

## **PANEL 4: Balancing Commerce and Security: Technical Challenges in Cost-Benefit Analysis, Simulation Modeling, and Stakeholder Involvement**

Moderator: Isaac Maya, University of Southern California, CREATE

Panelist 1: Tayfur Altiok, Rutgers University, CCICADA - “Simulation Modeling for Urban Area Commerce and Security Initiatives: Complexities and Challenges”

Panelist 2: Adam Rose, University of Southern California, CREATE - “Benefits and Costs of Counterterrorism Security Measures in an Urban Area”

Panelist 3: Renee Graphia Joyal, Rutgers University, CCICADA - “Soliciting Stakeholder Groups and Eliciting Security Decision-Making Processes”

DHS Panel  
Coordinator: Dave Newton

Scribe: Samrat Chatterjee, University of Southern California, CREATE

The DHS Science Conference - Fifth Annual University Network Summit

**Catastrophes & Complex Systems:**  
**TRANSPORTATION**

March 30 - April 1, 2011  
Renaissance Hotel · Washington, DC

<https://www.orau.gov/dhssummit>

# Adam Rose, University of Southern California, CREATE

## “Benefits and Costs of Counterterrorism Security Measures in an Urban Area”

- Mitigation costs are direct and indirect including spillovers (e.g. congestion, delays, change in business environment, and property values)
- Benefits are the losses from an attack that can be prevented by security measures
- Behavioral linkages can translate into losses (e.g. social amplification of risk)
- Resilience is defined as the ratio of avoided loss to the maximum potential loss
- Computable General Equilibrium (CGE) Analysis is a multi-market model of behavioral responses to price signals and external shocks subject to resource constraints

**Renee Graphia Joyal, Rutgers University, CCICADA**  
**“Soliciting Stakeholder Groups and Eliciting Security Decision-Making Processes”**

- To understand and estimate the impacts of security, methodologies including stakeholder interviews, expert elicitation sessions, focus group panels, and surveys have been identified
- The scope of the study, the diversity of Lower Manhattan’s economic environment, and the extent of the region’s security environment have raised some challenges:
  - Development of research guides and instruments
  - Complexities related to protection of human subjects
  - Soliciting stakeholder participation
- A qualitative component to the UCASS study helps understand different stakeholders’ unique needs and concerns related to security impacts on our society

**Tayfur Altiok, Rutgers University, CCICADA**  
**“Simulation Modeling for Urban Area Commerce and Security Initiatives: Complexities and Challenges”**

- Discrete-Event Modeling approach is adopted for estimating performance measures including number of people, physical impact of countermeasures, and risk and economic profiles
- Mobile (e.g. people) and stationary (e.g. streets) components along with businesses interact and are included in simulation modeling of urban area people dynamics over time
- Using risk models, economic models, and potential security measures as inputs, the ARENA Model generates performance measures of interest

# Questions and Answers

- Is stakeholder buy-in a new advancement in data gathering?
  - Prior work has been done in engaging stakeholders; use of advanced survey tools
- What are other applications of the Arena model? Limitations (e.g. density, distance, data)?
  - Past work has been conducted with ports; Model can be extended in scope; Model size can cause accuracy issues
  - As we move along, accurate data will be incorporated in the modeling framework
- Practicality of the model for first responders? Tactical and/or strategic decision-making? Can real-time information be used to update the model? SoS approach?
  - Model is for planning purposes; Provide information to decision-makers than can lead to more refined decisions; Tool that decision-makers can use to visualize risk-economics tradeoff
- Were there any stakeholder groups that mentioned concerns other than security and economics, e.g. aesthetics?
  - E.g. On Wall Street: aesthetics is a consideration; Efforts to make security less intrusive
- Consideration of economic and/or cultural drivers that influence personal behavior?
  - Focus on understanding the reasons for Lower Manhattan turning into a booming residential area

The DHS Science Conference - Fifth Annual University Network Summit

**Catastrophes & Complex Systems:**  
**TRANSPORTATION**

March 30 - April 1, 2011  
Renaissance Hotel · Washington, DC

<https://www.orau.gov/dhssummit>