AGENDA

14th Annual George Mason University Conference on
"Atmospheric Transport and Dispersion Modeling"

July 13-15, 2010

Conference Chair: Zafer Boybeyi
(George Mason University, Fairfax, VA)

All Sessions will be held at Room 103, Innovation Hall
George Mason University, Fairfax, VA, U.S.A.

THEMES: 1) Improve understanding of atmospheric transport and dispersion processes, 2) Support homeland security requirements, and 3) Share experience across different sectors.

DAY 1 - TUESDAY, JULY 13, 2010

(7:30 – ALL DAY) REGISTRATION

(7:30 – 9:30) CONTINENTAL BREAKFAST

(8:00 – 8:15) INTRODUCTIONS

(8:15 – 8:30) WELCOMING REMARKS

(Vikas Chandhoke, Dean, College of Science)

Session 1 – General Transport & Dispersion Studies
***Session Chair* – David Bacon (Science Applications International Corp., McLean, VA)**

(8:30 – 8:45) Automated Source Parameter Estimation for Atmospheric Transport and Dispersion Applications
P. E. Bieringer*, I. Sykes, F. Vandenberghe, J. Hurst, J. Weil, G. Bieberbach, S. Parker, R. Cabell & S. Longmore
*National Center for Atmospheric Research, Boulder, CO

(8:45 – 9:00) Atmospheric Emission Source Detection by Machine Learning
G. Cervone* & P. Franzese
*George Mason University, Fairfax, VA

(9:00 – 9:15) Multi-Entity Field Approximation (MEFA) for Hazard Origin Estimation
A. J. Annunzio*, S. E. Haupt, G. S. Young & L. M. Rodriquez
*The Pennsylvania State University, State College, PA

(9:15 – 9:30) The Importance of Wind Speed Data to Accurately Simulate the Dispersion of Dense Vapor Clouds
F. Gavelli* & O. R. Hansen
*GexCon, Bethesda, MD

(9:30 – 9:45) Weather Effects on Hazard Predictions for Fully Functional or Intercepted Missiles
J. A. Magerko*, M. Niedzielski, R. Fry & J. Hannan
*TASC, Colorado Springs, CO

(9:45 – 10:00) Integrating High-Fidelity Plume Models Into Simulation And Training Tools

A. Moses*, J. Boris, G. Patnaik & K. Obenschain
*Naval Research Laboratory, Washington, D.C.

(10:00 – 10:30) COFFEE BREAK

Session 2 – General Transport & Dispersion Studies (Con't)
***Session Chair* – Cheryl Klipp (Army Research Laboratory, Adelphi, MD)**

(10:30 – 10:45) Reanalysis of FFT07 Phase I Using a Genetic Algorithm Coupled with Dispersion Models
L. Rodriguez*, S. E. Haupt, G. S. Young, A. J. Annunzio & K. J. Long
*The Pennsylvania State University, State College, PA

(10:45 – 11:00) Experimental Results for IR Transmittance, Visibility and Particle Sizes of Anthropogenic Dust Plumes
L. W. Stockham*, S. McLaren, D. Modarress & P. Graham
*TASC, Albuquerque, NM

(11:00 – 11:15) Atmospheric Chemistry Module for Modeling TICs in HPAC/JEM
V. Chynwat*, S. D. Rottmann, W. Moore, T. Siler & D. S. Burns
*ENSCO, Inc., Melbourne, FL

(11:15 – 11:30) Diagnostic Wind Model Initialization over Complex Terrain Using the Airborne Doppler Wind Lidar Data
Y. Wang*, C. Williamson, G. Huynh, D. Garvey, D. Emmitt & S. Greco
*Army Research Laboratory, Adelphi, MD

(11:30 – 11:45) Progress Towards a New Transport Solver for CONTAM
D. M. Lorenzetti* & W. S. Dols
*Lawrence Berkeley National Laboratory, Berkeley, CA

(11:45 – 12:00) Execution of a Field Test Program
D. P. Storwold*, E. P. Argenta, J. M. White & J. C. Pace
*Dugway Proving Ground, Dugway, UT

(12:15 – 1:30) LUNCH BREAK

Session 3 – General Transport & Dispersion Studies (Con't)
***Session Chair* – Ian Sykes (Sage Management, Princeton, NJ)**

(1:30 – 1:45) Effects of Model Resolution, FDDA and MEDOC Converters for Modeling the Vancouver Olympics
A. Deng*, D. Stauffer, G. Hunter, J. Zielonka, J. Toffler & Eric Sorbo
*The Pennsylvania State University, State College, PA

(1:45 – 2:00) Down-Selection of NWP Ensemble Configurations for AT&D Applications
J. A. Lee*, W. C. Kolczynski, T. C. McCandless, S. E. Haupt, D. R. Stauffer & A. Deng
*The Pennsylvania State University, State College, PA

(2:00 – 2:15) Development as an Operational System of a 3D Modeling Suite from the Global Scale to the Urban Scale Application to a Toxic Release in New York City (NY) USA
P. Armand*, C. Duchenne, J. Moussafir, A. Albergel, C. Olry & O. Oldrini
*Commissariat à l'Energie Atomique et aux Energies Alternatives, Arpajon, France

(2:15 – 2:30) Saturated Liquid Source Term Knowledge Gap
J. Henrikson* & N. Platt
*Institute for Defense Analyses, Alexandria, VA

(2:30 – 2:45) Intelligent Detector Placement Model
R. D. Evans*, S. Rottmann, J. Piotrowski, S. Maminakis, S. Master & M. Kienzle
*ENSCO, Inc., Melbourne, FL

(2:45 – 3:00) Plume Tracking and Source Location Estimation Based on UAV Measurements
L. O'Steen
Savannah River National Laboratory, Savannah, SC

(3:00 – 3:30) COFFEE BREAK

Session 4 – Local/Urban Scale Transport & Dispersion Studies
***Session Chair* – Ian Griffiths (RiskAware Limited, Bristol, United Kingdom)**

(3:30 – 3:45) A Simple Dense Gas Model for the Urban Dispersion Model
K. Ratcliffe
Defence Science & Technology Laboratory, Porton Down, Salisbury, UK

(3:45 – 4:00) RUSTIC/MESO Urban and Rural Transport and Dispersion Modeling
J. A. Roney*, D. A. Burrows & C. Tobin
*ITT Corporation, Colorado Springs, CO

(4:00 – 4:15) Local Isotropy in an Urban Environment Using Simple Spectral Models
S. Chang*, G. Huynh, D. Garvey, D. Tofsted & C. Williamson
*Army Research Laboratory, Adelphi, MD

(4:15 – 4:30) Unsteady RANS Modeling of Particle Dispersion in an Urban Area
E. M. M. Wingstedt
Norwegian Defence Research Establishment, Kjeller, Norway

(4:30 – 4:45) Algorithm for Indoor Sampler Placement with Possible Extension to Indoor-Outdoor Environments
M. D. Sohn*, T. Walter & D. M. Lorenzetti
*Lawrence Berkeley National Laboratory, Berkeley, CA

(4:45 – 5:00) Effects of Buildings on Dispersion in and above Model Urban Canopies
P. Huq* & P. Franzese
*University of Delaware, Newark, DE

(5:00 – 5:15) Aerosol and Cloud Microphysical Measurements in Istanbul Turkey
O. Sen*, D. Axisa, A. Teller & R. Bruintjes
*Istanbul Technical University, Istanbul, Turkey

(5:15) ICE BREAKER

(6:30) ADJOURN (End of the First Day)

DAY 2, WEDNESDAY, JULY 14, 2010

(7:30 – ALL DAY) REGISTRATION (CON'T)

(7:30 – 9:30) CONTINENTAL BREAKFAST

Special Department of Homeland Security (DHS) Session 5 – Jack Rabbit Test Program
***Session Chair* – Joe Chang (Homeland Security Studies & Analysis Institute, Arlington, VA)**

(8:20 – 8:30) Opening Remarks on Jack Rabbit Test Program and TSA/DHS Initiatives
J. Aherne* & G. Famini
*Transportation Security Administration, U.S. Department of Homeland Security, Arlington, VA

(8:30 – 8:45) Project Jack Rabbit – An Overview of the Spring 2010 Field Release Trials of Chlorine and Ammonia
S. B. Fox*, J. P. Aherne, C. Schuhmacher & D. Storwold
*Battelle/Chemical Security Analysis Center, DHS S&T, Aberdeen Proving Ground, MD

(8:45 – 9:15) The Jack Rabbit Test Program Trial Summary
D. P. Storwold*, E. P. Argenta, J. M. White, J. C. Pace, S. Fox & A. Negron
*Dugway Proving Ground, Dugway, UT

(9:15 – 9:30) Point Location Air Monitoring During Full-Scale Chlorine and Ammonia Release Tests
D. Hamlin
Center for Toxicology and Environment Health, North Little Rock, AR

(9:30 –9:45) Deposition of Chlorine on Terrestrial Material as a Loss Mechanism for Dense Plumes
J. Hearn*, M. Henley, R. Nichols, R. Weber & J. Eichler
*Applied Research Associates/Tyndall AFB, FL

(9:45 – 10:00) Scientific Issues, Preliminary Findings, and Recommendations of Jack Rabbit Field Trials
J. Chang*, S. Hanna, R. Britter & R. Koopman
*Homeland Security Studies and Analysis Institute, Arlington, VA

(10:00 – 10:30) COFFEE BREAK

Special Department of Homeland Security Session 6 (Con't) – Jack Rabbit Test Program
***Session Chair* – Tom Spicer (University of Arkansas, Fayetteville, AR)**

(10:30 – 10:45) Jack Rabbit – Lessons Learned, Questions Arising and Some Requirements for Background Data
B. B. Hicks
Metcorps, Norris, TN

(10:45 – 11:00) Pre-Test Simulation of the Jack Rabbit Release Scenarios Using SCIPUFF
I. Sykes*, D. Henn & R. Babarsky
*Sage Management, Princeton, NJ

(11:00 – 11:15) Observations on Flashing Two-Phase Releases from the Desert Tortoise and Jack Rabbit Tests
T. Spicer
University of Arkansas, Fayetteville, AR

(11:15 – 11:30) Validation of the Toxic Industrial Chemical Mist Pool Concept
T. J. Bauer
Naval Surface Warfare Center, Dahlgren, VA

(11:30 – 11:45) Blind Simulations of the Jack Rabbit Ammonia and Chlorine Release Experiments Using FLACS
F. Gavelli*, M. Ichard & O. R. Hansen
*GexCon, Bethesda, MD

(11:45 – 12:00) Numerical Simulations of the Release of Chlorine From a Pressurized Tank
T. Vik* & B. A. P. Reif
*Norwegian Defence Research Establishment, Kjeller, Norway

(12:00 – 12:15) High Resolution Measurements of Chlorine and Ammonia Concentrations Using UV-Vis Sensors during the Jack Rabbit Field Test
L. Ogle
Signature Science, Austin, TX

(12:15 – 1:30) LUNCH BREAK

Special OFCM Session 7 – Panel Discussion

(1:30 – 3:00) Panel Discussion
Moderator: Dr. Walter D. Bach, Jr.,
Army Research Office, Research Triangle Park, NC

The OFCM report, *Federal Research and Development Needs and Priorities for Atmospheric Transport and Diffusion Modeling,* identified seven pillars of research needs for Federal agencies and the research community to achieve "Quantifying the Uncertainty" of modeling efforts. Some measures have been taken to address these needs to enhance our capabilities and understanding of dispersion. Dispersion of hazards in urban domains was key concerns of the Joint Action Group developing the report. The panelists will present perspectives from the cutting edge of scientific and operational challenges to the understanding and modeling of those processes.

Panelists:

- **Dr. Harindra Joseph Fernando,** Wayne and Diana Murdy Endowed Professor of Engineering and Geosciences, University of Notre Dame, Notre Dame, IN
- **Dr. Steven Hanna,** Hanna Consultants, Kennebunkport, ME
- **Mr. John Pace**, U.S. Army Dugway Proving Ground, Dugway, UT
- **Dr. Gayle Sugiyama,** NARAC-IMAAC Program, Energy and Environment Directorate, Lawrence Livermore National Laboratory, Livermore, CA
- **Mr. Albert H. Mongeon**, NOAA National Weather Service Homeland Security Activities, Silver Spring, MD

(3:00 – 3:30) COFFEE BREAK

Session 8 – Planetary Boundary Layer (PBL) Studies
***Session Chair* – Mike Brown (Los Alamos National Laboratory, Los Alamos, NM)**

(3:30 – 3:45) Planetary Boundary Layer Depth and Its Impact on Dispersion
K. J. Schmehl*, S. E. Haupt & B. Reen
*The Pennsylvania State University, State College, PA

(3:45 – 4:00) Modeling the Evaporation from a Liquid Film Beneath Turbulent Boundary Layers
B. A. P. Reif* & T. Vik
*Norwegian Defence Research Estabshment, Kjeller, Norway

(4:00 – 4:15) An Assessment of the Quality of Input Data for a Real-Time Boundary Layer Analysis
C. Tassone*, M. Tsidulko, Y. Zhu, J. Whiting, L. Cucurull, S. Liu, J. McQueen & G. DiMego
*NOAA, Camp Springs, MD

(4:15 – 4:30) Application of the Analogy between the Navier-Stokes Equations and Maxwell's Equations to an Investigation of Boundary Layer Turbulent Vortices
D. M. Garvey* & E. M. Measure
*U.S. Army Research Laboratory, Adelphi, MD

(4:30 – 4:45) Variations in Surface Heat Flux Components from Suburban to Built-Up Downtown Areas in JU2003
S. Hanna
Hanna Consultants, Kennebunkport, ME

(4:45 – 5:00) Evaluation of Planetary Boundary Layer Depth from Various WRF Model Configurations
S. Masters*, M. Kienzle & R. J. Evans
*ENSCO, Inc., Melbourne, FL

(5:00) ADJOURN (End of the Second Day)

DAY 3 - THURSDAY, JULY 15, 2010

(7:30 – ALL DAY) REGISTRATION

(7:30 – 9:30) CONTINENTAL BREAKFAST

Session 9 - Model Evaluation, Uncertainty Studies & Risk Assessment
***Session Chair* – Sue Haupt (The Pennsylvania State University, State College, PA)**

(8:30 – 8:45) Observing and Modeling Dispersion Realizations in a Time Varying Wind Field
S. E. Haupt*, K. J. Long, F. J. Zajaczkowski & A. J. Annunzio
*The Pennsylvania State University, State College, PA

(8:45 – 9:00) Evaluation of the QUIC Dispersion Modeling System - Successes and Failures
M. Brown
Los Alamos National Laboratory, Los Alamos, NM

(9:00 – 9:15) Development and Evaluation of Fast Concentration Fluctuation Models
M. Bull*, L. Carrivick & I. Griffiths
*RiskAware Limited, Bristol, United Kingdom

(9:15 – 9:30) Validating an LES-Based Emergency Response Tool for Puff Dispersion in a Typical European City
B. Leitl*, G. Patnaik, J. Boris, S. Werk, F. Harms, D. Hertwig, S. Fischer & M. Schatzmann
*University of Hamburg, Hamburg, Germany

(9:30 – 9:45) Optimization Under Uncertainty and Risk
M. Orlitzky
Towson University, Towson, MD

(9:45 – 10:00) Comparisons of Predictions from HPAC Urban Modes to Urban 2000 and Joint Urban 2003 Data: Urban Canopy, Urban Dispersion Model, and Micro SWIFT/SPRAY
K. M. Papadantonakis* & N. Platt
*Institute for Defense Analyses, Alexandria, VA

(10:00 – 10:30) COFFEE BREAK

Session 10 - Model Evaluation, Uncertainty Studies & Risk Assessment (Con't)
***Session Chair* – John Pace (Dugway Proving Ground, Salt Lake City, UT)**

(10:30 – 10:45) Evaluation of a Probabilistic Dispersion Capability Using an Operational Ensemble Forecast Product
I. Sykes*, D. Henn, R. Long, D. Stauffer, G. Hunter & J. McQueen
*Sage Management, Princeton, NJ

(10:45 – 11:00) Methodology for Statistical Comparison of Model Generated Wind Fluctuations with Short-Range Dispersion Observations
N. Platt*, S. Warner, P. Bieringer, G. Bieberbach, A. Wyszogrodzki & J. Weil
*Institute for Defense Analyses, Alexandria, VA

(11:00 – 11:15) Graphical Representation of Meteorological Uncertainty for HPAC-SCIPUFF from Ensembles

B. P. Reen*, D. R. Stauffer, A. Deng, G. K. Hunter, R. I. Sykes & D. S. Henn
*The Pennsylvania State University, State College, PA

(11:15 – 11:30) Calibration of the Wind Direction and Speed from Weather Stations in Real Time for Use in a CBR Emergency Assessment System
M. Lee*, G. Patnaik & D. Fyfe
*Berkeley Research Associates, Beltsville, MD

(11:30 – 11:45) Year-Long Study of the Sensitivity of Linear Variance Calibration Parameters
W. Kolczynski*, D. R. Stauffer, S. E. Haupt & A. Deng
*The Pennsylvania State University, State College, PA

(11:45 – 12:00) Risk Estimation for Large-Scale Chlorine Road Transport Networks
D. Morgan* & P. O'Neill
*Towson University, Towson, MD

(12:00 – 12:15) Micro SWIFT/SPRAY (MSS) Dense Gas Capability Validation
R. L. Vernot*, J. W. Troiler, J. H. Beale, J. Mussafir & C. Olry
*SAIC, King of Prussia, PA

(12:15 – 1:30) LUNCH BREAK

Session 11 - Local/Urban Scale Transport & Dispersion Studies
***Session Chair* – Zafer Boybeyi (George Mason University, Fairfax, VA)**

(1:30 – 1:45) Predicting Detection Extent of Chemicals Released into a Mock Urban Environment Using SWIFT 5.0
J. H. Beale
SAIC, King of Prussia, PA

(1:45 – 2:00) Spatial/Temporal Scales of Turbulence Anisotropy in an Urban Canyon
C. Klipp
Army Research Laboratory, Adelphi, MD

(2:00 – 2:15) Exhaust Dispersion Modeling; A Comparison of Wind Tunnel, CFD and AERMOD Modeling Approaches
A. Kolesnikov
CPP Inc., Fort Collins, CO

(2:15 – 2:30) HYWINMOD: A Hybrid Wind Tunnel Modeling Approach For Complex Dispersion Modeling Applications
R. L. Petersen
CPP, Inc., Fort Collins, CO

(2:30 – 2:45) Combined Multizone and CFD Capabilities of CONTAM
A. K. Persily*, W. S. Dols & L. Wang
*National Institute of Standards and Technology, Gaithersburg, MD

(2:45 – 3:00) Developments of the MSS (Micro-Swift-Spray) Model: Parallel Version (PMSS) and Progress in the Inclusion of Flashing Aerosols
J. Moussafir*, C. Olry, O. Oldrini, P. Armand, C. Duchenne, J. Troiler, G. Tinarelli, L. Mortarini, D. Anfossi & S. Trini-Castelli
*ARIA Technologies, Boulogne-Billancourt, France

3:00 ADJOURN (End of the Conference)

Session 12 - Poster Session

(P-1) Robust Networking Architectures and Secured Communication Schemes for Contaminant Sensors
M. McNeal III*, W. Chen, S. Aungst & S. E. Haupt
*The Pennsylvania State University, State College, PA

(P-2) CFD Investigation of Near Building Flows for Integrated Wind Energy Applications
J. A. Cole*, S. E. Haupt & S. W. Steward
*The Pennsylvania State University, State College, PA

(P-3) The Impacts of AWS/WeatherBug Observations on Near-Surface Forecasts Using the WRF Model
E. Novakovskaia*, Z. Guo & A. Steinke
*AWS Convergence Technologies Inc., Germantown, MD