

# STIDS 2015



The Tenth International Conference on  
Semantic Technology for Intelligence, Defense, and Security

Semantics in Cyber-Physical Systems

November 18-20, 2015

Johnson Center  
George Mason University  
Fairfax, Virginia Campus

## Conference Proceedings

Kathryn B. Laskey, Ian D. Emmons, Paulo C. G. Costa, Alessandro Oltramari, Eds.



## Preface

The Tenth International Conference on Semantic Technology for Intelligence, Defense, and Security (STIDS 2015) provides a forum for academia, government, and industry to share the latest research on semantic technology for defense, intelligence, and security applications. Semantic technology is a fundamental enabler to achieve greater flexibility, precision, timeliness, and automation of analysis and response to rapidly evolving threats. The STIDS 2015 theme is Semantics in Cyber-Physical Systems. In addition, topics of general interest for STIDS include:

- Best practices in the engineering of ontologies
- Collaboration
- Command and Control (C2) and Situation Awareness (SA)
- Cyberspace: defense, exploitation, and counter-attack
- Decision making
- Economics and financial analysis
- Emergency response
- Human factors and usability issues related to semantic technologies
- Information sharing
- Infrastructure protection
- Intelligence collection, analysis, and dissemination
- Law and law enforcement
- Planning: representation of and reasoning over plans and processes
- Predictive analysis
- Provenance, source credibility, and evidential pedigree
- Resiliency, risk analysis, and vulnerability assessment
- Science and technology (biology, health, chemistry, engineering, etc.)
- Sensor systems
- Sociology (social networks, ethnicity, religion, culture, politics, etc.)
- Spatial and temporal phenomena and reasoning
- Uncertainty as it relates to ontologies and reasoning

Fairfax, VA  
November 2015

Ian Emmons and Kathryn Laskey  
STIDS 2015 Technical Chairs

Paulo Costa and Alessandro Oltramari  
STIDS 2015 General Chairs

# STIDS 2015 Committees

## Program Committee

Carl Andersen	BBN Technologies
Erik Blasch	AFRL
Rommel Novaes Carvalho	Brazil's Office of the Comptroller General
Werner Ceusters	SUNY at Buffalo
Paulo Costa	George Mason University
Timothy Darr	Knowledge Based Systems Inc.
Ian Emmons	Raytheon BBN Technologies
Matthew Fisher	Progeny Systems
Mark Greaves	Pacific Northwest National Laboratory
Richard Haberman	EMSolutions, Inc.
Peter Haddawy	Mahidol University
Brian Haugh	IDA
John Hebel	University of Maryland, Baltimore County
Edward Huang	George Mason University
Terry Janssen	Quantum Cybersecurity Systems LLC
Gregory Joiner	BBN Technologies
Anne-Laure Jousset	NATO Centre for Maritime Research and Experimentation (CMRE)
Mieczyslaw Kokar	Northeastern University
Dave Kolas	BBN Technologies
Kathryn Laskey	George Mason University
Louise Leenen	CSIR
David Mireles	Raytheon BBN Technologies
Ranjeev Mittu	US Naval Research Laboratory
Jeffrey Morrison	Office of Naval Research
Leo Obrst	MITRE Corporation
Alessandro Oltramari	Carnegie Mellon University, CyLab
Mary Parmelee	MITRE Corporation
Gregor Pavlin	Thales Group
Andrew Perez-Lopez	BBN Technologies
Plamen Petrov	Raytheon BBN Technologies
Setareh Rafatirad	George Mason University
Douglas Reid	Google
Patrice Seyed	Rensselaer Polytechnic Institute

---

Barry Smith	SUNY Buffalo
Tony Stein	Raytheon BBN Technologies
Kathleen Stewart	University of Maryland
Gheorghe Tecuci	George Mason University
Brian Ulicny	Thomson Reuters
Amanda Vizedom	Criticollab, LLC
Andrea Westerinen	Nine Points Solutions, LLC
Duminda Wijesekera	George Mason University
Abbas Zaidi	George Mason University

---

### **STIDS Steering Committee**

---

Paulo Costa	George Mason University
Ian Emmons	Raytheon BBN Technologies
Katherine Goodier	Xcelerate Solutions
Kathryn Laskey	George Mason University
Leo Obrst	MITRE Corporation
Barry Smith	NCOR, University at Buffalo

---

## STIDS 2015 Organizing Committee

### General Chairs

Paulo Costa

Alessandro Oltramari

### Technical Chairs

Ian Emmons

Kathryn Laskey

### Publicity Chair

Amanda Vizedom

### Tutorials Chair

Mary Parmelee

### Classified Session Chair

Brian Haugh

### Local Team (GMU)

Debra Schenaker (Administrative Chair)

Priscilla McAndrews

Tamara Day

Alexandre Barreto

Ricardo Fernandes

## Michael Dean Best Paper Award



August 7, 1961 - November 19, 2014

The Michael Dean Best Paper Award was established in 2014 in recognition of Michael Dean's many and diverse contributions to the STIDS community. In selecting the winner, the committee sought to highlight the qualities that made Mike such an asset to this community. The criteria for selection exemplify the very best contributions to the conference and the community. To this end, the Michael Dean Best paper is the one that, in the judgment of the award committee, best satisfies the following criteria:

1. Conveys a clear, careful understanding of the problem or issue being addressed, and clearly states why it matters.
2. Conveys a thorough understanding of technical issues, and a well-grounded, pragmatic view of prior and related work.
3. Clearly identifies the specific semantic technologies being discussed, and their relationship to the problem.
4. Identifies specific experience or expertise on which the paper and its conclusions draw.
5. If a semantic system or application is being presented as part of a solution, clearly identifies and communicates the components of this system, including any ontologies, and how they interact, as well as their degree of actuality, availability, maturity and source.
6. Identifies whether and how such system/application/components have been evaluated and with what results.
7. Identifies outcomes, experiences, and lessons learned.
8. Demonstrates prioritization of greater technical and domain understanding and problem-solving over self-promotion, organizational promotion, partisan or programmatic scorekeeping, or other, narrower concerns.
9. Demonstrates knowledge of prior and current art, strengthens such knowledge in the community, and promotes better understanding by sharing the rationale for choices, especially when they diverge from common practice.
10. Demonstrates and strengthens the state of the art of semantic technology via the quality of the work described. Provides promising ways forward while negotiating known trade-offs and avoiding known pitfalls. Helps more junior technologists avoid repetition of old errors, and provides more senior technologists with new insights.

The winning paper was announced on the last day of the conference:

- *2015 Michael Dean Best Paper*: Noam Ben-Asher, Alessandro Oltramari, Robert F. Erbacher, Cleotilde Gonzalez. *Ontology-based Adaptive Systems of Cyber Defense*.
- *Runner-up*: Kathryn Blackmond Laskey, Sudhanshu Chandekar, Bernd-Peter Paris. *A Probabilistic Ontology for Large-Scale IP Geolocation*.

### 2015 Michael Dean Award Committee

Erik Blasch	AFRL
Richard Haberlin	EMSolutions, Inc.
Peter Haddawy	Mahidol University
Anne-Laure Joussemme	NATO Centre for Maritime Research and Experimentation (CMRE)
Louise Leenen	CSIR
Ranjeev Mittu	US Naval Research Laboratory
Leo Obrst	MITRE Corporation
Brian Ulicny	Thomson Reuters
Amanda Vizedom (Chair)	Criticollab, LLC
Andrea Westerinen	Nine Points Solutions, LLC