

Annual Meeting 2016

Quick Fire 3: Unconventional Weapons and Technology, Political Instability, Risk Communication

- Enrichment and Reprocessing Futures Study presented by James Halverson
- New Analytic Methods for the Exploitation of Open-Source Structured Databases on the Pursuit of WMD Terrorism presented by Markus Binder
- Criminal Activities Penetrating European/African Radiological Security presented by Gary Ackerman
- Future Enhancements to the Capability Development Framework (CDF) presented by Steve Sin
- Radiological and Nuclear Detection Architecture Analyses presented by Steve Sin
- Assessing Future Chem-Bio Threats and Approaches to Addressing Them presented by Gary Ackerman
- Computational Modeling of Grievances and Political Instability through Global Media presented by Gary LaFree
- School Disaster Communication presented by Holly Roberts
- Complacency and False Alarms in Tornado Affected Communities presented by Michael Egnoto
- Revealing Trends and Outliers in Global Terrorism and Radicalization through Rapid Visual Data Exploration with Keshif presented by Adil Yalcin



Enrichment and Reprocessing Futures Study

Gary Ackerman (PI), Michelle Jacome (PM), James Halverson, Dan Smith, Molly MacCalman

Project Objectives:

Examine violent non-state actor ability to undertake complex engineering projects and, in turn, the feasibility of a non-state E or R project in light of emerging technologies.

Deliverables:

- Extensive literature review
- 5 VNSA case studies
- 4 coded profiles
- Modeling and comparative analysis (T-TAM)
- 200+ sites profiled / vulnerability assessed



Transition Product:

"Designing Danger" special issue of the Journal of Strategic Security

Results
Adversary Threat
Past VNSA activities reflect sophistication enough to attempt E or R processes. Among the groups modeled, Hezbollah was most likely to successfully adopt either of the technologies
Of the four adversaries examined, apart from "Dawn of the Divine Truth"

(DDT), Hezbollah was by far the most likely adversary to be aware of both technologies and to decide to pursue either technology. Journal of Strategic Security Articla I aber 1 Designing Danger: Comple **Table of Contents** Foreword to the Special Issue on Complex Engineering by Violent Non-State Actors. "Designing Danger": Complex Engineering by Violent Non-State Actors: Introduction to the Special Issue. The Provisional Irish Republican Army and the Development of Mortars Aum Shinrikyo's Nuclear and Chemical Weapons Development Efforts The Revolutionary Armed Forces of Colombia (FARC) and the Development of Narco-Submarines Los Zetas and Proprietary Radio Network Development Digging Into Israel: The Sophisticated Tunneling Network of Hamas A.Q. Khan Nuclear Smuggling Network 104 Comparative Analysis of VNSA Complex Engineering Efforts

Disciplining Terror: How Experts Invented "Terrorism".

Superforecasting: The Art and Science of Prediction .

Al Oa'ida to ISIS ...

The Great War of Our Time: The CIA's Fight Against Terrorism from

134

124

128



Contact

James Halverson

jhalver@umd.edu

301-405-7131

www.start.umd.edu



New Analytic Methods for the Exploitation of Open-Source Structured Databases on the Pursuit of WMD Terrorism:

Ronald Breiger, Gary Ackerman, H. Brinton Milward, Victor Asal & R. Karl Rethemeyer

Project Goals: Understand which characteristics of terrorist groups are most closely associated with the decision to pursue chemical, biological, radiological, and nuclear (CBRN) weapons — characteristics that can serve as early warning indicators of intent and capability.

Project Status: Completed March 2016

Project Approach:

<u>Enhance</u> structured databases of CBRN incidents and related asymmetric activities on the part of violent nonstate actors (VNSAs). Formulate *longitudinal* models for the profile similarity network that undergirds the distinctive features of the data.

Leverage those databases by means of new analytical methods and perspectives;

Validate using in-depth case studies.

<u>Integrate</u> all aspects of the project's data and methods into an end-to-end process for turning disparate sources of information on non-state CBRN activities into actionable insights for analysts, commanders and decisionmakers.

Outputs

WMD Data Analysis Stream
Dual-to-Regression Models
Configurational Analysis method
WMD data Source Evaluation Schema
POICN Database
BAAD-2 Database

System for marrying POICN and BAAD databases (TORG)

New Method for interacting Qualitative with Quantitative WMD Analysis (case studies)



Markus K. Binder <u>mkbinder@umd.edu</u> 301-405-9870



Criminal Activities Penetrating European/African

Radiological Security

Gary Ackerman (PI); Michelle Jacome (PM) James Halverson, Molly MacCalman, Daniel Smith, Anastasia Kouloganes & Jeremy Poulson

Project Objective

Analyze TTPs used in recent sophisticated crimes and terrorist attacks to detect emerging trends relevant to RN material / weapon acquisition efforts.

Product:

50 + Sophisticated Events Profiles drawn from both global and local sources.



Results:

- Autonomous cells and broadly informal criminal arrangements may pose a more serious or direct threat to RN security than established criminal organizations.
- Insider participation is a serious concern in terms of security safeguards, nuclear or otherwise.
- As cyber-attacks become more prevalent, sophisticated criminals increasingly look to combine means of physical and digital infiltration to compromise secured systems and facilities.
- High level of innovation in tactics, techniques, and procedures can be discerned from the analysis of the individual profiles.



Michelle Jacome mjacome@umd.edu (301) 405-9317



Future Enhancements to the Capability Development Framework (CDF)

Steve Sin, Marcus Boyd, Brooke Liu & Michael Egnoto



- Vulnerability and consequence (V&C) based planning tool for the domestic portion of the Global Nuclear Detection Architecture (GNDA)
 - Organizes information about radiological and nuclear (RN) detection capabilities in the United States
 - Provides strategic guidance
 - Acts as a resource for Federal, state, local, territorial, and tribal jurisdictions to identify capability gaps
- 2 basic types of V&C indices included: *Target* and *Pathway*
 - *Target-type Indices*: Interior Population Index; Special Events Index
 - *Pathway-type Indices*: Interior Transit Index; Land Border Index; Maritime Index
- Lowest level of analysis: Census tract
- Aggregation levels: county; Metropolitan/Micropolitan Statistical Area; state; user defined area
- Evolution: Microsoft Excel → Stand-alone computer application → web-based online application
- Web-based online application has completed Alpha testing; currently in Beta testing phase
- Next Steps: Continue development based on user feedback; transition application to the funder



Steve S. Sin sinss@umd.edu (301) 405-8785 Marcus Boyd boydma@umd.edu (301) 405-9055

Brooke Liu bfliu@umd.edu (301) 405-6524 Michael Egnoto <u>megnoto@umd.edu</u> (301) 314-1873



Ν

Radiological and Nuclear Detection Architecture Analyses of Bulgaria, Georgia, Kazakhstan, Mongolia, Turkey, and Ukraine

Steve Sin

Background

- Global Nuclear Detection Architecture (GNDA) is a framework for detecting, analyzing, and reporting on nuclear and other radioactive materials that are out of regulatory control
- A requirement exists to evaluate current capabilities in the field of radiological and nuclear (RN) detection in order to define the best approach to further develop the GNDA
- Research involved both open source desk research and field research

Products

- 6 Country Reports (one per country of study)
- 4 Illicit RN Trafficking Scenarios
- Data for the 6 countries coded into Data Integration Tool

Summary of Findings

 Extraordinary efforts on the part of the United States and relevant partner states have improved the security of RN materials – especially the special nuclear materials – in the region

TAJIKISTAN

- These states, especially Georgia, still pose a significant threat of being a source and/or transit states of illicit RN material trafficking
- Private chartered flights and small ocean-going vessels (yachts, fishing vessels, etc.) continue to pose challenges to the GNDA



Steve S. Sin sinss@umd.edu (301) 405-8785



Assessing Future Chem-Bio Threats and Approaches to Addressing Them

Core Team: Gary Ackerman (PI), Tara Kirk Sell (co-PI), Markus Binder (PM), Crystal Boddie & Matt Watson





- **Goal**: Provide strategic guidance for next administration's chem-bio defense policy
- Horizon Scan: Several hundred mainstream and fringe sources + 48 SME interviews
 1,022 signals
 99 insights
 strategic mapping of threat/defense landscape (2-10 years out)
- Policy Review:
 - Literature + 51 stakeholder interviews
 - High-level policymaker Round Table (Sept '16)



Gary Ackerman gackerman@start.umd.edu 301-405-6656



Computational Modeling of Grievances and Political Instability Through Global Media (NSF)

- **Research Objective**: Compare ability of traditional social science methods and social media (Twitter) to study (a) reactions to political violence and (b) impact of grievances on political violence.
- **Testbed 1**: *Boston Marathon bombings*: What impact do attacks have on public attitudes? What predicts differential reactions? How stable are attitude changes over time? What are the strengths and weaknesses of surveys and social media data?
- **Testbed 2**: *Election violence in Sub-Saharan Africa*: Why are some elections violent? How are perceived grievances related to election violence? How can we use surveys, event data and social media to study connections between grievances and violence?
- **Testbed 3**: To develop a dashboard for integrating leading data bases on political violence.
- **Testbed 4**: Develop a common geo-spatial referencing system for different data bases in the analysis.



NSF INSPIRE Research Team: For more information, contact:

- Gary LaFree, Criminology
- David Backer, Political Science
- David Cunningham, Political Science
- Brooke Fisher Liu, Communications
- Jennifer Golbeck, Computer Science
- Paul Torrens, Geography
- George Mohler, Mathematics
- Brandon Behlendorf, Criminology
- Erin McGrath, Public and International Affairs
- Eric Dunford, Political Science
- Karsten Donnay, Computational Social Science
- Brian Wingenroth, Computer Science
- Cody Buntain, Computer Science
- Amy Adamczyk, Sociology
- Lauren Williams, Program manager
- Mila Johns, Project staff

Gary LaFree (<u>glafree@umd.edu</u>) Erin McGrath (<u>ecmcgrat@umd.edu</u>) Lauren Williams (<u>lgrosso@umd.edu</u>)



School Disaster Communication Brooke Liu, Holly Roberts, Tyler Page

Funded by the Maryland Department of Health and Mental Hygiene through a grant from the Centers for Disease Control.

Goal: Assess the current state of Maryland local school communication policies, procedures and processes, and make recommendations for improvements to fill identified gaps.



Findings

- State Preparedness Guidance
 - Add additional communication guidance for local school systems
 - Enhance the job aids to include more communication related items
 - Provide sample message templates
 - Provide realistic media relations guidance
 - District-Level Preparedness Guidance
 - Provide tailored guidance by crisis type
 - Provide additional resources
 - Provide more information for parents
 - Provide social and mobile media guidance
 - Provide media relations guidance
 - Provide evaluation support
 - Enhance training
 - Provide guidance on volunteers and donations
 - Enhance special needs planning
 - District-Level Social Media Guidance
 - Expand social media use
 - Expand topics transmitted via social media
 - Provide specific calls to action
 - Provide additional crisis information
 - Include more directed information
 - Provide temporal recommendations
 - Increase readability



Holly Roberts hroberts@umd.edu 301.405.9888



Complacency and False Alarms in Tornado Affected Communities

Michael J. Egnoto & Brooke Liu

Purpose: How do false alarms impact complacency to emergency weather warnings?



Focus: Improved understanding of disaster decision processes and capabilities.



Key Findings:

- 1. Comprehending Protective Actions
- 2. Communicating Behaviors
- 3. Preferred Information Sources
- 4. Preferences
- 5. Protective Decision Making
- 6. False Alarms, Accuracy, & Complacency
- 7. Myths and Cues
- 8. Lab vs. Real Life
- 9. Housing

Future Directions: Housing, Meteorologists, multi-public messaging

Project Funded by NOAA



Michael J Egnoto, PhD (PI) <u>megnoto@umd.edu</u>

P. 301.314.1873

Brooke Liu (Co-PI) Holly A. Roberts Jung Kyu Rhys Lim



Revealing **Trends** and **Outliers** in Global Terrorism & Radicalization through **Rapid Visual Data Exploration** with Keshif

- Rapid Prototyping using existing tools With results in a few days/weeks
- Collaborative Improvements by Experts in Terrorism Domain
- Building new features by setting shared goals
- Targeting Internal Research and External Dissemination
- Rich exploration inside a web browser

Exploring Multiple Datasets

- PIRUS Foreign Fighters
- Global Terrorism Database
- Narratives / Counter-Narratives Library



Available & Open Source at www.keshif.me START Data browsers will be available soon!





Contact

Adil Yalcin adil@keshif.me 240-391-8351

www.start.umd.edu