Last updated: 15 Jun 2023

AGENDA

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

June 20-22, 2023

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 (June 20) Enterprise Hall, Room 80

Session 1-Modeling Studies (1)
Chair: Joe Chang, RAND Corporation

	8:25 AM	8:30 AM	Welcoming Remarks
1.1	8:30 AM	8:50 AM	**Impacts of Land Surface and Meteorological Data Assimilation on Transport Modeling in the Snake River Plain** Joseph Wermter, Steven Chiswell, Brian Viner *Savannah River National Laboratory, Aiken, SC*
1.2	8:50 AM	9:10 AM	**Impact of Using Profile and Surface Observations on Meteorological Variables Computed Using MC-SCIPUFF** Sean Miner *Defense Threat Reduction Agency, Albuquerque, NM*
1.3	9:10 AM	9:30 AM	**Post-processing of CMAQ Forecast for Improving Air Quality Predictions** Stefano Alessandrini[1], Jared A. Lee[1], J. H. Kim[1], Scott Meech[1], R. Kumar[1], Irina V. Djalalova[2], James Wilczak[2] *[1] National Center for Atmospheric Research, Boulder, CO; [2] National Oceanic and Atmospheric Administration*
1.4	9:30 AM	9:50 AM	**Follow-up to the EMERGENCIES Project – High-fidelity 3D Simulations Accounting for Uncertainties in the Event of Hazmat Dispersion Over a Huge Urban Area** Patrick ARMAND[1], Christophe DUCHENNE[1] , Olivier OLDRINI[2] , and Sylvie PERDRIEL[2] *[1] CEA, DAM, DIF, Arpajon, France; [2] AmpliSIM, Paris, France*
1.5	9:50 AM	10:10 AM	**CBRN Modelling of Sources and Agent Fate: an Introduction to the MODISAFE Project** Jan Burman[1], Oscar Björnham[1], Stephane Burkhart[2], Thomas Vik[3], Thor Gjesdal[3], Simon Gant[4], Helen Cruse[4], Rory Hetherington[4], Liam Gray[4], Matteo Carpentieri[5], Marco Placidi[5], Alan Robins[5], Guillaume Leroy[6]

[1] Swedish Defense Research Agency (FOI), Sweden; [2] Armament General Directorate (DGA), France; [3] Norwegian Defense Research Establishment (FFI), Norway; [4] Heath and Safety Executive (HSE), United Kingdom; [5] University of Surrey, Surrey, United Kingdom; [6] INERIS, France

10:10 AM 10:40 AM ***COFFEE BREAK***

Session 2-Fire Modeling and Observations
Chair: Thomas O. Spicer, University of Arkansas

2.1 10:40 AM 11:00 AM **QUIC-Fire and QUIC-SMOKE: Planning Safe and Effective Prescribed Fires**
Vijay George Narayanan, R.R. Linn, M.A. Nelson, M.J. Brown, S. Brambilla

Los Alamos National Laboratory, Los Alamos, NM

2.2 11:00 AM 11:20 AM **Can We Improve Short-range Plume Dispersal Modelling for Fire Related Emergency Response Operations?**
Nicola Stebbing
The Met Office, Exeter, United Kingdom

2.3 11:20 AM 11:40 AM **SIMPAC Forest Fire Operational SAAS Platform**
Bruno Ribstein[1], Marine Laplanche[1] , Maxime Nibart[1] , Damien Piga[2]
[1] ARIA Technologies, Boulogne-Billancourt, France; [2] AtmoSud, Marseille France

2.4 11:40 AM 12:00 PM **Smoke and Wind Observations of a Prescribed Fire at Eglin Air Force Base**

Matthew Nelson, Sara Brambilla, Diego Rojas Blanco, Vijay Narayanan, Mina Deshler, Liam Wedell, Jesse Canfield, Dorianis Perez, Rod Linn, and Michael Brown

Los Alamos National Laboratory, Los Alamos, NM

2.5 12:00 PM 12:20 PM **Chemical Fires Module Phase II**
Stephen Davis[1], Jayda Meisel[1], Tesema Chekol[1], James Reuther[1], Brian Pate[2]
Battelle Memorial Institute [1] ; Defense Threat Reduction Agency [2]

12:20 PM 1:20 PM ***LUNCH BREAK***

Session 3-HYSPLIT
Chair: Christopher Loughner, NOAA Air Resources Laboratory

3.1 1:20 PM 1:40 PM **Overview of NOAA's Regional Specialized Meteorological Center (RSMC) for Atmospheric Transport and Dispersion Emergency Response**
Jeffery T. McQueen[1], Binyu Wang[1], Robert Handel[1], Fanglin Yang[1], Mark Cohen[2], Tianfeng Chai[2], Sonny Zinn[2]

1National Oceanic and Atmospheric Administration, National Weather Service, National Centers for Environmental Prediction, College Park, MD; [2] National Oceanic and Atmospheric Administration, Air Resources Laboratory, College Park, MD

3.2 1:40 PM 2:00 PM **Development of a HYSPLIT – CarbonTracker-Lagrange Inverse CO_2 Modeling Prototype for the Washington, DC and Baltimore, MD Metropolitan Area: Results from the First Set of Synthetic Data Experiments**

Miguel Cahuich-López[1,2], Christopher P Loughner[1], Mark Cohen[1], Sonny Zinn[1], Xinrong Ren[1], Winston Luke[1], Paul Kelley[1,3], Phillip Stratton[1,3], Howard Diamond[1], Ariel Stein[1], Arlyn Andrews[4], Lei Hu[4,5], John Miller[4], Mike Trudeau[4,5], Bharat Rastogi[4,5], Sergio Ibarra-Espinosa[4,5],John Mund[4,5], Colm Sweeney[4], Steve Montzka[4], James Whetstone[6], Anna Karion[6], Kimberly Mueller[6], Israel Lopez-Coto[6,7], Subhomoy Ghosh[6,8], Brian McDonald[9], and Lesley Ott[10]

[1] National Oceanic and Atmospheric Administration, Air Resources Laboratory, College Park, MD; [2] Earth System Science Interdisciplinary Center, University of Maryland, College Park, MD; [3] Department of Atmospheric and Oceanic Science, University of Maryland, College Park, MD; [4] National Oceanic and Atmospheric Administration, Global Monitoring Laboratory, Boulder, CO; [5] Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO; [6] National Institute of Standards and Technology, Gaithersburg, MD; [7] School of Marine and Atmospheric Sciences, Stony Brook University, Stony Brook, NY; [8] University of Notre Dame, Notre Dame, IN; [9] National Oceanic and Atmospheric Administration, Chemical Sciences Laboratory, Boulder, CO; [10] NASA, Global Modeling and Assimilation Office, Greenbelt, MD

3.3 2:00 PM 2:20 PM **Reducing the Number of Computational Particles Needed for HYSPLIT Simulations**

Alice Crawford

National Oceanic and Atmospheric Administration, Air Resources Laboratory, College Park, MD

3.4 2:20 PM 2:40 PM **HYSPLIT Trajectory Analysis of Synoptic Scale Wind Patterns' Influence on Sea Breeze Development and Air Quality During the LISTOS Field Campaign**

Christopher Loughner

National Oceanic and Atmospheric Administration, Air Resources Laboratory, College Park, MD

3.5 2:40 PM 3:00 PM **Going with the Wind: Assessing GEFS Wind Fields for Volcanic Ash Forecasting with the HYSPLIT Model**

Binyu Wang[1], Alice Crawford[2], Jeff McQueen[3], Mark Cohen[2], Fanglin Yang[3], Sonny Zinn[2]

[1] National Oceanic and Atmospheric Administration, Lynker Contract Support, College Park, MD, [2] National Oceanic and Atmospheric Administration, Air Resources Laboratory, College Park, MD, [3] National Oceanic and Atmospheric Administration, National Weather Service, National Centers for Environmental Prediction, College Park, MD

3.6 3:00 PM 3:20 PM **The Impact of Using Assimilated Meteorological Fields with Local Observations on Dispersion Simulations**

Fong Ngan[1,2], Nebila Lichiheb[3,4], and Mark Cohen[1]

[1] National Oceanic and Atmospheric Administration, Air Resources Laboratory, College Park, MD; [2] Cooperative Institute for Satellites Earth System Studies, University of Maryland, College Park, MD; [3] National Oceanic and Atmospheric Administration, Air Resources Laboratory, Oak Ridge, TN; [4] Oak Ridge Associated Universities, Oak Ridge, TN

3:20 PM 3:40 PM ***COFFEE BREAK***

Session 4-Modeling of Radiological Releases
Chair: Simon Gant, Health and Safety Executive

4.1	3:40 PM	4:00 PM	**Brief Review of History of Modeling Transport and Dispersion of Radiological Releases** Steven R. Hanna *Hanna Consultants, Kennebunkport, ME*
4.2	4:00 PM	4:20 PM	**Realistic Radiological Exposure Calculations in Urban Areas** Matthew Nelson, Lucas Hetrick, Sean O'Dowd, Mina Deshler, Liam Wedell, Sara Brambilla, John Klumpp, Timothy Goorley, and Michael Brown *Los Alamos National Laboratory, Los Alamos, NM*
4.3	4:20 PM	4:40 PM	**Integrating an Urban Dispersion Model (QUIC) and an Internal Dosimetry Calculator (DEPDOSE)** Liam R. Wedell , Matthew A. Nelson, John A. Klumpp, Michael J. Brown *Los Alamos National Laboratory, Los Alamos, NM*
4.4	4:40 PM	5:00 PM	**Urban Dispersion and Radiation Modelling in ESTE CBRN with Implemented Lagrangian Particle Model** Ludovit Liptak, P. Carny, E. Fojcikova, M. Marcisovsky, M. Marcisovska *Abmerit, Trnava, Slovakia*
4.5	5:00 PM	5:20 PM	**Reintegration of the DELFIC Precipitation Scavenging Module** Matthew J. Krupcale *Oak Ridge National Laboratory, Oak Ridge, TN*
4.6	5:20 PM	5:40 PM	**Criteria for Modeling Atmospheric Dispersion of Radiological Releases from Nuclear Facilities – a Voluntary Consensus Standard** John Ciolek[1], Sarah Davis[2], Carl Mazzola[1] *[1] Los Alamos National Laboratory, Los Alamos, NM; [2] Argonne National Laboratory, Lemont, IL*
	5:40 PM		***DAY 1 ADJOURNS***

DAY 2 (June 21) Enterprise Hall, Room 80

Session 5-Jack Rabbit III (1)
Chair: Ron Meris, Defense Threat Reduction Agency

5.1	8:30 AM	8:50 AM	**Jack Rabbit III: Filling Atmospheric Ammonia Dispersion Modeling Gaps for Emergency Planning and Response Applications** Sun McMasters[1], Ronald Meris[2], Shannon Fox[1] *[1] DHS Chemical Security Analysis Center, Edgewood, MD; [2] Defense Threat Reduction Agency, Ft. Belvoir, VA*
5.2	8:50 AM	9:10 AM	**Modeling of Desert Tortoise and Fladis using Reanalysis Weather in Support of Jack Rabbit III** Steven Simpson, Matthew King, Sean Miner *Defense Threat Reduction Agency, Albuquerque, NM*
5.3	9:10 AM	9:30 AM	**Can Existing Samplers and Remote Sensors Provide Rapid Response Measurements of Deposition to Various Surfaces and Concentrations in Soils and Vegetation?** Steven R. Hanna *Hanna Consultants, Kennebunkport, ME*

5.4 9:30 AM 9:50 AM **Effect of Humidity on the Dispersion Behaviour of Pressure-liquefied Ammonia Jet Releases**

Gemma Tickle[1], Rory Hetherington[2], Simon Gant[2], Alison McGillivray[2], and Harvey Tucker[3]

[1] GT Science and Software, Waverton, Cheshire, United Kingdom; [2] Health and Safety Executive (HSE), Buxton, United Kingdom; [3] Health and Safety Executive (HSE), Bootle, United Kingdom

5.5 9:50 AM 10:10 AM **Thermodynamic Modeling of the Interaction of Ammonia and Air/Water for Consequence Assessment Purposes**

Thomas O. Spicer

University of Arkansas, Fayetteville, AR

10:10 AM 10:40 AM ***COFFEE BREAK***

Session 6-Jack Rabbit III (2) and Related Programs; Plume Tracking
Chair: Thomas Mazzola, Defense Threat Reduction Agency

6.1 10:40 AM 11:00 AM **Analysis Toolbox to Support the Hazard Assessment of Waterborne Ammonia Releases**

Peter Egli, Matthew Ward, Shane Palmer

Maritime Planning Associates, Inc., Newport, RI

6.2 11:00 AM 11:20 AM **Red Squirrel Ammonia Field Experiments and Modeling Results**

Seshu Dharmavaram

Air Products, Allentown, PA

6.3 11:20 AM 11:40 AM **Carbon Dioxide Pipelines: Dispersion Modeling Challenges and Tentative Plans for a Program of Field-scale Experiments**

Simon Gant

Health and Safety Executive (HSE), Buxton, United Kingdom

6.4 11:40 AM 12:00 PM **Evaluation of Spectroscopy Imager and Point Sensor Systems for Continuous Monitoring of Fugitive Methane**

Lukasz Zielinski, A. Ballard Andrews, Christopher Boucher, Aditi Chakrabarti, Mathieu Dauphin, Manasi Doshi, Kashif Rashid, Andrew Speck, Junyi Yuan

Schlumberger Doll Research, Cambridge, MA

6.5 12:00 PM 12:20 PM **Weather Radar Plume Tracking and Forecasting**

Tom Norby, Erik Kabela, David Hooper

Oak Ridge National Laboratory, Oak Ridge, TN

12:20 PM 1:20 PM ***LUNCH BREAK***

Session 7-Urban and Interiors Dispersion Modeling (1)
Chair: Paul Bieringer, Aeris LLC

7.1 1:20 PM 1:40 PM **Effect of Wind Direction on the Ventilation Dynamics of a Model Sports Stadium**

Andrew J. Banko[1], Tuhin Bandopadhyay[2], Laura Villafañe[2], Brad P. Sutton[2], Christopher J. Elkins[3], Michael J. Benson[1]

[1] United States Military Academy, West Point, NY; [2] University of Illinois at Urbana-Champaign, Urbana-Champaign, IL; [3] Stanford University, Stanford, CA

7.2 1:40 PM 2:00 PM **Tracer Gas Experiment of Urban Pollutant Transport: Urban Canyons and Indoor-Outdoor Transport**

Michael D. Sohn[1], Marion L. Russell[1], William W. Delp[1], David M. Lorenzetti[1], Kyla Cook[1], Benjamin Wong[2], Ang Yu Ming[2], Fiona Phua[2], Joseph Ng[2], Shermin Soh[2], Tan Sook Lan[2], Tay Bee Kiat[2], Yap Xiu Huan[2]

[1] *Lawrence Berkeley National Laboratory, Berkeley, CA;* [2] *DSO National Laboratories, Singapore*

7.3	2:00 PM	2:20 PM	**Aeris Rapid GPU Urban Modeling System (ARGUS) Capability Brief and Demonstration** Cody Floerchinger, Paul Bieringer, Kory Clark, Alyssa Feagans, Scott Runyon, Brian Martin *Aeris LLC, Louisville, CO*
7.4	2:20 PM	2:40 PM	**Computationally Efficient Probabilistic Modelling of Indoor Contaminant Concentrations** Martyn Bull, Peter Melling *Riskaware, Bristol, United Kingdom*
7.5	2:40 PM	3:00 PM	**Development of the UrbanAware Platform: UDM Updates and Radiological Modelling Capability** Martyn Bull *Riskaware, Bristol, United Kingdom*
7.6	3:00 PM	3:20 PM	**The Joint Outdoor-indoor Urban Large Eddy Simulation as a Tool for Emergency Management Planning and Threat Forecasting for Large Semi-enclosed Venues: Verification, Validation, and Demonstration** Cody Floerchinger[1], *Scott Runyon* [1], *Luna Rodriquez* [1], *Paul Bieringer* [1], *Scott Kreyenhagen* [1], *Andrew Banko* [2] [1] *Aeris LLC, Louisville, CO;* [2] *United States Military Academy, West Point, NY*
	3:20 PM	3:50 PM	***COFFEE BREAK***

Session 8-Communicating Dispersion Modeling Results Between Tactical Edge and Command and Control & Reachback; Urban and Interiors Dispersion Modeling (2)
Chairs: Andrew Banko, U.S. Military Academy; Cody Floerchinger, Aeris LLC

8.1	3:50 PM	4:10 PM	**Hazard Estimation and Assessment Toolkit (HEAT) Plugin for the Web Based Tactical Assault Kit (WebTAK)** George Bieberbach[1], Jonathan Hurst[1], Paul Bieringer[1], Brian Martin[1], Peter Melling[2], Russell Mills[2], Phil Wingfield[2], Connor Runyon[3], Ryan Hafer[3], Jason Rodriquez[3], Steve Parker[4], Stacey Campbell[4], Katie Raymond[5] [1] *Aeris LLC, Louisville, CO;* [2] *Riskaware, United Kingdom;* [3] *Applied Research Associates;* [4] *Xator Corporation;* [5] *Defense Threat Reduction Agency*
8.2	4:10 PM	4:30 PM	**Chemical Biological Alerting & Response Tool (CBART) Plugin for the Web Based Tactical Assault Kit (WebTAK)** Brian Martin[1], Paul Bieringer[1], Jonathan Hurst[1], Ryan Hafer[2], Rick Fry[3] [1] *Aeris LLC, Louisville CO;* [2] *Applied Research Associates, Inc.;* [3] *Defense Threat Reduction Agency*
8.3	4:30 PM	4:50 PM	**Integrated Urban: State of the Urban and Indoor Dispersion Modeling Project** Michael D. Sohn[1], *David M. Lorenzetti* [1], *Paul E. Bieringer* [2], *Scott Kreyenhagen* [2], *George Bieberbach* [2] [1] *Lawrence Berkeley National Laboratory, Berkeley, CA;* [2] *Aeris LLC, Louisville, CO*
8.4	4:50 PM	5:10 PM	**QUEST – Queryable Source Term Estimation Tool** Scott Runyon, Brian Martin, Paul Bieringer, Scott Kreyenhagen *Aeris LLC, Louisville CO*
	5:10 PM		***DAY 2 ADJOURNS***

7:00 PM ***NO-HOST SOCIAL DINNER, LOCATION TBD***

DAY 3 (June 22) Enterprise Hall, Room 80

Session 9-Modeling Studies (2); Database
Chair: Steve Hanna, Hanna Consultants

9.1 8:30 AM 8:50 AM **CBRN Wind Tunnel Design Using LES-simulation**
Jan Burman
Totalförsvarets Forskningsinstitut, Stockholm, Sweden

9.2 8:50 AM 9:10 AM **Identifying Issues with NAME's Urban Dispersion Scheme at High Urban Density**
Lois Huggett
The Met Office, Exeter, United Kingdom

9.3 9:10 AM 9:30 AM **A New Plume Rise Algorithm for Modeling Aircraft Sources in AERMOD**
Gavendra Pandey[1], Akula Venkatram[2], and Saravanan Arunachala[1]
[1] Institute for the Environment, University of North Carolina at Chapel Hill, Chapel Hill, NC; [2] University of California at Riverside, Riverside, CA

9.4 9:30 AM 9:50 AM **Using WRF Turbulent Kinetic Energy (TKE) in HPAC Predictions: Statistical Metrics and Results**
Caleb Wagner, Glenn Hunter, Dave Stauffer, Doug Henn
Xator, LLC

9.5 9:50 AM 10:10 AM **Acceleration of Simulations by Application of a Kernel Method in a High-resolution Lagrangian Particle Dispersion Model**
Daniela Barbero[1,2], Bruno Ribstein[3], Maxime Nibart[3] , Gianni Luigi Tinarelli[1]
[1] ARIANET S.R.L., Milan, Italy; [2] Politecnico di Milano, Milan, Italy; [3] ARIA Technologies, Boulogne-Billancourt, France

9.6 10:10 AM 10:30 AM **Status on the Development of Database/Website for DTRA Programs MUST, JU03, and FFT07**
Eugene Vickers[1], Don Fazenbaker[1], Gerita Cochran[2]
[1] U.S. Army Combat Capabilities Development Command - Chemical Biological Center, Aberdeen Proving Ground, MD; [2] Norfolk State University, Norfolk, VA

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

Session 10-Urban Modeling; Source Term Estimation; AI/ML
Chair: Zafer Boybeyi, George Mason University

10.1 11:00 AM 11:20 AM **Computational Performance of Lattice Boltzmann Method Based Large Eddy Simulation for Urban Dispersion**
Brendan Waters[1], Helen Schottenhamml[2], Harald Kostler[3], Ben Thornber[1]
[1] The University of Sydney, Australia; [2] IFP Energies nouvelles, Rueil-Malmaison, France; [3] Friedrich-Alexander-Universitat Erlangen-Nurnberg, Erlangen, Germany

10.2 11:20 AM 11:40 AM **Transport and Dispersion of Chemical Agent in the Urban Atmosphere using NBC_RAMS**
Hyeyun Ku, Jiyun Seo, Jungjae Son, Hyunwoo Nam
Advanced Defense Science & Technology Research Institute, Agency for Defense Development, Daejeon, Republic of Korea

10.3 11:40 AM 12:00 PM **Dirty Bomb Source Term Characterization and Downwind Dispersion**
Matthew Nelson, Sara Brambilla, and Michael Brown
Los Alamos National Laboratory, Los Alamos, NM

10.4 12:00 PM 12:20 PM **Testing a Machine Learning Model for the Source Term Estimation**

Stefano Alessandrini, Scott Meech
National Center for Atmospheric Research, Boulder, CO

10.5 12:20 PM 12:40 PM **End-to-end AI for Solving Atmospheric Forecasts**
Johan Mathe
Atmo, Berkeley, CA

12:40 PM ***DAY 3/CONFERENCE ADJOURNS***

Poster Session

11.1 **Hazard Dispersion Modelling at Dstl**
Atticus Hall-McNair, Daniel Miller
Dstl Porton Down, Salisbury, United Kingdom

June 23

GMU conference registration not required
Horizon Hall, Room 2014

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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