9/11 SYMPOSIUM PANELIST PRESENTATION ABSTRACTS

Panel 1: University Centers: Creation, Goals and Future

Mel Bernstein, Distinguished Senior Fellow, Global Resilience Institute, Northeastern

Presentation Abstract: When DHS was established, as a direct consequence of 9/11, it originally consisted of operational entities from across the Federal government. Importantly, it was recognized that there was a need for additional capabilities to deal with uncertainties and knowledge gaps, leading to the creation of the Science and Technology Directorate. Within S&T, the Office of University Programs was established with two key goals: to engage the university community in needed research and development and, very importantly, to provide needed talent to confront future threats. Building on successful models developed at other agencies, S&T created a series of university-based Centers of Excellence (COE), each focused on a specific topical area of concern and need. The selection process was highly competitive and those selected demonstrated subject matter expertise, the ability to collaborate with partner institutions and Federal agencies, and a clear work force plan. The fact that the COE program continues and thrives to this day is testament to the contributions the university communities have made to homeland security.

Panel 2: Lessons Learned from 9/11

Adam Rose, Director Emeritus and Senior Research Fellow, CREATE, USC

Economic Consequence Analysis of 9/11 and Beyond

Presentation Abstract: In 2009, CREATE and affiliated researchers completed a set of 8 coordinated studies of the economic consequences of the September 11, 2001, terrorist attacks. The study represented one of the first applications of CREATE's Economic Consequence Analysis Modeling Framework, which improved ordinary economic impact analysis by incorporating resilience and behavioral responses. The studies reached a consensus estimate of between $71 and $138 billion in U.S. GDP losses (updated to 20220 dollars). 72% of the potential losses were prevented by the relatively rapid relocation of 95% of the 1,100 tenants of the World Trade Center. Of the remaining losses, more than 80% were attributed to the almost 2-year decline in airline travel and related tourism due to fear.

Major lessons from the event and its analysis are applicable to future man-maned and natural disasters. First, (post-disaster) resilience is a powerful second-line of defense when (pre-disaster) mitigation fails. At the same time, fear can get the best of us and lead to sizable economic losses. Resilience capacity can be enhanced prior to disasters and fear can be quelled by accurate news reporting and government risk messaging. Price increases following a major disaster are not always examples of

gouging but can be valuable market signals of the severity of resource scarcity. Fiscal and monetary policy represent valuable countermeasures as well.

Panel 3: Emerging Biological Threats

Pitu Mirchandani, Chief Scientist, CAOE, ASU

Presentation Abstract: This presentation purposes an integrative data-driven approach to preparedness and resiliency to Biological Threats. The framework for this approach consists of three major steps: (1) discovering onset of outbreaks or pandemics due to a contagion and its strains, and to track their spread, (2) predicting the effects on the spread from medical, physical and social interventions, and (3) recommending proactive actions to control and mitigate the cascading impacts, including low probability high cost impacts, due to the spread of the contagion.

Juergen A. Richt, DVM, PhD; Director, CEEZAD, Kansas State

Threats to Food and Agricultural Systems

Presentation Abstract: The U.S. Food and Agriculture Sector accounts for approximately 20% of the national economic activity. The U.S. has enjoyed abundant, affordable, and high-quality foods for decades. However, this could be changing. The globalized nature of the Food and Agriculture sector makes it vulnerable to a variety of threats. There is a critical need for a concerted national and international effort to detect and prevent transboundary spread of known or unknown pathogens, either naturally evolving or synthetically-derived, that have the potential to be catastrophic to the agriculture and food industries. Merely to cite one example, the mortality rate among pigs exposed to the African Swine Fever (ASF) virus is up to 100 percent - and ASF is only one example. Given that reality, it is vital that attention be prioritized to the development of methods of combatting the potential for rogue actors to weaponize pathogens, including the deliberate introduction of such pathogens into agricultural systems. The pace in the emergence, discovery and genetic manipulation of microbes transcends current regulatory and biosecurity protocols.

Panel 4: Detecting Threatening Behavior

Carey Rappaport, Deputy Director, ALERT, Northeastern

Presentation Abstract: The aircraft hijackings and targeted building collisions of 9/11 changed the face of terrorism in many ways. In particular, it showed that the effects of small weapons could be amplified greatly if the terrorists were willing to sacrifice themselves. To make air travel safer, all items that could damage a plane mid-flight or overwhelm the crew must be excluded.

This is a challenge because of the uncontrolled nature of public air travel: all types of passengers transporting all types of items, many of which could be considered threatening. It has become necessary to prevent guns, knives, and explosives from entering the secure area leading to the aircraft.

The ALERT Center of Excellence has been supporting DHS S&T Apex Screening at Speed (SaS) Program by developing technologies that strive to enable risk-based passenger screening, improve threat detection performance, and promote a better passenger experience. Two of these technologies will be discussed.

Improving Advanced Imaging Technologies:
ALERT has been developing new sensor concepts and algorithms which will reduce the false alarms and associated pat-downs at airport security stations. One important project has led to automatic anomaly material characterization and segmentation into threat/no threat categories. This is accomplished by processing the body part cross sectional view and applying electromagnetic principles to distinguish explosives and peroxides and metals from benign materials. Although not entirely perfect, the algorithms have the potential to make the screening process faster and less invasive.

Supporting Risk-based Screening:
ALERT's Correlation of Luggage & Specific Passengers (CLASP) project is developing near real-time automated tracking algorithms (ATAs) to track passengers and their associated items at the checkpoint. In addition to tracking passengers and their items, the CLASP system is being designed to associate ownership of items, detect items left behind at the checkpoint, detect potential thefts.

By maturing algorithms developed under CLASP, ALERT strives to make the passenger-baggage tracking capability sufficiently robust so it can support operational pilots and support Risk Based Screening in an airport environment. ALERT hopes to reduce the cognitive load on Transportation Security Officers (TSOs) at the security checkpoint or command center and reduce operating costs by automating the detection of these events.

Ioannis Kakadiaris, Principal Investigator, BTI, University of Houston

Presentation Abstract: This presentation reflects on the lessons learned from our research on face and body recognition and proposes how my team can contribute to future efforts to enhance homeland security. Regarding reflection, I summarize the results of the DHS-sponsored research on "Eye in the Woods": Image-based Recognition of Threatening Behavior. Regarding future contribution, I propose topics that relate to 1) tools to help investigators locate dark web marketplaces, 2) face recognition (for minors, for masked individuals, for a biometric vehicular exit for predicting the face using an image of a hand and speech), 4) predicting adverse events using immigration data, and 5) using deep fakes as an offensive tool.

Boleslaw Szymanski, Principal Investigator, CINA, GMU

Presentation Abstract: We focus on organizational structures in covert networks, such as criminal or terrorist networks. Their members engage in illegal activities and attempt to hide their association and interactions with these networks. Hence, data about such networks are incomplete. We introduce a novel method of rewiring covert networks parameterized by the edge connectivity standard deviation. The generated networks are statistically similar to themselves and to the original network. The higher-level organizational structures are modeled as a multilayer network while the lowest level uses the Stochastic Block Model. Such synthetic networks provide alternative structures for data about the original network. Using them, analysts can find structures that are frequent, therefore stable under perturbations. Another application is to anonymize a generated network and use it for testing new software developed in open research facilities. The results indicate that modeling edge structure and the hierarchy together is essential for generating networks that are statistically similar but not identical to each other or the original network. In experiments, we generate many synthetic networks from two covert networks. Only a few structures of synthetics networks repeat, with the most stable ones shared by 18% of all synthetic networks making them strong candidates for the ground truth structure.

Preprint: A Network Generator for Covert Network Structures
https://arxiv.org/pdf/2008.04445.pdf

Panel 5: The Evolution of Terrorist Threat

Eli Berman, Senior Research Fellow, CREATE, UCSD

Presentation Abstract: Looking back, effective research response to 9/11 required interdisciplinary flexibility to meet an interdisciplinary challenge. Traditional terrorism studies, which you might get in a Political Science or History class, benefited from augmentation with data science, military strategy, economics, data science, law, sociology of religion and other fields. We also needed more immediate dialogue -- including data sharing-- with practitioners and policymakers, to meet a rapidly evolving threat. Despite US excellence in academics and CT, twenty years in, we're still poorly organized to research and educate on terrorism.

What works? Following that formula of interdisciplinarity, data sharing and contact with practitioners, the Empirical Studies of Conflict, became extremely productive once up and running (with help from CREATE and Minerva).

We've learned:

- How the most lethal terrorist groups – religious radicals, organize;
- How they can be disrupted;
- How to constructively gain critical "see something say something" support from civilian populations;

- How to deter enemies and build alliance relationships in counterterrorism;
- and much more.

These insights, based now on two decades of data, may provide a foundation for future scholarship on terrorism, and contribute to a reduction in threat.

Erroll Southers, Associate Director of International Programs, CREATE, USC

Presentation Abstract: In the aftermath of the 9/11 attack, our national and homeland security efforts were forced to acknowledge the capability of an adaptive adversary, with the capacity to learn at every opportunity, whether the subsequent plot was thwarted or successfully executed. Simultaneously, there was a continued denial of the threat from domestic extremists able to execute lethal attacks while eluding much of the U.S. homeland security apparatus or the thought that they would globalize their aspirations. We have reached another critical crossroad, requiring us to respond to the transnational and internationalization of our domestic violent extremists. George W. Bush captured the essence of our challenge in his 9/11 20th anniversary memorial speech when he said, *"There is little cultural overlap between violent extremists abroad and violent extremists at home. But in their disdain for pluralism, in their disregard for human life, in their determination to defile national symbols, they are children of the same foul spirit. And it is our continuing duty to confront them."*