



SERDP and ESTCP 2011 Project-of-the-Year Awards

Presented by:

Dr. Jeffrey A. Marqusee

Executive Director, SERDP and ESTCP

Dr. Anne M. Andrews

Deputy Director, SERDP and ESTCP





ASSESSING VAPOR INTRUSION AT CHLORINATED SOLVENT-IMPACTED SITES



**Environmental
Restoration**



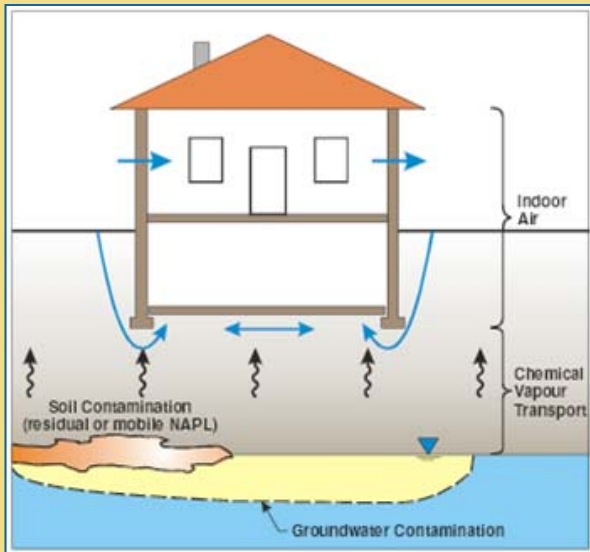
**Project-of-the-Year
2011**

DR. PAUL C. JOHNSON

Arizona State University

*Ira A. Fulton Schools of Engineering
Tempe, Arizona*

ASSESSING VAPOR INTRUSION AT CHLORINATED SOLVENT-IMPACTED SITES



Results

- Elucidated mechanisms that govern how chemicals in groundwater percolate into buildings
- Determined how temporal variability affects measurements that predict exposure
- Assessed effects of other indoor sources

Benefits

- Profound impact on how risk from vapor intrusion will be assessed
- Major risk pathway driving cleanup actions at contaminated DoD groundwater sites
- Control a potentially significant liability





ASSESSING VAPOR INTRUSION AT CHLORINATED SOLVENT-IMPACTED SITES

Principal Investigator:

DR. PAUL C. JOHNSON

*Arizona State University
Ira A. Fulton Schools of Engineering
Tempe, Arizona*

CO-PERFORMERS:

Arizona State University

**Dr. Hong Luo
Mr. Chase Holton
Dr. Paul Dahlen
Mr. Yuanming Guo**

Hill Air Force Base

**Mr. Kyle Gorder
Dr. Erik Dettenmaier**

IST

Dr. Robert Hinchee



ADVANCED SIGNAL PROCESSING FOR UXO DISCRIMINATION

**Munitions
Response**

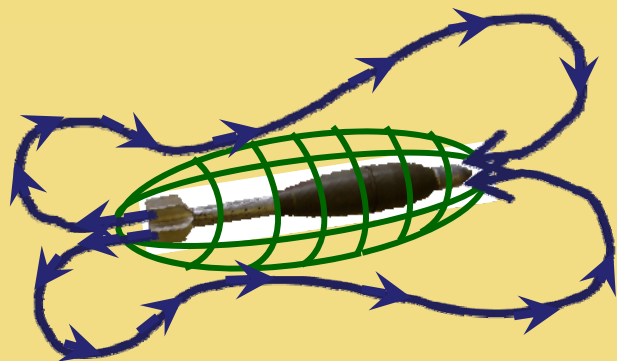


**Project-of-the-Year
2011**

DR. FRIDON SHUBITIDZE

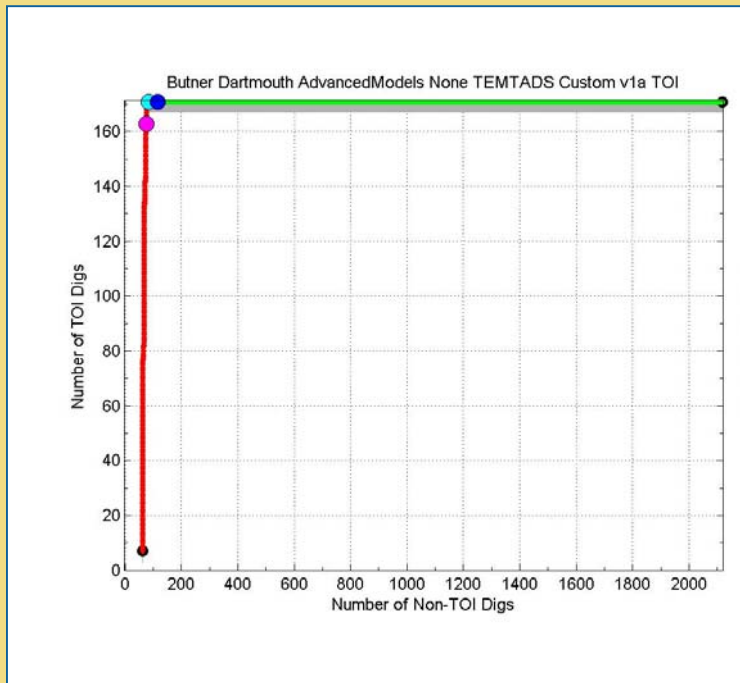
*Dartmouth College and
Sky Research, Inc.
Hanover, New Hampshire*

ADVANCED SIGNAL PROCESSING FOR UXO DISCRIMINATION



Results

- Sophisticated physically complete models that extract more meaningful parameters from advanced EMI sensor data
- Near perfect classification demonstrated at the former Camp Butner, North Carolina



Benefits

- Accurate classification of UXO and clutter on difficult sites
- Save billions of dollars in munitions response
- Accelerate cleanup process with limited resources



ADVANCED SIGNAL PROCESSING FOR UXO DISCRIMINATION

Principal Investigator:

DR. FRIDON SHUBITIDZE


*Dartmouth College and
Sky Research, Inc.
Hanover, New Hampshire*

CO-PERFORMERS:

Sky Research, Inc.
Ms. Irma Shamatava

Dartmouth College
Dr. Alex Bijamov
Dr. Juan Pablo Fernández

U.S. Army Engineer Research and Development Center –
Cold Regions Research and Engineering Laboratory
Dr. Benjamin Barrowes
Dr. Kevin O'Neill



FORECASTING THE EFFECTS OF MULTIPLE, INTERACTING STRESSORS ON AT-RISK POPULATIONS

**Resource
Conservation &
Climate Change**



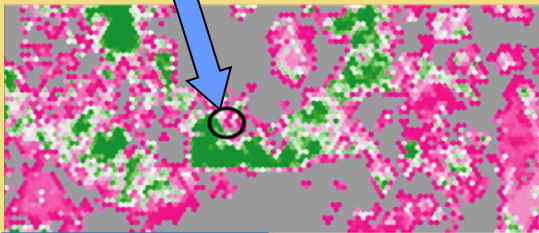
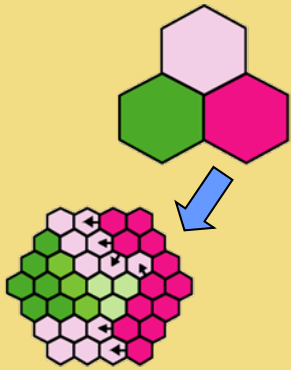
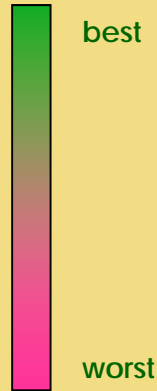
**Project-of-the-Year
2011**

DR. JOSHUA J. LAWLER

*University of Washington
School of Forest Resources
Seattle, Washington*

FORECASTING THE EFFECTS OF MULTIPLE, INTERACTING STRESSORS ON AT-RISK POPULATIONS

Habitat quality




Results

- Created a population model to simulate responses of threatened, endangered, and at-risk species to multiple stressors in dynamic landscapes
- Evaluated impacts of military activities, loss of habitat, climate change, and other threats on
 - red-cockaded woodpecker at Fort Benning
 - desert tortoise at Fort Irwin
 - black-capped vireo at Fort Hood

Benefits

- Practical tool for DoD land managers to holistically assess management actions
- Benefit species management and training



**FORECASTING THE EFFECTS OF
MULTIPLE, INTERACTING STRESSORS
ON AT-RISK POPULATIONS**

Principal Investigator:

DR. JOSHUA J. LAWLER

*University of Washington
School of Forest Resources
Seattle, Washington*

CO-PERFORMERS:

U.S. EPA

Dr. Nathan H. Schumaker

University of Washington

Mr. Chad Wilsey

Southern Utah University

Dr. Betsy A. Bancroft



COMBUSTION SCIENCE TO REDUCE PARTICULATE MATTER EMISSIONS FOR MILITARY PLATFORMS

**Weapons
Systems &
Platforms**



**Project-of-the-Year
2011**

DR. W. M. ROQUEMORE

*Air Force Research Laboratory
Propulsion Directorate
Wright-Patterson AFB, Ohio*

COMBUSTION SCIENCE TO REDUCE PARTICULATE MATTER EMISSIONS FOR MILITARY PLATFORMS



Results

- Experiments and simulations to understand the chemistry, fluid dynamics, and thermodynamics of particle formation in high-performance engines
- Models to predict emissions from current JP-8 and future alternative fuels



Benefits

- Validated chemistry and soot models suitable for use with combustor design codes
- Enable jet engine manufacturers to design and build engines that emit less pollution



COMBUSTION SCIENCE TO REDUCE PARTICULATE MATTER EMISSIONS FOR MILITARY PLATFORMS

Principal Investigator:

DR. W. M. ROQUEMORE

*Air Force Research Laboratory
Propulsion Directorate
Wright-Patterson AFB, Ohio*

CO-PERFORMERS:

Pennsylvania State University

**Dr. Thomas A. Litzinger
Dr. Robert J. Santoro
Dr. A. Geraldine Mouis
Dr. Arvind V. Menon
Dr. Suresh Iyer**

University of Dayton Research Institute

**Dr. Sukh Sidhu
Dr. Scott David Stouffer
Dr. Moshan Kahandawala
Dr. Saumitra Saxena
Ms. Alanna Rose O'Neil**

United Technologies Research Center

**Dr. Meredith B. Colket
Dr. Robert J. Hall
Dr. Stephen Zeppieri
Ms. Heidi Hollick**

Army Research Laboratory

**Dr. Kevin L. McNesby
Dr. Barrie E. Homan
Dr. John M. Densmore
Dr. Matthew M. Biss
Mr. Richard A. Benjamin
Dr. Chol-Bum Kweon
Dr. Matthew S. Kurman**

Innovative Scientific Solutions, Inc.

**Dr. Vish Katta
Mr. R. Alan Forlines**

Yale University

Dr. Mitchell D. Smooke

Air Force Research Laboratory

**Dr. Vincent Belovich
Dr. Joseph Zelina
Ms. Amy C. Lynch**

PASSIVE SAMPLING TO SUPPORT REMEDIATION OF CONTAMINATED SEDIMENTS

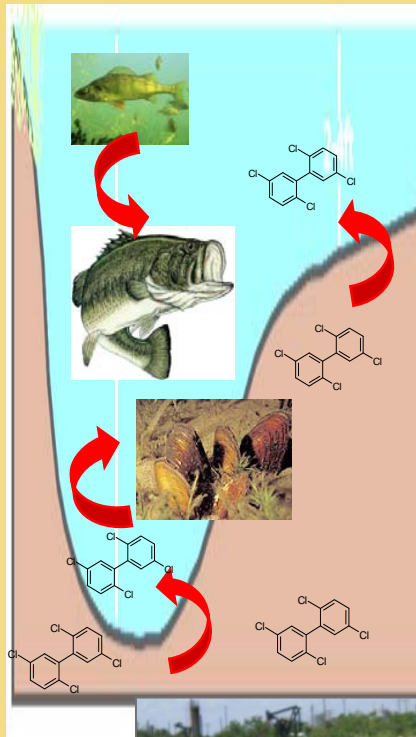


*Project-of-the-Year
2011*

**DR. PHILIP M.
GSCHWEND**

***Massachusetts Institute of Technology
Department of Civil and
Environmental Engineering
Cambridge, Massachusetts***

PASSIVE SAMPLING TO SUPPORT REMEDIATION OF CONTAMINATED SEDIMENTS



Results

- Passive sampling method to measure the fraction of sediment contamination that can enter the food chain and pose a risk to ecological receptors and human health
- Ability to assess both horizontal and vertical contaminant distributions

Benefits

- Accurate and robust approach for assessing risk and targeting remediation
- Life-cycle cost reductions for characterization, remediation, and long-term monitoring at DoD contaminated sediment sites





**PASSIVE SAMPLING TO
SUPPORT REMEDIATION OF
CONTAMINATED SEDIMENTS**

Principal Investigator:

DR. PHILIP M. GSCHWEND

*Massachusetts Institute of Technology
Department of Civil and Environmental Engineering
Cambridge, Massachusetts*

CO-PERFORMERS:

Massachusetts Institute of Technology

**Mr. John MacFarlane
Dr. Loretta Fernandez
Ms. Elizabeth Follett
Ms. Jennifer Apell**

ICF International

**Mr. Kevin Palaia
Mr. Dean Gouveia
Mr. Steven Reichenbacher**

U.S. Army Natick Soldier Systems Center

Mr. James Connolly