-H: Lightning Talks: Risk Assessment Potpourri: microbial, dermal, epidemiologic, and metal modelling

Meeting Room 16
Chair: Mark Weir

1:30 pm T3-H.1
The Public Health Costs from Antimicrobial Resistance in Eight Common Pathogens
Katherine Toran, Andrew Estrin, Michael Lanther
Food and Drug Administration

1:35 pm T3-H.2
Biofilm Ecology Modeling Method for Improved Quantitative Microbial Risk Assessment Modeling
Mark Weir, David Hibler
Ohio State University, Sustainability Institute

1:40 pm T3-H.3
Improving the integration of epidemiological data into human health risk assessment: what risk assessors told us they need
Sandrine Deglin, Igor Burstyn*, Carl Phillips, David Miller
Health and Environmental Sciences Institute, Drexel University, Epiphi Consulting, US Environmental Protection Agency

1:45 pm T3-H.4
Epidemiology: a field that is growing in importance and relevance to risk assessment
David Miller
US Environmental Protection Agency

1:50 pm T3-H.5
Benchmark dose modeling for epidemiological dose-response assessment using case-control studies
Francesco De Pretis, Kan Shao
University of Modena and Reggio Emilia, Indiana University

1:55 pm T3-H.6
A Bayesian Approach to Estimate Parameters for Children from a Pharmacokinetic Model for Methylmercury Exposure to Pregnant Women
Michael Dezernaga, Yu-Sheng Lin, Leonid Kopylev, Deborah Segal
US EPA

2:00 pm T3-H.7
Assessing environmental health risks in Meghalaya, India: evaluating spatial methodologies
Ann Elise Lewallen, Erica Goto
University of Victoria, University of Arizona

2:05 pm T3-H.8
Risk assessment of skin disease caused by differential selection and use of PCP in the showering environment
Yihan Gao, C.Y. LAM
Japan Advanced Institute of Science and Technology

2:10 pm T3-H.9
Streamlining dermal risk assessment through a risk decision framework.
Paul Deleo, Elke Jensen, Andrew Maier, Silvia Maberti, Lauren Glöckler, Heather Lynch
American Chemistry Council, Dow, Cardno ChemRisk, ExxonMobil Chemical Company, Stantec ChemRisk

2:15 pm T3-H.10
A handbook of occupational dermal exposure factors for streamlining dermal risk assessment
Paul Deleo, Elke Jensen*, Silvia Maberti, Andrew Maier, Heather Lynch, Claire Hamaji
American Chemistry Council, Dow, ExxonMobil Chemical Company, Cardno ChemRisk, Stantec ChemRisk

2:20 pm T3-H.11
Risk characterization of pediatric injuries from textual emergency department records using ChatGPT: new opportunities for epidemiological surveillance
Dario Gregori, Giulia Lorenzoni
University of Padova

3:00 pm T3-H.12
Risk Analysis is a relatively new discipline that developed very rapidly in the 1970s-2000s. Compared to twenty years ago, there seems to be less risk research being funded—a trend that is particularly true in Europe and may also partially apply to the US. A reason might be the lack of replacement of retired senior risk professors with new talents. As a result, universities that had been at the forefront of risk research have arguably changed their priorities. Another reason may also be the appeal of new concepts such as ‘precaution’ or ‘sustainability’ that lead to hazard-based rather than risk-based approaches. There is a concern that several new regulations—from the energy transition to chemical or food policy—are not sufficiently rooted in risk science. The European Green Deal is one such body of regulation that is very much based on hazard classifications and precautionary thinking. In the US the concept of Green chemistry may also raise similar concerns. We have also witnessed an increased focus on topics like cumulative risk that seem to be risk-based but rarely are. Is there a future for risk analysis? Do North America and Europe converge or do they diverge when it comes to the use of risk analysis? Is risk research actually in decline, or could it be that risk science is hidden in other types of research? In this round table, panelists will provide 5–10-minute interventions discussing their perspective on risk analysis in Europe and North America. They will cover a wide range of risks and disciplines.

Panelists
• Katherine McComas
• Rui Gaspar
• George Gray
• Robyn Wilson

3:30 PM – 5:00 PM

T4-A: Roundtable: Does risk analysis have a future? A transatlantic perspective

Rock Creek Ballroom
Chair: Frederic Bouder

3:30 pm T4-A.1
Watershed Resilience for Low-Capacity Communities
Igor Linkov
Engineer Research and Development Center, U.S. Army Corps of Engineers

3:50 pm T4-A.3
Resilience Developments at DHS
Frank Randon
DHS

4:10 pm T4-A.4
USACE Approach to Watershed Resilience
Michael Deegan
USACE

4:30 pm T4-A.5
Community engagement in watershed resilience: Anderson County in SC
David Vaughn
Clemson University

3:30 pm T4-B.1
T4-B.2
T4-B.3
T4-B.4
<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td><strong>3:30 PM – 5:00 PM</strong></td>
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<tr>
<td>T4-C: Symposium: Food Safety and Security Measures</td>
<td><strong>River Birch B</strong>&lt;br&gt;Chair: Yuhuan Chen</td>
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<tr>
<td>3:30 pm</td>
<td>Subsistence Fish and Seafood Consumption&lt;br&gt;Systematic Review: Literature Evidence Map&lt;br&gt;Amnia Wilkins&lt;br&gt;USEPA</td>
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<tr>
<td>3:50 pm</td>
<td>Modeling within lot variability in pathogen contamination and the impact on predicted risk reduction from sampling ready-to-eat foods&lt;br&gt;Régis Pouillot, Yuhuan Chen, V. Jane Van Doren&lt;br&gt;Goldbelt, FDA Center for Food Safety and Applied Nutrition</td>
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<td>4:10 pm</td>
<td>Quantify risk reduction from sampling using L. monocytogenes in ready-to-eat foods survey data and ROC curves&lt;br&gt;Yuhuan Chen, Régis Pouillot, V. Jane Van Doren&lt;br&gt;FDA Center for Food Safety and Applied Nutrition, Goldbelt</td>
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<td>4:30 pm</td>
<td>Relative importance of preharvest, pre-rehang, and post-rehang interventions on Salmonella load in young chicken&lt;br&gt;Peter Evans, Amber Pasko, Courtney Amundson, Scott Malcolm, Berhanu Tameru&lt;br&gt;USDA/FSIS/USDA/FDA/FSI/S</td>
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<td><strong>3:30 PM – 5:00 PM</strong></td>
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<tr>
<td>T4-D: Natural Hazards Infrastructure Resilience</td>
<td><strong>Meeting Room 2</strong>&lt;br&gt;Chair: Seth Guikema</td>
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<tr>
<td>3:30 pm</td>
<td>Cell phone data for determining the role of access to essential services in disaster recovery&lt;br&gt;Tessa Swanson, Seth Guikema*&lt;br&gt;University of Michigan</td>
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<td>3:45 pm</td>
<td>Assessing the effectiveness of multi-infrastructure disaster risk reduction options on metro-wide restoration timelines&lt;br&gt;David Bristow, Andrew Deelstra&lt;br&gt;University of Victoria</td>
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<td>4:00 pm</td>
<td>Intelligent Decision-Making in Electrical Infrastructure Management to Promote System Resilience&lt;br&gt;Madison Horgan&lt;br&gt;Arizona State University</td>
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<td>4:15 pm</td>
<td>Probabilistic seismic analysis of water supply interruptions in terms of societal impact&lt;br&gt;Rithika Dulam, Rachel Davidson, Nafiseh Solemanian, Sina Naeimi&lt;br&gt;University of Delaware</td>
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<td>4:30 pm</td>
<td>Risk Analysis for Coupled Power – Sewer Systems&lt;br&gt;Rosalia Otaduy-Ramirez&lt;br&gt;University of Michigan</td>
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<td><strong>3:30 PM – 5:00 PM</strong></td>
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<tr>
<td>T4-E: Risk in Critical Industrial Sectors</td>
<td><strong>Meeting Room 3</strong>&lt;br&gt;Chair: Zachary Collier</td>
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<td>3:30 pm</td>
<td>Modeling manufacturing overproduction risks for outsourcing decisions using game theory&lt;br&gt;Zachary Collier&lt;br&gt;Radford University</td>
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<td>3:45 pm</td>
<td>Enterprise Risk Management for Electrification of Cold Regions Maritime Ports&lt;br&gt;Robert Baker, Megan C. Marcellin*, Dan Hendrickson, Thomas L. Polmateer, James H. Lambert&lt;br&gt;University of Virginia, Port of Virginia</td>
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<td>4:00 pm</td>
<td>The Role of Knowledge and Trust in Developing Risk Perceptions of Autonomous Vehicles: A Moderated Mediation Model&lt;br&gt;Kathryn Robinson-Tay, Wei Peng&lt;br&gt;Washington State University</td>
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<td>4:15 pm</td>
<td>Geospatial cost-benefit assessment of telecommunication infrastructure protection strategies in conflict economies&lt;br&gt;Edward Oughton, Jevgenijs Steinbuks, Harris Selod&lt;br&gt;George Mason University, World Bank</td>
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<td>4:30 pm</td>
<td>Analytical Review of Resilience of Ukraine’s Critical Energy Infrastructure to Cyber Risks and Threats in Times of War&lt;br&gt;Andrii Davydiuk&lt;br&gt;CCDCOE</td>
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<td><strong>3:30 PM – 5:00 PM</strong></td>
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<tr>
<td>T4-F: Roundtable: Integrated Engineering, Public Health, and Data Analytics: A Holistic Approach towards Crisis Mitigation, Response, and Recovery</td>
<td><strong>Meeting Room 4</strong>&lt;br&gt;Chair: Benjamin Trump</td>
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<td>3:30 pm</td>
<td>In the face of ever-evolving global challenges, it is evident that an interdisciplinary approach, integrating engineering, public health, and data analytics, is indispensable in advancing both everyday life and crisis management, respectively. Traditional crisis response mechanisms have often leaned towards isolated, sector-specific responses. However, in today's complex, interconnected world, crises are no longer singular or static, making the efficacy of such approaches limited. Engineering, in its broadest sense, offers the necessary infrastructure and technology for swift crisis management. From emergency housing following natural disasters to rapid-response medical equipment in health emergencies, the role of engineering is critical. In our increasingly urbanized world, the importance of resilient infrastructure, both physical and digital, can't be overstated. Public health, the second pillar of our proposed approach, provides a keen understanding of the societal and individual impacts of crises. This field can identify, quantify, and communicate health risks and facilitate health-promoting responses. Their integration with engineering solutions and data analytics can enable more holistic responses. Data analytics forms the final core element of this integrative approach. It empowers decision-makers to understand the breadth and depth of crises, predict their trajectories, and evaluate the effectiveness of interventions. By integrating these three disciplines, we present a holistic, robust, and adaptable approach to crisis management. This convergence enables an in-depth understanding of crisis scenarios, improves the design and implementation of responsive infrastructures, and optimizes strategies based on real-time data.</td>
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**Panelists**
- Christopher Cummings
- Jeffrey Keisler
- Thomas Janisko
- Cody Thornton
- Eric Powell
Tuesday

3:30 PM – 5:00 PM

T4-G: Risk Communication and Perception for Social Systems
Meeting Room 5
Chair: Emma Soane

3:30 pm
T4-G.1
Updating the Nuclear Regulatory Commission waste incidental to reprocessing monitoring program with Be riskSMART
Christanne Ridge, Cynthia Barr, Harry Felsher, Christopher McKenney, Stephen Koenick
US Nuclear Regulatory Commission

3:50 pm
T4-G.2
Collaboration, Digitization and Risks: How Digital Collaboration Influences Infrastructure Project Safety
Emma Soane, Vikki Edmondson, Katherine Ziegelbauer
The London School of Economics and Political Science, Northumbria University

4:10 pm
T4-G.3
Americans’ views of fusion energy: Implications for sustainable public support
Kuhika Gupta, Hank Jenkins-Smith*, Joseph Ripberger, Carol Silva, Andrew Fox, Will Livingston
University of Oklahoma

3:30 PM – 5:00 PM

T4-H: Symposium: Risk Communication in the Public Sector: Challenges and Successes in Applying Science Across Government
Meeting Room 16
Chair: Madeline Beal

3:30 pm
T4-H.1
Misinformation, Disinformation, and Coordination in Risk Communication: Reflections from East Palestine OH
Mike Nye
US Environmental Protection Agency

3:45 pm
T4-H.2
New Approaches to Risk Communication at NOAA
Gina Eosco
NOAA

4:00 pm
T4-H.3
A Risk Communication Training Platform for the Public Sector, Built on Best Practices from the Fields of Risk Communication and Adult Learning
Madeline Beal
US EPA

4:15 pm
T4-H.4
Using Data to Drive Risk Decision Making and Risk Communication at WMATA
Nickea Bradley
The Washington Metropolitan Transit Authority

4:30 pm
T4-H.5
Development and Use of the Framework for Communicating Benefits, Risks and Uncertainties for Medical Products
Paula Rausch
Food and Drug Administration
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<tr>
<th>Time</th>
<th>Session</th>
<th>Chair/Presenter</th>
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<tbody>
<tr>
<td><strong>Wednesday</strong></td>
<td><strong>W1-A: Symposium: Water Security and Systems Analysis for Infrastructure Development</strong></td>
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<tr>
<td>8:50 am</td>
<td>W1-A.2 Risks of Water Scarcity and Climate in Asset Management for Energy Infrastructure</td>
<td>Megan C. Marcellin, University of Virginia</td>
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<td>9:30 am</td>
<td>W1-A.4 Water Security and Systems Analysis for Infrastructure Development</td>
<td>Ronnie E. Hill Jr., University of Virginia</td>
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<tr>
<td><strong>8:30 AM – 10:00 AM</strong></td>
<td><strong>W1-B: Symposium: Resilience in Transportation Systems</strong></td>
<td><strong>River Birch A</strong></td>
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<tr>
<td>8:30 am</td>
<td>W1-B.1 The Impact of sea-level rise and roadway flooding on workforce accessibility for US</td>
<td>Benjamin Trump, US Army Corps of Engineers</td>
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<td>coastal military installations</td>
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<td>8:45 am</td>
<td>W1-B.2 A Graph-based Data-driven Approach for Achieving Resilient Transit Systems: A Case</td>
<td>James Ede, Vireo Advisors</td>
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<td>Study of the Washington Metropolitan Area Transit Authority</td>
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<td>9:00 am</td>
<td>W1-B.3 Climate Financing for Marine Transport: Analyzing the Impact of Climate Adaptation</td>
<td>Jo Anne Shatkin, Vireo Advisors</td>
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<td>Investments in Inland Waterways</td>
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<td>9:15 am</td>
<td>W1-B.4 Using Travel-Time to Essential Services to Identify Vulnerable and Fragile</td>
<td>Brian Zhang, Vireo Advisors</td>
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<td>9:30 am</td>
<td>W1-B.5 Path ranking approach to improve connectivity to essential service facilities and</td>
<td>Sabarethinam Kameshwar, Louisiana State University</td>
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<td>reduce inequities in accessibility</td>
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<td><strong>8:30 AM – 10:00 AM</strong></td>
<td><strong>W1-C: Symposium: Innovative Approaches to the Risk Assessment and Risk Management of Emerging Substances</strong></td>
<td><strong>River Birch B</strong></td>
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<tr>
<td>8:30 am</td>
<td>W1-C.1 Emerging Trends in Grouping Chemicals for Regulatory and Toxicological Purposes</td>
<td>Kelsey Hendrixson, Noblis</td>
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<td></td>
<td>W1-C.2 Current Approaches to Grouping Nanomaterials for Regulatory and Toxicological</td>
<td>James Ede, Vireo Advisors</td>
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<td>Assessments</td>
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<td>9:10 am</td>
<td>W1-C.3 Qualifying Novel Bio-based Materials for the Market: EHS, Sustainability and Beyond</td>
<td>Jo Anne Shatkin, Vireo Advisors</td>
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<td>9:30 am</td>
<td>W1-C.4 Evaluating the Bioavailability of Novel Forms of Cellulose for Food Additive</td>
<td>Brian Zhang, Vireo Advisors</td>
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<td>Applications</td>
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<tr>
<td><strong>8:30 AM – 10:00 AM</strong></td>
<td><strong>W1-D: Symposium: Computational applications in Sustainability, Resilience, Equity, &amp; Engineering</strong></td>
<td><strong>Meeting Room 2</strong></td>
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<tr>
<td>8:30 am</td>
<td>W1-D.1 Vehicle electrification's impact on access to essential services during long-duration power outages</td>
<td>Yamil Essus, North Carolina State University</td>
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<td>8:45 am</td>
<td>W1-D.2 Quantifying Disaster Impacts with the American Housing Survey</td>
<td>Benjamin Rachunok, North Carolina State University</td>
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<td>9:00 am</td>
<td>W1-D.3 Indices for Measuring Disaster Social Capital</td>
<td>Ignacio Sepulveda, North Carolina State University</td>
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<td>9:15 am</td>
<td>W1-D.4 Building a national risk and resilience planning dashboard</td>
<td>Tom Logan, University of Canterbury</td>
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<td>9:30 am</td>
<td>W1-D.5 Placeholder Presentation</td>
<td>Rabab Haider, Massachusetts Institute of Technology</td>
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### Wednesday

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:30 AM – 10:00 AM</td>
<td><strong>W1-E: Statistical Models for Engineering and Infrastructure System</strong></td>
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</tbody>
</table>
| 8:30 am      | W1-E.1: A probabilistic method to assess the risk of contamination-induced insulator flashover  
Gitanjali Bhattacharjee, Ezra Jampole, Abid Kemal Exponent, Inc. |
| 8:50 am      | W1-E.2: Generalizable framework to mitigate above ground storage tank failure  
Celine Robinson  
Duke University |
| 9:10 am      | W1-E.3: Machine learning methods to predict the occurrence of Arctic maritime incidents  
Rajesh Kandel  
Vanderbilt University |
| 9:30 am      | W1-E.4: Quantum Fault Trees: Applications and Future Opportunities  
Enrique Lopez Droguett, Gabriel San Martin  
University Of California Los Angeles |

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<th>Time</th>
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<tr>
<td>8:30 AM – 10:00 AM</td>
<td><strong>W1-F: Symposium: School Safety and Security: Models and Practices</strong></td>
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</table>
| 8:30 am      | W1-F.1: Protecting Soft Targets  
Ian Unson, Jun Zhuang  
University at Buffalo |
| 8:45 am      | W1-F.2: Reducing Risks Through Improved Crowd Modeling and Guidance in Emergency Situations: A Theoretical Approach  
Milad Siami, Hamidreza Montazeri, Atefe Darabi  
Northeastern University |
| 9:00 am      | W1-F.3: School Shootings: When will the craziness end  
Jimmie Oxley  
University of Rhode Island |
| 9:15 am      | W1-F.4: Simulating and optimizing resource allocation for school safety  
Yusuf Ihsan Tokel  
University at Buffalo |
| 9:30 am      | W1-F.5: School Safety and Security: Models and Practices  
Kevin Kapadia, Richard John, Katie Byrd  
University of Southern California |

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<th>Time</th>
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<tbody>
<tr>
<td>8:30 AM – 10:00 AM</td>
<td><strong>W1-G: Symposium: Risk Management and Emerging Biotechnology</strong></td>
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</table>
| 8:30 am      | W1-G.1: Considering Risk and the Bioeconomy  
Henry Willis  
The RAND Corporation |
| 8:50 am      | W1-G.2: Modelling the Value of Pandemic Characterization: Benefits and Risks  
Kevin Esvelt  
Massachusetts Institute of Technology |
| 9:10 am      | W1-G.3: Practical Perspectives on Risk Management Tradeoffs Addressing the Bioeconomy and Medical Product Supply Chains  
Stuart Evenhaugen  
Department of Health and Human Services, Administration for Strategic Preparedness and Response |
| 9:30 am      | W1-G.4: Mitigating Emerging Technology Risks by Considering Ethical, Legal and Societal Issues (ELSI)  
Daniel Gerstein  
RAND |

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<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>8:30 AM – 10:00 AM</td>
<td><strong>W1-H: PFAS and Plastics – Risk Communication and New Technologies</strong></td>
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</tbody>
</table>
| 8:30 am      | W1-H.1: Dreaded and unknown: online risk communication and polyfluoroalkyl substances (PFAS)  
Carrie Loomis, Laura Rickard, Amelia Couture Bue, Janet Yang  
University of Maine, University at Buffalo |
| 8:50 am      | W1-H.2: Uncertain and relevant? How conflicting message influences information processing about PFAS contamination  
Xinxia Dong, Janet Yang  
University at Buffalo |
| 9:10 am      | W1-H.3: The Integration of microplastics and nanoplastics into large scale multiple stressor ecological risk assessments using San Francisco Bay and the Delta Region as a case study  
Wayne Landis, Emma Sharpe, Cynthia Kuhn  
Western Washington University |
| 9:30 am      | W1-H.4: Applying new technology to inform new plastics  
Margaret MacDonell, Cheng Wang, Kevin Hickey, Kurt Picel  
Argonne National Laboratory |
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<tr>
<th>Time</th>
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| 8:30 am      | **W1-J: Cyber- and Cryptocurrency Risks**          | Fabio Massacci        | Potomac Ballroom Salon I        | **W1-J.1** Decoding cryptocurrency adoption: Insights from Quebec’s public sentiment and trust analysis  
Nathalie de Marcellis-Warin, Thierry Warin*  
Polytechnique Montreal & CIRANO, HEC Montréal  
*Corresponding Author  
**W1-J.2** Cryptocurrency market risk analysis: evidence from FZL function  
Seyram Pearl Kumah  
Akenten Appiah-Meriah University of Skills Training and Entrepreneurial Development  
**W1-J.3** Cyber Expert LLM Safety Assistant (CELSA): Increasing Cybersecurity Resilience Through the Development of a Large Language Model  
Madison Smith, Igor Linkov, Benjamin Trump,  
Kelsey Stoddard, Andrew Strelzoff  
US Army Corp of Engineers, Engineer Research and Development Center  |
| 8:30 am      | **W1-K: Lightning Session: Energy, Climate, Uncertainty, and Cyber** | Nick Pidgeon          | Potomac Ballroom Salon II       | **W1-K.1** Tools for decision-making under deep uncertainty in community adaptation: which, when and how  
Patrick Curran, Anita Wreford, Tom Logan  
University of Canterbury, Lincoln University  
**W1-K.2** Validating a measure of public preferences for information about uncertain science  
Chelsea Ratcliff, Blue Harvill, Rebekah Wicke  
The University of Georgia, The Ohio State University, Cornell University  
**W1-K.3** Ensuring/insuring resilient energy system infrastructure  
Katherine Lonergan, Salvatore Francesco Greco,  
Giovanni Sansavini  
ETH Zurich  
**W1-K.4** Improving the representation of cost of capital in energy system models  
Katherine Lonergan, Florian Egli, Sebastian Osorio,  
Giovanni Sansavini, Michael Pahle, Tobias S. Schmidt, Bjørn Steffen  
ETH Zurich, Potsdam Institute for Climate Impact Research (PIK)  
**W1-K.5** Deliberating disruption: public perceptions of in home and network impacts from heat decarbonisation in the UK  
Nick Pidgeon, Gareth Thomas, Karen Henwood, Fiona Shirani  
Cardiff University  |
| 8:30 am      | **W1-L: Wildfire Risks**                           | Erin Budzyn            | Potomac Ballroom Salon III      | **W1-L.1** WISE: Wildfire Safe Evacuation Planning and Management  
Mohammad Pishahang, Enrique Lopez Droguett*,  
Marilia Ramos, Ali Mosleh  
University of California, Los Angeles  
*Corresponding Author  
**W1-L.2** Are southern California recreationists fire-tired? Exploring message fatigue and perceived risk levels of national forest visitors  
Erin Budzyn, Elizabeth Perry, Adam Zwickle,  
Jessica Miesel, José Sánchez, Alyssa Thomas, Brian Peterson  
Michigan State University, USFS, Kansas State University  
**W1-L.3** Data-Driven Analysis of Equity in Wildfire Resource Allocation  
Fatima Umar, Sayanti Mukherjee  
University at Buffalo, The State University Of New York  |
| 8:30 am      | **8:30 AM – 10:00 AM**                            |                       |                                 | **8:30 am W1-K.6** Framework for Cyber Risk Loss Distribution of Client-Server Networks: A Bond Percolation Model and Industry Specific Case Studies  
Stefano Chiaradonna, Petar Jevtic, Nicolas Lanchier,  
Sasa Pesic  
Arizona State University  
**8:50 am W1-K.7** Assessment of the poverty-line population vulnerable to climate-driven coastal flooding in Low and Middle Income Countries (LMICs)  
Allison Thomey, Edward Oughton  
George Mason University  
**9:05 am W1-K.8** Global public concerns about climate change and severe weather: Evidence from the World Risk Poll  
Wandi Brune de Bruin, Patrycja Słeboda, Tsegaye Glibo Gatsio  
University of Southern California, World Bank  
**9:10 am W1-K.9** From science to stakeholder-driven institutions: confronting underground infrastructure risks  
Rae Zimmerman, Debra Laefer, Carlos Restrepo,  
Al Leidner, Wendy Dorf, Kim Hertz, Sai Charan Kukunoor, Peter Gmelch  
New York University, GISMO  |

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**Wednesday**

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>10:30 AM</td>
<td>W2-A: Symposium: Cost-Benefit Analysis for Critical Infrastructure Cybersecurity</td>
<td>Rock Creek</td>
<td>Omer Keskin</td>
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<tr>
<td>10:30 AM</td>
<td>Cyber Risk in the US Space Sector: Exploring the Applicability of International Law to Cyber Attacks on Space Infrastructures</td>
<td>Ballroom</td>
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<tr>
<td>10:30 AM</td>
<td>Predicting the Impact of Climate Change on Renewable Energy Generation in the USA</td>
<td>W2-B.1</td>
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<tr>
<td>10:30 AM</td>
<td>A Graph Neural Network Approach for Analyzing Urban Rail Transit System Threat Deterrence</td>
<td>W2-B.2</td>
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<td>10:30 AM</td>
<td>Electronic Health Data Risk &amp; Compliance</td>
<td>W2-B.3</td>
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<td>10:30 AM</td>
<td>Cybersecurity as Cost and Profit Centre: Critical Infrastructure Perspective</td>
<td>W2-B.4</td>
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<td>10:30 AM</td>
<td>Representing Climate Impacts in Power System Planning</td>
<td>W2-B.5</td>
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<tr>
<td>10:30 AM</td>
<td>W2-B: Symposium: Exploring Multi-Faceted Impacts of Climate Change on Energy Infrastructure</td>
<td>River Birch A</td>
<td>Renee Obringer</td>
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<tr>
<td>10:30 AM</td>
<td>W2-C: Renewable energy and climate change mitigation</td>
<td>River Birch B</td>
<td>Elnaz Kabir</td>
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<td>10:30 AM</td>
<td>Risk communication strategies of EM organizations: implications from 2019 Arkansas River Floods</td>
<td>W2-D.1</td>
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<tr>
<td>10:30 AM</td>
<td>Improving recruiting for impactful RCTs: Outcomes from two studies in climate frontline communities</td>
<td>W2-D.3</td>
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<td>10:30 AM</td>
<td>Combining behavioral data and computational modeling to assess societal implications of private adaptation to climate-induced hazards</td>
<td>W2-D.4</td>
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<td>10:30 AM</td>
<td>W2-D: Natural Hazards Perception &amp; Communication</td>
<td>Meeting Room 2</td>
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Speakers:
- Brianna Bace, University at Albany
- Samrat Chatterjee, Rishi Sahastrabuddhe, Auroop Ganguly, Pacific Northwest National Laboratory, Northeastern University
- Joy Adul, Pennsylvania State University
- Vijay Bhaskar Chiluveru, Pennsylvania State University
- Tharindu De Silva, Vanderbilt University
- Elnaz Kabir, Texas A&M University
- Andrea Staid, EPRI
- Sayanti Mukherjee, University at Buffalo, The State University Of New York
- Ben Yankson, University at Albany
- C. Ariel Pinto, University at Albany, State University Of New York
- Benjamin Yankson, University at Albany
- Sayanti Mukherjee, University at Buffalo, The State University Of New York
- Douglas Bessette, Jacob White*, Michigan State University
- Bona Ryan, Agil Darmawan*, University of Victoria, PT Perusahaan Listrik Negara
- Sayanti Mukherjee, University at Buffalo, The State University Of New York
- Monica Gattinger, Michael Cleland, Rafael Armando*, Patricia Larkin, University of Ottawa
- Natalie Herbert, Teal Harrison, Jenna Jorris, Maria Carmen Lemos, Gabrielle Wong-Parodi, Stanford University, Adaptation International, University of Michigan
- Tatiana Filatova, Delft University of Technology
- Elnaz Kabir, Texas A&M University
- Natalie Herbert, Teal Harrison, Jenna Jorris, Maria Carmen Lemos, Gabrielle Wong-Parodi, Stanford University, Adaptation International, University of Michigan
- Tatiana Filatova, Delft University of Technology
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<tr>
<td>10:30 am</td>
<td>W2-E: Foundations of Risk Analysis 2</td>
<td>Mitch Small</td>
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<td>Meeting Room 3</td>
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<td>10:30 am</td>
<td>W2-F: Symposium: Disaster Risk Reduction</td>
<td>Allison Reilly</td>
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<td>and Short- and Long-term Outcomes</td>
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<td>Meeting Room 4</td>
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<td>10:30 am</td>
<td>W2-G: Emerging Risks – Similarities Across</td>
<td>Christopher Doehring</td>
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<td>Meeting Room 5</td>
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<td>10:30 am</td>
<td>W2-H: Symposium: Interventional Probability</td>
<td>Kenneth Mundt</td>
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<td>of Causation with Potential Applications to</td>
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<td>Formaldehyde Leukemogenicity</td>
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<td>Meeting Room 16</td>
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<td>10:30 am</td>
<td>Evidence-based risk assessment (EBRA) using</td>
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<td>ontology framework and Bayesian network</td>
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<td>model of causal relation of accidents: A case</td>
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<td>study of combustion devices</td>
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<td>10:45 am</td>
<td>Mixture Models for the Cascade of Values,</td>
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<td>Beliefs, Preferences, and Behaviors</td>
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<td>Mitch Small</td>
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<td>10:45 am</td>
<td>The application of the Cynefin framework</td>
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<td>in disaster risk management: predictive</td>
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<td>approaches for enhancing practices and</td>
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<td>adaptive approaches to address complexity</td>
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<td>and uncertainty</td>
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<td>11:00 am</td>
<td>Assessing adaptive capacity to hurricane-related infrastructure losses in the US</td>
<td>Linda Waters, University of Maryland</td>
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<td>11:00 am</td>
<td>Rent Affordability after Hurricanes: Longitudinal Evidence from U.S. Coastal States</td>
<td>Kelse Best, University of Maryland</td>
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<td>11:15 am</td>
<td>Sensitivity Analysis of Voluntary Buyout and</td>
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<td>Relocation Policies via High-resolution Agent-based Modeling</td>
<td>Pragathi Jha, Purdue University</td>
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<td>11:30 am</td>
<td>A framework for risk communication on emergent technologies</td>
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<td>10:30 am</td>
<td>Evaluating a pre-disaster relocation subsidy plan in coastal Louisiana via high-resolution agent-based simulation</td>
<td>Fangyuan Li, Diako Abbasi, Purdue University, University of Maryland, College Park</td>
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<tr>
<td>10:45 am</td>
<td>When federal disaster aid doesn’t suffice: a multivariate analysis of aid-to-damage ratios after hurricanes</td>
<td>Linda Waters, University of Maryland</td>
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<td>11:00 am</td>
<td>The uncanny underground: subsurface associations and their implications for perceptions of subterranean technologies</td>
<td>Catherine Lambert, Dominic Balog-Way, Katherine McComas, Julia Cousse, Evelina Trutneye, Cornell University, University of Geneva</td>
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<tr>
<td>11:15 am</td>
<td>Workshop on trust and trustworthiness of AI from a risk communication perspective</td>
<td>Ann Bostrom, Julie Demuth, Christopher Wirz, Mariana Cains, Andrea Schumacher, Deianna Madlambayan, Jacob Radford, University of Washington, National Center for Atmospheric Research, Cooperative Institute for Research in the Atmosphere (CIRA), Colorado State University (CSU)</td>
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<tr>
<td>11:30 am</td>
<td>Autonomous Vehicle (AV) Risk Perspectives</td>
<td>Christopher Doehring, Zairg Pagan Cajigas, Robert Bordley, James Bagian, Xunbi Ji, Minghao Shen, Gabor Orosz, Seth Guikema, University of Michigan</td>
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<tr>
<td>10:30 am</td>
<td>Causal Epidemiology: overview of current approaches</td>
<td>Stantec</td>
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<td>10:45 am</td>
<td>The Importance of Evidence-Based Methods and Critical Appraisal of Systematic Biases in Evaluating Causation: Case Study on Formaldehyde and Lymphohematopoietic Cancers</td>
<td>Daniele Wikoff, ToxStrategies</td>
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<td>11:00 am</td>
<td>Individual Probability of Causation</td>
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<td>Tony Cox, George Maldonado</td>
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<td>Cox Associates, University of Minnesota School of Public Health</td>
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<td>11:15 am</td>
<td>Interventional Probabilities of Causation (IPoC) with epidemiological and partial mechanistic evidence: benzene vs. formaldehyde as chemical myeloid leukemogens</td>
<td>Kenneth Mundt, Tony Cox, William Thompson, University of Massachusetts, Cox Associates</td>
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<td>11:30 am</td>
<td>Panel Discussion: Application of Advanced Causal Methods</td>
<td>Margaret Murray, Tony Cox, Ted Simon, William Thompson, Kenneth Mundt, Center for Truth in Science, Cox Associates, Ted Simon LLC, University of Massachusetts</td>
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Rock Creek Ballroom
Chair: Jonathan Wiener

Today space exploration is being actively pursued by numerous governments, as well as by numerous private corporations. These actors are undertaking many missions for diverse purposes including scientific research, communications, commerce, mining, military forces, and planetary defense - not only in Earth orbit and on our Moon, but also on Mars, asteroids, and beyond. They confront an array of emerging space risks, including operational accidents, space debris, space weather, geopolitical conflict, human health in space, and more. This session will focus on two key challenges: (i) “Planetary Protection” to assess and reduce the health and ecological risks of microorganisms being transported from one planet to another, such as forward contamination from Earth to other planets, and backward contamination from Mars Sample Returns to Earth; and (ii) “Planetary Defense” to assess and prevent collisions by large asteroids and other Near-Earth Objects that could cause local disasters or a global mass extinction event. Biosafety protocols to prevent forward and backward contamination have been developed by COSPAR and national space agencies over several decades; today their application to the Mars Sample Returns (being collected on Mars now, and planned to return to Earth within a decade) remains under discussion, with uncertainties regarding questions such as: how to recognize and assess unfamiliar astrobiology; how and where to build adequate biosafety laboratory facilities to study the samples; how to make decisions about scientific advances with ultra-low-probability risks of planet-scale catastrophe, which current laws may apply or new laws may be needed (e.g., laws on environmental impact assessment, pandemic infectious disease, and invasive species); and how to enlist cooperation by other spacefaring nations. As to planetary defense, the project by NASA & partners to start deflecting asteroids (demonstrated by the pathbreaking DART mission in 2022) exhibits a confluence of expert risk analysis, astute aerospace engineering, and carefully cultivated political support for funding measures to prevent low-probability global catastrophic risk – and thus raises questions about how best to address other higher-risk asteroids, and how to apply these lessons to other extreme risks. Existing space law, such as the 1967 Outer Space Treaty, calls on governments to address some of these issues, but its coverage may have gaps, its standards may need updating for newly emerging risks, its translation into national government policies may be incomplete, and its ability to reach private actors may be in question. New or improved approaches by scientific and social communities, national governments, private corporations, and international regimes may be needed to address emerging space risks.

W3-B: Climate Change and Public Health

River Birch A
Chair: Jacqueline MacDonald Gibson

1:30 pm - 3:00 pm

W3-B.1 Quantifying the burden of disease attributable to ambient air pollution and climate change in the United Arab Emirates

Tongchuan Wei, Jacqueline MacDonald Gibson*, Nick Kruskamp, Nathan Ellemrner
North Carolina State University, RTI International

1:50 pm

W3-B.2 Balancing Climate Resilience and Adaptation for Caribbean SIDS: Promoting Institutional Capacities

Stephanie Galaitsi, Benjamin Trump, Igor Linkov, Christopher Cummins
US Army Engineer Research and Development Center, US Army Corps of Engineers

2:10 pm

W3-B.3 Climate change and the risk of cardiovascular diseases in high-income countries: A systematic literature review

Samrin Ahmed Kusum, Grace Kilroy, Jacqueline MacDonald Gibson
North Carolina State University
1:30 PM – 3:00 PM

**W3-E: Symposium: Exploring the Role of Psychological Factors in Shaping Judgments and Decisions on Societal Issues**  
*Meeting Room 3*

**Chair:** Caitlin Drummond Otten

1:30 pm **W3-E.1**  
Food disgust influences how people perceive risks associated with immigrants  
Michael Siegrist  
ETH Zurich

1:45 pm **W3-E.2**  
Intuitive Toxicology: Beliefs about New Approach Methods for Chemical Risk Assessment Among Risk Assessors and the Public  
Angela Bearth  
ETH Zurich

2:00 pm **W3-E.3**  
Risk perception, science communication, and public understanding of battery usage and storage  
Alex Segnè Cohen, Bunquin Jon Benedik  
University of Oregon

2:15 pm **W3-E.4**  
Do individuals selectively engage their scientific reasoning abilities?  
Caitlin Drummond Otten  
Arizona State University

2:30 pm **W3-E.5**  
That’s Funny: The Role of Humor in Risk and Benefit Perceptions and Support for Geothermal Energy  
Sara Yeo, Michael Cacciatoore, Isabelle Freiling, Meaghan McKasy, Leona Y.F. Su, Sarah Rose Siskind, James Caven  
University of Utah, University of Georgia, Utah Valley University, University of Illinois at Urbana-Champaign, Hello SciCom

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1:30 PM – 3:00 PM

**W3-F: Symposium: Bringing Sex Toys Out of the Dark – A Convergent Approach to Identifying and Mitigating Potential Health Risks**  
*Meeting Room 4*

**Chair:** Joana Sipe

1:30 pm **W3-F.1**  
Problem introduction, observed data and policy gaps that instigated this work, and motivation for convergent approach.  
Jaleesia Amos, Christine Ogilvie Hendren  
Duke University, Appalachian State University

1:40 pm **W3-F.2**  
Experimental data conducted by the co-author team to corroborate concerns about potential sex toy exposures and hazards.  
Joana Sipe  
Duke University

1:55 pm **W3-F.3**  
Conceptual introduction of multi-perspective approach to risk management with a panel of diverse stakeholders  
Zoe Ligon, Jaleesia Amos  
Duke University

2:10 pm **W3-F.4**  
Moderated Panel with Government, Journalist, Retail, Legal Scholar, and Exposure Scholar Perspectives  
Joana Sipe, Christine Ogilvie Hendren  
Duke University, Appalachian State University

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1:30 PM – 3:00 PM

**W3-G: Antecedents to Trust and Behavior**  
*Meeting Room 5*

**Chair:** Richard John

1:30 pm **W3-G.1**  
Associations of fear and anger with risk perceptions and preventive behaviors during the COVID-19 pandemic: May and December 2020  
Patrycja Sleboda, Wandi Bruine de Bruin, Joo Árvai, Caitlin Drummond Otten, Lauren Lutzke, Alex Cohen  
University of Southern California, Arizona State University, University of Oregon

1:45 pm **W3-G.2**  
Validity of Behavioral Measures of Risk-Taking  
Richard John, Kevin Kapadia, Coco Tang  
University of Southern California

2:00 pm **W3-G.3**  
When does trust matter? Examining characteristics of behavior moderating effects of trust on compliance intentions  
Hwanseok Song, Prudence Mbah  
Purdue University

2:15 pm **W3-G.4**  
Public attitudes and perspectives on the tradeoffs associated with limiting nighttime lighting  
Andrew Fox, Maggie Leon-Conwin, Hark Jenkins-Smith, Carol Silva, Cheyenne Black, Jeffrey Kelly, Kyle Horton, Carolyn Burt, Ali Khalighifar, Grace Trankina  
University of Oklahoma, Colorado State University

2:30 pm **W3-G.5**  
Licensed to greenwash? Investigating corporations’ approach to sustainability communication  
Shupei Yuan, Haoran Chu  
Northern Illinois University, University of Florida

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1:30 PM – 3:00 PM

**W3-H: Cyber: Indicators vs Regulators**  
*Meeting Room 16*

**Chair:** Ruby Booth

1:30 pm **W3-H.1**  
Shifting With the Adversary: Developing Indicators for A Changing Cyber Landscape  
Ruby Booth  
Sandia National Laboratories

1:50 pm **W3-H.2**  
A Flexible and Scalable Risk Analysis Framework: From Methods to Application  
Laura Weinstock  
Sandia National Laboratories

2:10 pm **W3-H.3**  
Analysis of a Federal Response to Catastrophic Cyber Risk from Cyber Insurance Perspective  
Brianna Bace  
University at Albany

2:30 pm **W3-H.4**  
Risk Formulation for NCFs: Lessons from Financial Risk Measurement and Continuity  
Kevin Griffith  
Sandia National Labs
The concept of the “wicked problem” was introduced decades ago to characterize the complexity of applying science to policy, with different stakeholder valuations, complex causes, changing definitions of causation and success – to name a few issues. Cybersecurity is indeed a wicked problem. It has been primarily viewed a problem that users of information and communications technology (ICT) have to manage through having stronger security and more resiliency to reduce consequences of inevitable incidents. Few have been dealing with the nature of insecurities inherent in cyberspace and the threat itself. Some insecure aspects of ICT appear to be changing as demands increase for ICT firms to provide “security by design” and to be accountable, to some extent, for their products/services’ security. Thus, vulnerabilities are just starting to be better assessed/managed. However, less attention has been paid to the underlying issue of malicious actors and how to affect their capacity, capability and intent. This roundtable will consider how cybersecurity can become less of a wicked problem.

Other areas of international risk have been considered wicked problems but have been managed by the international community. The Stimson Center, a nonpartisan DC-based think tank working on international security issues, has undertaken a project to look at some other areas of international risk – from chlorofluorocarbons to dual-use materials – to consider lessons (including decision processes) that could be translated to better managing cyberspace, with a focus on accountability. One of the lessons emerging is the importance of detailed risk assessments with stakeholder input and valuations, something cyberspace has generally lacked.

**Panelists**
- Seth Guikema
- Terje Aven
- Katherine McComas
- Henry Willis
- Jim Lambert

Regulatory impact assessments of risk reducing regulations are required by several Executive Orders. These analyses include cost-benefit analysis and assessments of other impacts. Guidance and oversight are provided by the U.S. Office of Management and Budget (OMB), which is part of the Executive Office of the President. OMB’s Circular A-4 provides guidelines to Federal agencies on the development of regulatory analysis and accounting statements. These requirements have been established over the last several decades. The current administration issued a new Executive Order 14094 “Modernizing Regulatory Review”, which reinforces the basic principles of previous executive orders and directs OMB to issue revisions to Circular A-4 by April 6, 2024. Earlier this year OMB published the much-anticipated proposed revisions to Circular A-4 and requested public comment. The proposed revisions raise several interesting benefit-cost analysis issues, including appropriate discount rates and distributional impacts of regulations.

This roundtable will bring together experts from academia and U.S. Federal agencies to discuss the proposed revisions and potential changes to current regulatory analysis practices. This group consists of established and well-respected professionals with a long history of conducting economic analyses of risk regulations, including contributors to development of HHS, EPA, DOT, and OMB guidelines for regulatory impact assessments.

Updating and finalizing Circular A-4 is one of the top priorities of the administration and may impact policies for years to come as well as the framework for conducting regulatory impact assessments of these policies. Discussions resulting from this roundtable will contribute to shaping practices related to economic analysis of regulations that reduce health, safety, and security risks.
3:30 PM – 5:00 PM  
W4-E: Risk Visualization, Perception, and Communication  
Meeting Room 3  
Chair: Fernando Ferrante

3:30 pm W4-E.1  
The Dynamics of Fear: Exploring Logarithmic Changes in COVID-19 Risk Perception over Time in South Korea  
Ji-Bum Chung, Min-Kyu Kim, BaEun Lee  
Ulsan National Institute of Science and Technology

3:45 pm W4-E.2  
Governance during Uncertainty: The role of governors and federalism in US disaster response during the COVID-19 pandemic  
Kasia Klasa  
University of Michigan

4:00 pm W4-E.3  
Proposal for a Single Index (CIRIX) for Quantifying Resilience of Critical Infrastructures/Entities Against Extreme Threats  
Aleksandar Jovanovic, Helene Schernberg  
Steinbeis EU-VRi, ETHZ Risk Center

4:15 pm W4-E.4  
Public transportation network vulnerability assessment considering both overall and equity aspects  
Behnam Tahmasbi, Saeed Saleh Namadi, Asal Mehdi Tabrizi  
University of Maryland

4:30 pm W4-E.5  
Exploring Risk Visualization and Communication Tools for Nuclear Reactors  
Fernando Ferrante, Mark Wishart, Andrew Miller  
Electric Power Research Institute, Jensen Hughes

3:30 PM – 5:00 PM  
W4-F: Symposium: Safety assessment of cultured meat and seafood products  
Meeting Room 4  
Chair: Kimberly Ong

3:30 pm W4-F.1  
Safety assessment of cultured meat and seafood products: Insights from regulators, industry, and safety experts  
Kimberly Ong  
Vireo Advisors

3:50 pm W4-F.2  
Microbial risks in cultured meat and seafood products  
Wei Ng  
Vireo Advisors

4:10 pm W4-F.3  
Risk assessment of growth factors and culture media inputs  
Kora Kukk, Kimberly Ong, Jo Anne Shatkin  
Vireo Advisors

4:30 pm W4-F.4  
A simulated digestion model to evaluate the safety of bioactive molecules  
Christie Sayes  
Baylor University

3:30 PM – 5:00 PM  
W4-G: Hurricane Research – A Dynamic Risk Science  
Meeting Room 5  
Chair: Gabrielle Wong-Parodi

3:30 pm W4-G.1  
Social influence and protective action during rapidly intensifying tropical cyclones  
Gabrielle Wong-Parodi, Natalie Herbert, Andrea Schumacher, Hugh Walpole, Rebecca Morss, Julie Demuth  
Stanford University, Cooperative Institute for Research in the Atmosphere (CIRA) at Colorado State University (CSU), National Center for Atmospheric Research

3:45 pm W4-G.2  
Changing risk perceptions as hurricanes approach landfall: longitudinal panel data for 3 hurricanes  
Julie Demuth, Andrea Schumacher, Rebecca Morss, Gabrielle Wong-Parodi, Natalie Herbert, Hugh Walpole  
National Center for Atmospheric Research, Cooperative Institute for Research in the Atmosphere (CIRA) at Colorado State University (CSU), Stanford University

4:30 pm W4-G.3  
Subjective attribution, risk perceptions, and adaptation and environmental behaviors  
Gabrielle Wong-Parodi, Dana Reilhan, Dana Rose Garfin  
Stanford University, University of California Irvine, UCLA

4:15 pm W4-G.4  
“I don’t trust you so I am staying put:” media dependencies surrounding Hurricane Ian and their impact on risk perception, mitigation, evacuation, and trust of emergency responders  
Ken Lachlan, James DiCairano, Christine Gilbert, Patric Spence  
University of Connecticut, SUNY- Stony Brook, University of Central Florida

4:30 pm W4-G.5  
Efficacy and real-time behavior during hurricanes: Evidence from three case studies, 2020-2022  
Natalie Herbert, Julie Demuth, Rebecca Morss, Andrea Schumacher, Hugh Walpole, Gabrielle Wong-Parodi  
Stanford University, NCAR, Cooperative Institute for Research in the Atmosphere (CIRA) at Colorado State University (CSU), National Center for Atmospheric Research
Military and Civilian infrastructure as well as manufacturing and trade have been adversely impacted disrupted by recent shocks and stresses associated with global change, conflicts and supply chain breakdowns. The Department of Defense (DoD) has a critical need to secure its sources of materiel against both intentional—including adversarial—and unintentional disruptions. DARPA has initiated Resilient Supply-and-Demand Networks (RSDN) program to address strategic challenges of supply chain networks. The program views SDNs as open, complex, evolving systems whose dynamics reflect the impact of both external factors (e.g., conflict, climate change) and internal behaviors (e.g., inventory management). These factors are often driven by the locally focused decisions of SDN participants themselves. SDN resilience is a characteristic of the SDN system as a whole. Resilience enhancements, therefore, require coordinated action among SDN participants, who may individually lack the incentive and discretion to undertake this complex process.

This session will present the program and its progress to developing set of tools capable of assessing SDN risk and resilience and conducting stress testing to decide on implementing resilience-by-design and resilience-by-intervention in complex networks.

**Panelists**
- Igor Linkov
- Andres Gonzalez
- Adam Rose
- Kevin Kiernan
- Heather Pastolic

**W4-H: Roundtable: DARPA Resilient Supply-and-Demand Networks Program**
*Meeting Room 16*
*Chair: Mark Flood*

Lessons from selected cooperation projects with MENA countries  
Ben Trump

Use of Risk Analysis to Inform Evidence-Based Environment and Health Policymaking in Abu Dhabi  
Jacqueline MacDonald Gibson  
North Carolina State University

The Main institutional risks threatening the MENA region  
Nouh El Harmouzi  
Arab Center for Research

Presentation title: Establishing a new chapter in the Mena region  
Frederic Bouder  
University of Stavanger
Westin Washington DC Floor Plans
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