

## FINAL AGENDA

# Twenty-Eighth Annual George Mason University Conference on Atmospheric Transport and Dispersion Modeling

May 21-22, 2024

### Conference Chairs:

Joseph Chang, RAND Corporation, Arlington, VA  
Zafer Boybeyi, George Mason University, Fairfax, VA

**Enterprise Hall, Room 80 (In-person Only)**  
**George Mason University, Fairfax, VA**

### **DAY 1 (May 21) Enterprise Hall, Room 80**

#### **Session 1-Consequence Assessment & Ammonia Research**

**Chair: Joseph Chang, RAND Corporation**

- |     |          |          |   |
|-----|----------|----------|---|
|     | 8:25 AM  | 8:30 AM  | Welcoming Remarks   |
| 1.1 | 8:30 AM  | 8:50 AM  | <b>Comparison of Tritium Dose Calculations from Selected Codes</b><br>Mariah Garcia<br><i>Sandia National Laboratories, Albuquerque, NM</i>   |
| 1.2 | 8:50 AM  | 9:10 AM  | <b>Enhancing Volcanic Emission Forecasting Through Data Fusion and Trajectory Analysis: A Case Study of 2022 Hunga Tonga Eruption</b><br>Bavand Sadeghi, Alice Crawford, Tianfeng Chai, Mark Cohen, Justin Sieglaff, Michael Pavolonis, Hyun Cheol Kim, Gary Morris<br><i>National Oceanic and Atmospheric Administration, Air Resources Laboratory, College Park, MD</i> |
| 1.3 | 9:10 AM  | 9:30 AM  | <b>Estimation of Possible Contaminant Area Over Mountainous Terrain Using NBC_RAMs</b><br>Hyeyun Ku, Jiyun Seo, Sungjin Won<br><i>Agency for Defense Development, Daejeon, Republic of Korea</i>  |
| 1.4 | 9:30 AM  | 9:50 AM  | <b>Red Squirrel Tests – Cold Liquid Ammonia Releases Under Pressure, Rainout Fraction Analysis</b><br>Joanna Weyrich, Elizabeth M Lutostansky, Seshu Dharmavaram<br><i>Air Products, Allentown, PA</i>  |
| 1.5 | 9:50 AM  | 10:10 AM | <b>Recent Research Activities on Ammonia at HSE Science Division, Part 1</b><br>Rory Hetherington <sup>1</sup> , Simon Gant <sup>1</sup> , Gemma Tickle <sup>2</sup> , Alison McGillivray <sup>1</sup><br><sup>1</sup> <i>Health and Safety Executive (HSE), Buxton, United Kingdom;</i> <sup>2</sup> <i>GT Science and Software, Waverton, Cheshire, United Kingdom</i>  |
| 1.6 | 10:10 AM | 10:30 AM | <b>Recent Research Activities on Ammonia at HSE Science Division, Part 2</b><br>Rory Hetherington <sup>1</sup> , Simon Gant <sup>1</sup> , Gemma Tickle <sup>2</sup> , Alison McGillivray <sup>1</sup><br><sup>1</sup> <i>Health and Safety Executive (HSE), Buxton, United Kingdom;</i> <sup>2</sup> <i>GT Science and Software, Waverton, Cheshire, United Kingdom</i>  |

10:30 AM 11:00 AM **COFFEE BREAK**

#### **Session 2-Model Development & Urban & Interior Modeling (1 of 2)**

**Chair: Thomas O. Spicer, University of Arkansas**

- 2.1 11:00 AM 11:20 AM **Impact of Adding Additional Levels To MC-SCIUFF on Resulting Wind Profiles and Hazard Areas**  
Sean Miner  
*Defense Threat Reduction Agency, Albuquerque, NM*
- 2.2 11:20 AM 11:40 AM **Heterogenous Canopy in a Lagrangian-Stochastic Dispersion Model for Particulate Matter from Multiple Sources**  
Eyal Fattal<sup>1</sup>, Hadas David-Saroussi<sup>1</sup>, Mattya Ben-Efraim<sup>1</sup>, Omri Buchman<sup>1</sup>, Yehuda Arav<sup>1</sup>, Eran Tas<sup>2</sup>, Ziv Klausner<sup>1</sup>
- 2.3 11:40 AM 12:00 PM **Probabilistic Model of Chemical Sensor Response Coupled with Ensemble Mean Simulations Using SCIUFF**  
Oliver Daniel, Matthew Lindemer  
*National Ground Intelligence Center, Charlottesville, VA*
- 2.4 12:00 PM 12:20 PM **Two-Dimensional Particle Image Velocimetry Measurements in a Wind Tunnel Model of the Denser-Than-Air Releases of the Jack Rabbit II Field Tests**  
Paulo V.d.F. Lopes, Chad T. Smith, Thomas O. Spicer  
*University of Arkansas, Fayetteville, AR*
- 2.5 12:20 PM 12:40 PM **Spatial and Temporal Scales of Flow and Dispersion in Subway Stations**  
Yehuda Arav

12:40 PM 1:40 PM **LUNCH BREAK**

**Session 3-AI/ML & Database**

**Chair: Cody Floerchinger, Aeris LLC**

- 3.1 1:40 PM 2:00 PM **Tactical Assault Kit (TAK) Tactical Sensor Placement (TSP)**  
Jordan Lefebvre, Paul Bieringer, Donovan Quimby, Oscar Lopez  
*Aeris LLC, Louisville, CO*
- 3.2 2:00 PM 2:20 PM **Differential Evolution with Snooker Updater for Source Term Estimation in the UrbanAware-NG AI-Enabled Decision Support Prototype**  
Siân Jenkins, Emily Tyler, Russell Mills, Martyn Bull  
*Riskaware, Bristol, United Kingdom*
- 3.3 2:20 PM 2:40 PM **Structurally Consistent Rapid Internal Building Estimation (SCRIBE)**  
Donovan Quimby, Paul Bieringer, Jordan Lefebvre, Oscar Lopez  
*Aeris LLC, Louisville, CO*
- 3.4 2:40 PM 3:00 PM **Automatic Feature Extraction from Nuclear Cloud Imagery**  
Joel Khristy, Haley Sullivan, Thomas Karnowski, Vincent Jodoin, Pablo Moresco  
*Oak Ridge National Laboratory, Oak Ridge, TN*
- 3.5 3:00 PM 3:20 PM **Empirical-Statistical Downscaling for the Global Climatological Analysis Tool (GCAT) and the Italian Wind Atlas**  
Stefano Alessandrini, Chris Rozoff, Simone Sperati  
*National Center for Atmospheric Research, Boulder, CO*
- 3.6 3:20 PM 3:40 PM **Status on The Development of Database/Website for DTRA Programs MUST, JU03, and FFT07**  
Eugene Vickers<sup>1</sup>, Don Fazenbaker<sup>1</sup>, Gerita Cochran<sup>2</sup>  
<sup>1</sup> U.S. Army Combat Capabilities Development Command - Chemical Biological Center, Aberdeen Proving Ground, MD; <sup>2</sup> Norfolk State University, Norfolk, VA

3:40 PM 4:00 PM **COFFEE BREAK**

**Session 4-Fire Modeling & Ensemble Modeling**

**Chair: Simon Gant, Health and Safety Executive**

- 4.1 4:00 PM 4:20 PM **Predicting Prescribed Fire Smoke Impacts on Road Visibility: Using QUIC-Fire for Burn Design and Planning**  
Diego Rojas, David Robinson, Alexander Josephson, Matthew Nelson, Rod Linn, Sara Brambilla  
*Los Alamos National Laboratory, Los Alamos, NM*
- 4.2 4:20 PM 4:40 PM **New Multigrid Method for QUIC-Fire Wind Solver**  
Jesse Slaten<sup>1,2</sup>, David Robinson<sup>1</sup>, Daniel Pineda<sup>2</sup>, Sara Brambilla<sup>1</sup>  
<sup>1</sup> *Los Alamos National Laboratory, Los Alamos, NM;* <sup>2</sup> *The University of Texas at San Antonio, San Antonio, TX*
- 4.3 4:40 PM 5:00 PM **Implementing Aerosol Coagulation in the QUIC-Fire/QUIC-SMOKE Model**  
Hannah Brink, Sara Brambilla, Matthew Nelson, Kyle Gorkowski, Liam Wedell, Diego Rojas Blanco, Katherine Benedict  
*Los Alamos National Laboratory, Los Alamos, NM*
- 4.4 5:00 PM 5:20 PM **Ensemble Seasonal Forecasting for Near-Future Mission Planning**  
Scott Meech, Stefano Alessandrini, Yongxin Zhang  
*National Center for Atmospheric Research, Boulder, CO*
- 4.5 5:20 PM 5:40 PM **Atmospheric Transport and Dispersion Model Ensembles for Emergency Response Applications**  
Alice Crawford, Tianfeng Chai, Mark Cohen, Binyu Wang, Sonny Zinn  
*National Oceanic and Atmospheric Administration, Air Resources Laboratory, College Park, MD*
- 5:40 PM **DAY 1 ADJOURNS**

## **DAY 2 (May 22) Enterprise Hall, Room 80**

### **Session 5-Jack Rabbit III**

**Chair: Ron Meris, Defense Threat Reduction Agency**

- 5.1 8:30 AM 8:50 AM **Jack Rabbit III Ammonia Study**  
Ron Meris  
*Defense Threat Reduction Agency, Ft. Belvoir, VA*
- 5.2 8:50 AM 9:10 AM **Jack Rabbit III: Environmental Factors Affecting Ammonia Airborne Plume Transport Dispersion**  
Sun McMasters<sup>1</sup>, Ronald Meris<sup>2</sup>, Shannon Fox<sup>1</sup>  
<sup>1</sup> *DHS Chemical Security Analysis Center, Edgewood, MD;* <sup>2</sup> *Defense Threat Reduction Agency, Ft. Belvoir, VA*
- 5.3 9:10 AM 9:30 AM **Jack Rabbit III Test Support Studies**  
Jennifer Holdridge<sup>1</sup>, Matt Rowley<sup>1</sup>, Kent Hofacre<sup>1</sup>, Tesema Chekol<sup>1</sup>, Ron Meris<sup>2</sup>  
<sup>1</sup> *Battelle Memorial Institute, Columbus, OH;* <sup>1</sup> *Defense Threat Reduction Agency, Ft. Belvoir, VA*
- 5.4 9:30 AM 9:50 AM **JR III Phase I Chamber Testing: Capturing Atmospheric Concentrations with Emergency Response Technologies vs. Laboratory Technologies 2024**  
Andy Byrnes  
*Utah Valley University, UT*
- 5.5 9:50 AM 10:10 AM **JR III MWG Initial Modeling Exercise ALOHA Comparison and What Responders Really Need to Know**  
Robert Bradley  
*Emergency Management Solutions, Inc.*
- 5.6 10:10 AM 10:30 AM **Activities and Plans of JR III Working Group on Deposition and Surface Chemical Reactions**

Steven R. Hanna  
*Hanna Consultants, Kennebunkport, ME*

- 5.7 10:30 AM 10:50 AM **Chlorine and Ammonia Removal by Dry Deposition during an Accidental Release: Considering the Importance of the Boundary Layer Resistance**

Thomas O. Spicer  
*University of Arkansas, Fayetteville, AR*

10:50 AM 11:20 AM **COFFEE BREAK**

**Session 6-Urban & Interior Modeling (2 of 2)**

**Chair: Paul Bieringer, Aeris LLC**

- 6.1 11:20 AM 11:40 AM **Propagating Outdoor Plume Uncertainty into Building Models**

David M. Lorenzetti, Michael D. Sohn,  
*Lawrence Berkeley National Laboratory, Berkeley, CA*

- 6.2 11:40 AM 12:00 PM **Three-Dimensional Flow Structure and Ventilation Dynamics of a Cross-Ventilated Building**

Andrew Banko<sup>1</sup>, Adam Eckstein<sup>1</sup>, Joshua Gilliard<sup>1</sup>, Alyssa Lee<sup>1</sup>, Tuhin Bandopadhyay<sup>2</sup>, Laura Villafane<sup>2</sup>, Brad Sutton<sup>2</sup>

<sup>1</sup> *United States Military Academy, West Point, NY*; <sup>2</sup> *University of Illinois at Urbana-Champaign, Urbana-Champaign, IL*

- 6.3 12:00 PM 12:20 PM **Urban SCIPUFF in HPAC**

Douglas Henn, Ian Sykes, Stephen Parker, Caleb Wagner, Casey Meakin, Glenn Hunter

*Parsons Corporation*

- 6.4 12:20 PM 12:40 PM **The Joint Outdoor-Indoor Large Eddy Simulation for Numerical Weather Prediction (JOULES-NWP): Towards a Time Varying LES for Urban Weather and Transport and Dispersion Forecasting**

Cody Floerchinger, Paul Bieringer, Kyle Neizgoda, Scott Runyon, Kevin Petty  
*Aeris LLC, Louisville, CO*

- 6.5 12:40 PM 1:00 PM **Transport and Dispersion Forecasting for Semi-Enclosed Venues: A Case Study at Stade de France using JOULES-NWP**

Kyle Neizgoda, Cody Floerchinger, Paul Bieringer, Scott Runyon, Kevin Petty  
*Aeris LLC, Louisville, CO*

1:00 PM 2:00 PM **LUNCH BREAK**

**Session 7-Weather Input & Model Uncertainty**

**Chair: Steven R. Hanna, Hanna Consultants**

- 7.1 2:00 PM 2:20 PM **Handling Meteorological Input Data Gaps in Modeling Accidental Releases of Hazardous Chemicals during Transportation**

Steven R. Hanna  
*Hanna Consultants, Kennebunkport, ME*

- 7.2 2:20 PM 2:40 PM **Comparing the Influence of Input Meteorological Dataset and Dispersion Model on Regulatory Modelling Outputs**

David Carruthers, Christina Hood, James O'Neill, Rose Jackson, David Jinks, Martin Seaton, Sarah Strickland

*Cambridge Environmental Research Consultants (CERC), Cambridge, UK*

- 7.3 2:40 PM 3:00 PM **Methodology for Converting ASOS Meteorological Data for Use in the MACCS Code**

Daniel J. Clayton  
*Sandia National Laboratories*

- 7.4 3:00 PM 3:20 PM **Spatio-Temporal Analysis of Micrometeorological Flow-Field at a Coastal Plain Adjacent to Complex Terrain**

Ziv Klausner<sup>1</sup>, Mattya Ben-Efraim<sup>1</sup>, Yehuda Arav<sup>1</sup>, Eran Tas<sup>2</sup>, Eyal Fattal<sup>1</sup>

- 7.5 3:20 PM 3:40 PM **Introducing Surface Roughness in Adhesion for Stochastic and Rock'n'Roll Models to Describe Particle Resuspension in Turbulent Flows**  
David Ben Shlomo<sup>1,2</sup>, Roy Almog<sup>1</sup>, Ziv Klausner<sup>3</sup>, Eyal Fattal<sup>3</sup>, Ronen Berkovich<sup>1</sup>

3:40 PM 4:10 PM **COFFEE BREAK**

**Session 8-Decision Support**

**Chairs: Zafer Boybeyi, George Mason University**

- 8.1 4:10 PM 4:30 PM **Weather Radar for Emergency Response and Tracking**  
Michael Benson  
*Oak Ridge National Laboratory, Oak Ridge, TN*
- 8.2 4:30 PM 4:50 PM **Modeling the Fukushima Daiichi Nuclear Disaster with QUIC-DEPDOSE**  
Matthew Nelson, John Klumpp, Diego Rojas, Liam Wedell, Sonali John, Chibuikwe Onwukwe, Sara Brambilla, and Michael Brown  
*Los Alamos National Laboratory, Los Alamos, NM*
- 8.3 4:50 PM 5:10 PM **The Common CBRN Model Framework (CCMF): Accelerating the Delivery of the Latest S&T Model Advancements to the Operational Decision Maker**  
  
George Bieberbach<sup>1</sup>, Jonathan Hurst<sup>1</sup>, Paul Bieringer<sup>1</sup>, Brian Martin<sup>1</sup>, Russell Mills<sup>2</sup>, Phil Wingfield<sup>2</sup>, Selena Leary<sup>3</sup>, Jason Rodriguez<sup>3</sup>, Steve Parker<sup>4</sup>, Stacey Campbell<sup>4</sup>, Chris Kiley<sup>5</sup>  
  
<sup>1</sup> *Aeris LLC, Louisville, CO*; <sup>2</sup> *Riskaware, United Kingdom*; <sup>3</sup> *Applied Research Associates*; <sup>4</sup> *Parsons Corporation*; <sup>5</sup> *Defense Threat Reduction Agency*
- 8.4 5:10 PM 5:30 PM **Use of National Centers for Environmental Prediction Reanalysis Data to Support Severe Accident Consequence Analysis at Locations without Onsite Meteorological Data**  
  
Elena Yegorova<sup>1</sup>, Daniel Clayton<sup>2</sup>, Keith Compton<sup>1</sup>  
<sup>1</sup> *US Nuclear Regulatory Commission, Washington, DC*; <sup>2</sup> *Sandia National Laboratories, Albuquerque, NM*
- 5:30 PM **DAY 2/CONFERENCE ADJOURNS**  
7:00 PM **NO-HOST SOCIAL DINNER, LOCATION TBD**

**May 24**

**GMU conference registration not required**  
**Merten Hall, Room 2500**

**Jack Rabbit III Break-out Session**

**Chair: Ron Meris, Defense Threat Reduction Agency**

9:00 AM 12:00 PM **Jack Rabbit III Break-out Session**

All are welcome; registration for for GMU conference is not required.  
*The break-out session will be hybrid with a ZoomGov connection.*

As a reminder to the participants, you need to ensure you have the appropriate Zoom for Government app and/or your web browser plug in. (<https://zoomgov.com/download>)

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