

## 2015 Minerva Research Summaries

(last updated September 29, 2015)

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## Public Service Provision as Peace-building: How do Autonomous Efforts Compare to Internationally Aided Interventions?\*

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Naomi Levy, Santa Clara University

Jessica Piombo, Naval Postgraduate School

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**Aim:** A dynamic and causal approach to understanding statebuilding and peacebuilding by investigating the effects of external engagement on the outcomes of state coherence and depth of peace.

**Countries examined:** Cambodia, Laos, and Uganda (via fieldwork); Rwanda

Both scholars and practitioners often treat statebuilding and peacebuilding as synonymous processes. Yet, the two rest on different logics and may at times work at cross purposes. This research project seeks to improve both the theory and practice of how peace is achieved in post-conflict countries by disentangling the related goals of statebuilding and peacebuilding. We ask two core questions: what is the relationship between statebuilding and peacebuilding; and how does the degree and type of external engagement affect the outcomes of these processes: state coherence and the depth of peace? To answer these questions, we analyze the ability of three post-conflict states—Cambodia, Laos, and Uganda—to provide public services and resolve societal grievances at the local level. The research also seeks to understand how externally led interventions compare with more autonomous and domestically motivated peace processes in achieving improvements in state capacity and sustainable peace, though a comparative study of post-conflict processes in the three countries.

### Methodology:

Our study varies the degree and level of external involvement in statebuilding and peacebuilding initiatives through case selection that enables both a cross-national comparison (Cambodia and Laos) and an intertemporal comparison (Uganda in two distinct time periods). We further enhance our analytical leverage by focusing on outcomes at the subnational and sectoral levels, where the tangible results of statebuilding and peacebuilding can be best observed.

Our research design allows us to draw comparisons across towns within countries, time periods within one country, and between the three countries and two regions. Through semi-structured interviews with elites and public service providers, we are compiling data on the degree and type of external engagement in selected sectors and localities as well as on the extent to which state capacity and sustainable peace have been realized at the local level. We are also building a comprehensive database of secondary indicators to complement our primary research. Overall, this methodology enables us to shed light on the causal relationships between the independent variable, *external engagement*, and the two main dependent variables, *state coherence* and *depth of peace*.

### Scientific Progress and Key Findings:

In the first two years of our project, we have initiated our field research, developed the conceptual framework for the project, elaborated causal mechanisms linking the independent and dependent variables, and initiated an expanded secondary data gathering effort (via expansion funds awarded in May 2015). Here we present the core conceptual framework and the causal mechanisms by which external

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*Anticipated period of performance:* Aug'13–July'16

engagement can influence the process of statebuilding and the ability to develop state coherence.

**Statebuilding and Peacebuilding as Causal Processes**

Our research begins with the recognition that the terms peacebuilding and statebuilding have become overloaded with a variety of meanings. **Figure 1** is a schematic of the conventional conceptualization of statebuilding and peacebuilding. It captures how peacebuilding and statebuilding both tend to be conceptualized as processes designed to move countries from a state of conflict or fragility to one of “liberal peace” (which entails democratic governance). Moreover, it reflects the general assumption that both processes are undertaken by the international community rather than local actors.

We argue that the processes of statebuilding and peacebuilding should be analytically separated from each other, as they have different underpinnings. Our proposed conceptual framework, which is presented in **Figure 2**, disentangles the processes of statebuilding and peacebuilding, and posits two sets of outcomes, which we term “state coherence” and “depth of peace.” We are particularly interested in how internationally-aided efforts compare to domestically led, autonomous recovery efforts in delivering these two sets of outcomes. Thus, the input on which we focus is “external engagement”— or how much and in what ways statebuilding and peacebuilding efforts are internationally aided.



Figure 1: The Conventional Approach

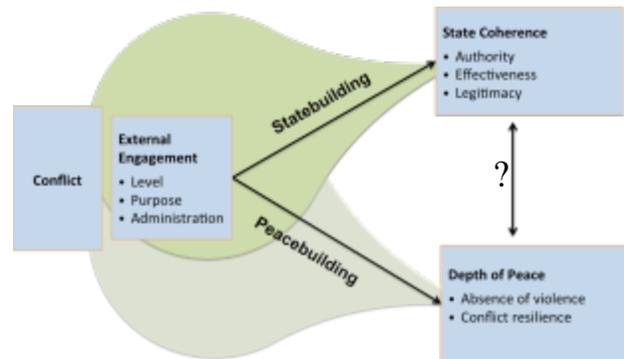


Figure 2: Our Model

**The Effects of External Engagement on State Coherence**

Based on our research, we have identified a set of causal dynamics through which external engagement can help or inhibit the creation of a coherent state apparatus, defined by the attributes of authority, capacity, and legitimacy (**Table 1**). We are in the process of identifying a similar set of causal dynamics linking external engagement to peacebuilding.

Table 1. Causal Dynamics and their Effects

Effects of Intervention	Causal Dynamics
<p>The dimensions of external engagement create a series of effects, which then combine in particular ways to produce either a pro-developmental or an anti-developmental dynamic.</p> <ul style="list-style-type: none"> <li>• Complementary, non-developmental assistance</li> <li>• Assistive/capacity building efforts</li> <li>• Substitution effects</li> <li>• Rentier effects</li> <li>• Regime maintenance and/or securitization dynamics</li> <li>• Competitive (parallel systems, non-coordinated)</li> </ul>	<p><b>Pro-developmental dynamic</b></p> <ul style="list-style-type: none"> <li>• Coordinated with government policies and strategies</li> <li>• Deliberate and successful attempt to build state authority, effectiveness, and legitimacy</li> <li>• Service provision that complements government efforts</li> </ul> <p>=&gt; <b>Greater state coherence</b></p> <p><b>Anti-developmental dynamic</b></p> <ul style="list-style-type: none"> <li>• External engagement that substitutes for and/or competes with the building of state capacity</li> <li>• Service provision that substitutes for or competes with government efforts; and thereby undermines</li> </ul>

- 
- state authority, effectiveness, and legitimacy
  - Assistance strategies that create a rentier state  
=> **Less state coherence**
- 

### **Anticipated Outcomes of Research:**

Measuring state capacity through the provision of public services allows us to examine how peacebuilding occurs where the state interfaces with society and how closing governance gaps at the domestic level can enhance a society's resilience and ability to sustain peace. Local-level contestation often occurs around the provision of public services; thus, as we examine this element of statebuilding, we can analyze the extent to which ordinary grievances and local conflicts related to these services are routed to and resolved through official channels, a crucial measure of peacebuilding. In doing so, we expect to be able to build generalized findings on the advantages and drawbacks of top-down, international peacebuilding interventions when compared to more bottom-up, autonomous peace processes.

### **Other Research Activities:**

#### ***Summer Research Fellows Program (SRFP) at Santa Clara University (created and led by Naomi Levy)***

With the support of an additional grant from the Minerva program, we recruited a senior lecturer and a group of eleven undergraduate researchers at Santa Clara University, who participated in an intensive week-long training. In addition to exposing the research fellows to scholarly research, this effort has three goals. First, the SRF team is constructing and coding a shareable database of our qualitative interview data. Second, the team is conducting a systematic review of the available existing data on each dimension of the three main variables in our study. Third, we are constructing a cross-national, time-series database of quantitative indicators at the national level for the universe of post-conflict cases.

***Field location scoping trip***, July–August 2015: With independent funding, Jessica Piombo engaged in a location scoping trip in Uganda (to help determine sites for the second round of field research in 2016) and a feasibility probe to include Rwanda as a shadow case in the project.

### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

This project will deliver a series of policy implications of interest to the United States government and other agencies involved in national defense and the international peace-building endeavor. Two of our assertions have particular policy relevance: first, that it is possible—and highly likely—that statebuilding and peacebuilding rest upon contrasting logics, such that efforts to create one might undermine the other. Second, the degree of international involvement or “external engagement” in both of these processes might truncate outcomes in each.

Understanding the implications of these two dimensions of our study is critically important for a range of U.S. government actors, missions, and programs. First, by and large, most of these actors have treated statebuilding as the way to obtain peace (statebuilding as peacebuilding). In practice, U.S. policies have promoted the creation of elite settlements and policy interventions to achieve both sets of goals simultaneously. Yet because the nature of the elite settlement required to achieve a peace agreement is very different from that required to sustain peace and build state capacity in the longer term, and because statebuilding might incorporate coercive elements into the process, deep peace on the ground may at times be compromised by statebuilding processes. Second, if certain forms of external intervention create anti-developmental outcomes that inhibit state coherence and a quality peace, the entire enterprise of external intervention in statebuilding and peacebuilding might prevent the sought-after outcomes. Understanding when and how this happens is critically important to improving U.S. engagement overseas. Thus, our research has direct implications for the very foundations of U.S. engagement strategies in any post-conflict state.

## Deterrence with Proxies<sup>\*</sup>

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**Aim:** Develop a game theoretic model to analytically support an overarching doctrine of sub-state threat suppression through proxies.

**Countries examined:** Fieldwork in Israel/Gaza, Israel/Palestinian Authority, and India. Additional work considering Afghanistan, China, Colombia, Denmark, Egypt, Germany, Iraq, Israel, Lebanon, Pakistan, Saudi Arabia, and Yemen.

The United States and its allies are shifting away from direct attacks on terrorists to a posture that projects power by inducing proxies, such as Pakistan, Afghanistan, and Yemen, to control transnational threats emanating from their own territory. Yet proxies do not put the same value on containing these threats as the United States does, creating a need for incentives—including a threat of direct military intervention—to motivate the U.S.'s desired level of effort. Conventional theories of deterrence inadequately address this strategic challenge.

### Approach:

In our framework, the proxy has an informational advantage in suppressing terrorism, and so can do so more cheaply than the principal, but does not share the principal's objectives. Incentives through future rewards or punishments are therefore necessary to induce proxy effort. Our framework will be informed by case study evidence from similar principal/proxy relationships in counterterrorism and counterinsurgency. We will empirically test the framework using new data from two conflicts—Israel's relationship with Hamas in suppressing terrorism from Gaza, and the Indian federal government's relationship with eight states in combatting the Maoist Naxalite insurgency.

### Scientific Progress and Key Findings:

The theory team, in consultation with the other teams, has identified five focused extensions of the model. Two of these extensions have been solved mathematically. Ten cases have been identified, of which nine seem to be in scope. Data from the Israel/Gaza/Palestinian Authority and India studies has been nearly all collected and cleaned. Coding is ongoing for the Gaza project, for cross-validation purposes. Preliminary results on home demolitions (Palestinian Authority) are available.

### Other Research Activities:

Professor Stephen Biddle of George Washington University has joined the project as a co-investigator. He will conduct complementary research on agency in security force assistance, which has already produced a draft working paper. For our India project, the sub-project on mining is using remote sensing to develop historical patterns and presence of minerals from past production, which will be linked to

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*Anticipated period of performance:* Sept' 14–Aug' 19 (with option)

conflict events.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

If validated, a robust framework of deterrence with proxies will provide guidance on how to design diplomatic, international, military, and economic efforts that motivate proxies to help manage emerging insurgent and terrorist threats. The same approach might apply to other transnational threats from non-state actors as well, including cyber-threats, drug trafficking, smuggling, and human trafficking.

**Future Work:**

We have identified a stretch goal of modeling deterrence with proxies when the problem to be suppressed (e.g., a terrorist organization) acts strategically. We are also discussing a stretch goal in which the principal suffers from an inability to commit to implicit contracts.

**Sharable data resources to be generated:** (details on page 168)

- Gaza Incidents Data
- Mining Activity in India from Satellite Images

## Energy and Environmental Drivers of Stress and Conflict in Multi-scale Models of Human Social Behavior<sup>\*1</sup>

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<http://www.redfish.com/urbanmetabolism/>

Our main problem is concerned with the relationships between energy and environmental change and crises in human social behavior in cities. In this project we divide this central problem into four parts:

1. *The Determinants of Change in Energy Systems*  
We are at present experiencing profound change in our energy systems, motivated in part by environmental change, caused by issue of energy exploration and extraction under current technologies. We study empirical patterns of innovation and change in energy technologies and develop models to predict future trends.
2. *The link between infrastructure, energy use and social behaviors in cities*  
This is the central problem of urban planning and policy. We tackle this issue by formalizing the problem in terms of the changes individuals may undergo in larger social networks, and analyzing the enabling roles of energy and services in patterns of development and crisis.
3. *Epidemic behavior in social dynamics*  
We study how the conditions of various urban environments affect the spread of behaviors and crises in urban environments. In particular we explore the consequences of larger social connectivity in larger cities and of the role of information and communication technologies in facilitating contact and spread.
4. *Policy development from control theory.*  
We use the insights from the points above to devise ways to simplify complex policy issues using instruments of engineering theory, such as feedback control. We also formalize under what conditions this is possible, and when other types of solution must be pursued.

### Approach:

Our methodology explores the link between classical and new ideas from the social sciences, new data opportunities in nations and cities around the world, and new (mathematical) theory development. We develop models of cities in terms of interacting networks of people, organizations and infrastructure and analyze their change and evolution under different scenarios. In doing this we develop new fundamental ideas for the social fabric and dynamics of cities, and their outputs, e.g. in terms of wealth and violence, as well as their underpinning in energy and other services. This also allows us to formalize policy making in terms of tools of complex systems and of engineering theory.

Our methods are general, but data can be nation-specific. Data is typically more available in developed countries, and we explored some new datasets for the US, UK and Portugal. We have also showed how mobile devices datasets from developing nations such as Cote d'Ivoire can be used even in the absence of much in the way of official census type data.

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*Anticipated period of performance:* Mar'12–**December 2015**

<sup>1</sup> Reprint of FY14 summary.

### **Scientific Progress and Key Findings:**

In this period of the project we continued to acquire and analyze datasets on the relationship between energy and environmental drivers and human social behavior and develop mathematical models that connect them to the structure of human social networks and to considerations of how they may change.

We have finished and published several major articles that provide a theoretical framework for the project and characterize the spatial and environmental distribution of sources of energy change and human health at the urban level.

First the manuscript described during the previous period [1], that analyzes homicide rates in cities of Colombia, Brazil and Mexico has now appeared in print. Its main results are the general character of these statistics, which establish a baseline for identifying extraordinary events, such as waves of crime or violence.

Second, a manuscript developing a theory of cities [2], in terms of the interaction between social and infrastructural networks, establishes also the energy requirements for global cities to remain connected socially. This work was the cover of *Science* magazine on June 21, 2013.

A manuscript had now appeared [3] analyzing national and regional pattern of innovation in energy technologies and their main drivers in terms of national investments and markets. It shows that energy innovation is tied not only to national strategies to develop these technologies, but also crucially to patterns of consumption and new capacity installation.

A few other manuscripts show how social connectivity can be measured in cities, using cell phone data in three different nations [4,7]. We have also developed these ideas theoretically and shown when policies to manage infrastructure can be developed using feed-back control strategies, especially when big(ger) data is available [4].

Finally, we related the structure of urban social networks to their cities functional diversity and economic productivity [6.]. We also proposed that such ideas are a cornerstone of human socioeconomic development and discussed how they can be facilitated by technology [8].

### **Anticipated Outcomes of Research:**

In this final period of the project we will continue to elaborate on methods to estimate the energy use of cities and its connection to their social dynamics. We are currently acquiring large data sets of building shapes and weather to generate models of energy use for many specific cities in real time. Associated methods of statistical inference and extrapolation are also being developed that we expect will allow us to treat other cities for which data is less available or accurate. We are also developing formal methods that treat urban policies about infrastructure and services in terms of feedback control theory. By the project's end date, in about one year, we will have final publications on these topics and a website estimating energy use across a large number of cities.

### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

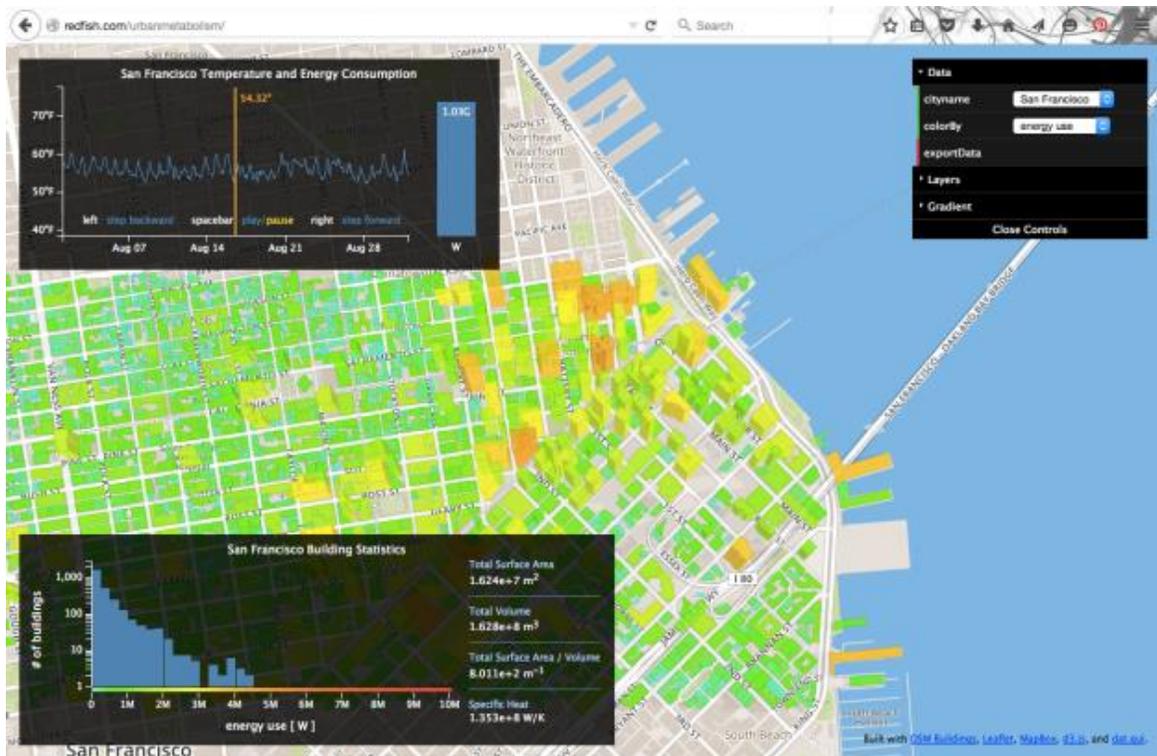
The project will create new analytical tools to analyze the structure cities and nations, both in terms of their infrastructure and social networks. It emphasizes especially the differentiation of functions that tends to happen in urban social networks with city size and its connection to energy and urban services. The project is also creating ways to estimate the energy consumption for a city in real time, as it is driven by weather and climate changes, and to conceptualize and manage policies through feed-back control

loops. These capabilities may be important in DOD missions related to urban areas, service provision and peace-keeping and reconstruction after conflict.

**Publications through this Minerva research:**

1. A. Gomez-Lievano, H. Youn, and L.M.A. Bettencourt. 2012. The Statistics of Urban Scaling and Their Connection to Zipf's Law. *PLoS ONE* 7: e40393
2. L.M.A. Bettencourt, The Origin of Scaling in Cities, *Science* 340: 1438-1441 (2013).
3. L.M.A. Bettencourt, J.E. Trancik, and J. Kaur. 2013. Determinants of the Pace of Global Innovation in Energy Technologies. *PLoS ONE* 8(10): e67864.
4. M. Schläpfer, L.M.A. Bettencourt, S. Grauwin, M. Raschke, R. Claxton, Z. Smoreda, G.B. West and C. Ratti. 2014. The Scaling of Human Interactions with City Size. *Journal of the Royal Society Interface* 11, 20130789.
5. L.M.A. Bettencourt. 2014. The Uses of Big Data in Cities, *Big Data* 2: 12-22.
6. L.M.A. Bettencourt, H. Samaniego, H. Youn (2014) Professional Diversity and the Productivity of Cities. *Nature Scientific Reports* 4: 5393.
7. C. Andris, L. M. A. Bettencourt (2014) Development, Information and Social Connectivity in Cote d'Ivoire. In print in *Infrastructure Complexity*. [\[link\]](#)
8. L.M.A. Bettencourt. 2014. The Role of Technology in Social Networks, to appear in *IEEE Proceedings*.

While no sharable data resources have been generated in the course of this research, we are preparing a website for real time energy use of cities around the world. A prototype can be accessed at <http://www.redfish.com/urbanmetabolism/>; see screenshot at **Figure 3**.



**Figure 3.** Screenshot of prototype site for analysis of real-time energy use of cities around the world.

## Thailand's Military, the USA and China: Understanding how the Thai Military Perceives the Great Powers and Implications for the US Rebalance\*

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Strategic and Defence Studies Centre, Australian National University

**Aim:** Understand the key determinants of Great Power influence over strategic security choices, and assessing whether Thai military and political figures are amenable to such influence.

**Countries examined:** Thailand (with fieldwork), the US, China, Japan, India, ASEAN and EU countries

Thailand's ties as an intimate US ally have declined in recent years and the US-Thai relationship is under pressure as China's regional influence grows. How and why has this happened? Does it matter for the US rebalance in Asia? What do people in the Thai military think about the alliance relationship and the changing strategic environment? Thailand is the only US treaty ally in mainland Southeast Asia. The United States has invested heavily in the relationship in the past, but is seeing a diminishing return on its investment there. Understanding the dynamics at work will help both US and Thai policy-makers. This project will trace the evolution of the Thai military thinking over the last century amidst competing great power influences. The working hypothesis is that the level of great power influence today can be correlated largely to the sense of continuing shared interests. The study will inform strategies for engaging and influencing responses across the Association of Southeast Asian Nations (ASEAN) and beyond to the changing strategic environment.

### Approach:

Our intention is to build this project around an empirical data collection exercise unprecedented in scale and focus. Central to this will be large-scale surveying of the attitudes and beliefs of serving junior to mid-level Thai military officers currently studying at up to ten different Thai military educational institutions. Surveying will be undertaken three times over three years. The survey will cover a wide range of factors affecting the thinking of the Thai military, including the fluctuations of US and Chinese influence over time.

Augmenting the data collected from surveys will be a series of twenty to twenty-five interviews. These will be with senior serving and retired military personnel from across the Thai armed forces, as well as other former senior officials and leaders with foreign policy experience and insights. We will also hold workshops with experts to assist in interpreting survey data. (See "Additional Research Activities".)

Coupled with documentary research and a robust theoretical framework, this approach will in total offer a new, sophisticated and powerful analysis of the culture, history, strategies and significance of external influences on Thailand's security choices.

### Scientific Progress and Key Findings:

We conducted fieldwork between 14-31 July in Thailand, surveying 674 Thai military personnel at nine different Thai military educational institutions. We also interviewed nine former high office holders (including a former prime minister and two former foreign ministers) and several former senior military commanders. Overall, the Thai military perceives its external security environment as benign – 43% felt "highly secure" and 39% "reasonably secure". They are more concerned about internal threats and believe defense spending should be directed towards meeting these. However within this generally

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\* *Government Program Officer:* Andrew Higier, Office of Naval Research—Singapore  
*Anticipated period of performance:* Feb'15–Jan'18

sanguine external outlook, Great Powers are still a significant factor in Thai security thinking. Respondents saw the threat from Great Powers as higher than the threat from neighboring countries, but less than the threat from non-traditional threats such as refugees, climate change and crime. Strikingly, 64% believe that Great Powers significantly influence Thailand's internal politics.

The interviews confirmed that **significant reserves of goodwill toward the US remain**, especially from the early twentieth and mid-twentieth century. But both the interviews and the survey data suggested that while US influence is still seen as significant, there is cooler view of the US in the current era. **In the current post-coup political environment US criticism of Thailand on several fronts is being keenly felt**, a phenomenon confirmed in our interviews. This, and the belief that Great Powers significantly affect internal politics, may also help explain the surprising result that **despite the alliance, 68% of Thai military respondents rated the US as a significant threat**. It will be important to repeat this surveying in a post-election environment, to test the extent to which current US-Thai bilateral tensions are influencing respondents, but early indications are that the current political dynamic is hampering the US rebalance. While 49% were aware of it, only 34% rated it as significantly beneficial. On the positive side, a significant proportion of respondents (43%) expect the US to have greater influence in ten years.

The survey data confirmed that **China's influence is perceived to have surged following the Global Financial Crisis**. 39% thought Chinese influence was high in the post-Cold War era, 62% thought similarly for the period following the GFC. This influence is expected to continue to increase, with 79% expecting China to have more influence in ten years. However the picture of China is mixed. Some interviewees emphasized the strong albeit complex cultural and economic linkages with China. Others stated China's actions in the South China Sea to be of longer term concern. **54% of the military survey respondents saw China as a highly threatening Great Power**. More work remains to be done in interpreting the survey information and repeating the surveys to remove transient factors, but our early hypothesis, that Thailand will pursue balanced, equidistant relations with multiple Great Powers as it did in the late nineteenth and early twentieth centuries, is tending to be confirmed. Perhaps the most significant difference between the current era and the late nineteenth century is ASEAN. 73% of respondents saw ASEAN as important to Thai security.

#### **Additional Research Activities:**

We will hold two workshops in 2015 with select groups of Thai senior officeholders and military elites, who will be asked to offer their interpretations of the survey results. The first workshop, with the Strategic Studies Centre of the Royal Thai Armed Forces will occur on 4 September 2015. The second workshop, with senior Thai civil servants enrolled in foreign policy courses at the King Prajadhipok Institute and Chulalongkorn University, will occur on 28 November 2015. These workshops will thereby add a further source of insights and means of interpreting the raw data. We also expect to conduct a further survey exercise with the Royal Thai Police Academy for comparative purposes. Other activities for 2015 include appraisal of the archives of the Thai Border Police with regards to their Cold War era cooperation with US agencies, and further interviews with senior officials.

#### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Our early findings suggest that Thailand's current domestic politics will remain a foreign and defense policy challenge for the US, with a degree of friction in the relationship at least in the short term. However in the longer term, and especially after Thailand returns to democracy, the US has a significant set of assets on which to maintain and build a robust security relationship with a capable military partner offering significant operational access to Southeast Asia. Principal amongst these are the Thai military's continuing high valuation of US doctrine and education. These elements in the US-Thai defense relationship are to an extent institutionalized, and will help weather the current political storm.

## Complex Emergencies and Political Stability in Asia\*

Principal Investigator: **Joshua Busby**, University of Texas at Austin, [busbyj@utexas.edu](mailto:busbyj@utexas.edu)

Co-PIs: **Robert Chesney**, University of Texas at Austin, and

Disaster vulnerability: **Josh Busby**, UT Austin

Conflict and complex emergencies: **Clionadh Raleigh**, University of Sussex

Governance implications: **Paula Newberg**, UT Austin

Natural disaster preparedness: **Jennifer Bussell**, UC Berkeley

International aid for mitigation: **Catherine Weaver**, UT Austin

**Mike Findley**, UT Austin

Complex emergencies dashboard: **Ashley Moran**, UT Austin

[www.strausscenter.org/cepsa](http://www.strausscenter.org/cepsa)

**Key questions:** How might various insecurities converge to impact vulnerability in Asia, and where and how could these insecurities develop into complex emergencies? What is the capacity of national governments and international actors to respond to disasters and complex emergencies?

**Regions to be examined:** South Asia (Bangladesh, India, Bhutan, Nepal, Pakistan, and Sri Lanka) and the Mekong region of Southeast Asia (Cambodia, Laos, Myanmar, Thailand, and Vietnam).

Due in large part to high population densities along rivers and low-elevation coastal zones, Asian countries have among the highest numbers of people exposed to the impacts of climate-related hazards and, thus, at greatest risk of mass death. Most of the world's mega-cities, defined as cities with a population in excess of ten million people, are located in Asia. By one count, as many as 17 of 26 megacities are located in Asia. Of the 2.47 billion people killed and affected by disasters worldwide from 2001 to 2010, 89% were located in Southeast, Southern, and Eastern Asia.

In such situations, civilian agencies are often overwhelmed. Increasingly, both national and foreign militaries are called upon to carry out humanitarian assistance operations in the event of major climate shocks. Moreover, climate change threatens to make the problem worse by increasing the intensity and possibly the frequency of climate-related hazards. Because of the potentially destabilizing consequences of a changing climate, a discussion about climate change and security has emerged. Interestingly, Asia remains understudied in that literature.

### Approach:

The Program on Complex Emergencies and Political Stability in Asia (CEPSA) explores the confluence of insecurities that impact vulnerability in Asia and strategies for response. In doing so, the Program investigates the following questions: What are the diverse forces that contribute to disaster vulnerability and complex emergencies in Asia? What are the implications of such events for local and regional security? How can investments in preparedness and prevention, supported by international donors, minimize impacts and build resilience?

The Program builds on the University of Texas at Austin's Climate Change and African Political Stability (CCAPS) Program, a multi-year effort funded by the Minerva Research Initiative. (See details at pg. 21.) The CEPSA Program leverages the novel methods developed under CCAPS and adds new risk assessment methods to design a framework for recognizing and analyzing complex emergencies in Asia.

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\* *Government Program Officer:* Micheline Strand, Army Research Office

*Government Point of Contact:* Lisa Troyer, Army Research Office, [lisa.l.troyer.ctr@mail.mil](mailto:lisa.l.troyer.ctr@mail.mil)

*Anticipated period of performance:* Sept' 14–Aug' 17

The Program addresses its key questions by examining the disaster, conflict, and governance components of complex emergencies, assessing the dynamics of each individual component and how they interact through feedback loops that form complex emergencies. Qualitative and quantitative methods include: (1) modeling disaster vulnerability using Geographic Information Systems, (2) coding and mapping conflict events in real-time, (3) conducting risk assessments and forecasting using geospatial analytics, (4) mapping aid flows to identify disaster response capacity, (5) conducting consultations and fieldwork to collect primary data, ground-truth conceptual tools and models, and implement case studies, and (6) designing mapping and analytical tools to facilitate the use of Program research in policy planning and response. The Program applies these methods in two core research areas: assessing the relationship between insecurities and complex emergencies in Asia, and identifying strategies to build government response capacity and societal resilience.

### Scientific Progress and Key Findings:

The Program compiled and released the first iteration of the expanded Armed Conflict Location and Event Dataset (ACLED) in South and Southeast Asia. The dataset<sup>2</sup> currently includes 2015 events in all 11 countries, updated monthly on the CEPSA website. In the coming months, ACLED will expand the Asia dataset by backcoding conflict events in all covered states to 2010 and, in some states, to 1997.

CEPSA researchers completed the first iteration of the CEPSA disaster vulnerability model for Asia. Our initial findings suggest that much of Bangladesh, parts of southern Myanmar (the Ayeyarwady region), and parts of southern and northwest Pakistan (Sindh, Balochistan, and the North-west frontier) are the most vulnerable locations to climate change from a climate security perspective.

CEPSA researchers also developed the new aid coding methodology to track climate and disaster risk management aid, determined the sampling structure, and began document collection and coding for Bangladesh and Nepal.

CEPSA researchers have conducted field research thus far in Bangladesh and India.

### Other Research Activities:

The program held a workshop on Complex Emergencies and Political Stability in Asia at the University of Texas at Austin, March 5, 2015. The workshop brought together 23 participants from the CEPSA team, other universities, and nongovernmental organizations to review research memos produced by the Program's six research teams and provide critique and feedback.

CEPSA researchers also integrated Program research into several publications and presentations aimed to share early findings on issues under study on the Program. They include:

- Joshua Busby and Nisha Krishnan. Forthcoming. "Widening the Scope to Asia: Climate Change and Security," in *Climate Change, Security and the Asia-Pacific Rebalance*, eds. Frank Femia and Caitlin Werrell, Center for Climate and Security.
- Joshua Busby. Forthcoming. "Climate Change and U.S. National Security: Sustaining Security Amidst Unsustainability," in *Sustainable Security: Rethinking American National Security Strategy*, eds. Jeremi Suri and Benjamin Valentino, Oxford University Press.
- Joshua Busby. October 2014. "Climate Change and Security," Lectures (2) at Colorado College, Colorado Springs, CO.
- Paula Newberg and Osama Abi-Mershed. May 2015. "Zones of Contention, Zones of Cooperation: Climate Change in the Evolving Indian Ocean-Arabian Sea-Persian Gulf Region,"

<sup>2</sup> All data and codebooks are available at [www.strausscenter.org/acled](http://www.strausscenter.org/acled).

*Workshop on Environmental Cooperation Across Borders*, Austin, TX.

- Clionadh Raleigh and Jonathan Gonzalez-Smith. March 2015. “Real-Time Analysis of Asian Political Violence, Conflict Trends No. 1,” *ACLED Conflict Trends Report*.
- Clionadh Raleigh, Sarah Kaiser-Cross, and Hillary Tanoff. May 2015. “Real-Time Analysis of Asian Political Violence, Conflict Trends No. 2,” *ACLED Conflict Trends Report*.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Understanding how different insecurities coalesce to impact vulnerability in Asia—and assessing when and how these insecurities can develop into complex emergencies—has strong implications for U.S. national security. Major displacements or unequal distribution of costs from cyclones, tsunamis, and flooding—all on the rise in parts of Asia—can potentially lead to civil unrest and, in some cases, develop into complex emergencies.

By mapping varied regional insecurities, the Program identifies: the areas of chronic concern where U.S. military assets may be directed for humanitarian relief or conflict containment; the areas at risk of disasters and complex emergencies; the potential vulnerability of bases, allies, and potential adversaries; and areas where destabilization might empower extremist groups. By producing the most accurate, real-time, disaggregated, geo-referenced data on Asian political violence and its agents, Program research also allows for comparable assessments of conflict across the most high-risk states using highly curated data on which to base policy, humanitarian, and security decisions. By identifying factors that impact national capacity to build resilience, as well as the rapid response capacity of international actors on the ground, Program research informs policy planning at national and international levels to potentially diminish the impact of future events and the need for U.S. intervention. Dynamic mapping and analytical tools will leverage Program research to provide integrated assessments of risks and potential intervention points, facilitating prediction, diagnosis, and responses related to complex emergencies.

**Sharable data resources [to be] generated (see descriptions on page 172):**

- *Resources for Complex Emergencies and Political Stability in Asia*: CEPSA expands the widely used ACLED conflict data to the high-risk regions of South and Southeast Asia. Currently, ACLED is the premier armed conflict location event dataset for Africa and selected other high-risk countries, providing near real-time, detailed data on conflict patterns, actors, and dynamics.
- *Disaster Vulnerability Model*: The CEPSA disaster vulnerability model for Asia will identify the subnational locations in Southern and Southeast Asia that are most vulnerable to climate-related hazards, defined in terms of the potential for large-scale loss of life.
- *Disaster and Climate Aid Data*: The CEPSA program is generating a new dataset tracking the components of international aid projects devoted to climate change adaptation and disaster risk management.
- *Mapping Tools*: The CEPSA program, in partnership with Development Gateway, is building an online, interactive mapping tool that will provide policymakers with a platform to visualize trends in disaster vulnerability, conflict, governance challenges, and disaster aid in Asia. The mapping tool will allow analysts to explore how various insecurities converge to impact vulnerability in Asia, and where and how these insecurities could develop into complex emergencies.

## Multi-Source Assessment of State Stability\*

Principal Investigator: **Kathleen Carley**, Carnegie Mellon University, [kathleen.carley@cs.cmu.edu](mailto:kathleen.carley@cs.cmu.edu)

**Huan Liu**, Arizona State University

**Mia Bloom**, Georgia State University

<http://casos.cs.cmu.edu/projects/project.php?ID=73&Name=Minerva>

**Aim:** Understand how cyber-media are used to affect state stability and social change, and to develop the technologies needed for assessing the cyber-mediated environment in a rapid, systematic and context sensitive way.

**Countries examined:** Yemen, UAE, Turkey, Tunisia, Syria, Qatar. Saudi Arabia, Oman, Morocco, Libya, Lebanon, Kuwait, Jordan, Iraq, Bahrain, Algeria. Partial data: Iran, Egypt, Sudan, Palestine

In the cyber-mediated environment both social media, e.g., Twitter, and traditional media, e.g., online news, are present and used. Social media is filled with information from news agencies, e.g. BBC, CNN and al-Jazeera, bots, corporations, and regular humans. The information carried via social media is not completely distinct from traditional media nor more timely. As more organizations and news agencies turn to the use of social media the relative impacts of social media and traditional media on social change become more complex, as does their role in governance. Despite the increase in attention to the “cyber world” and a recognition that cyberspace challenges traditional conceptions of influence, diplomacy and security, there is only a minimal ability to track this information and use it to assess or forecast societal level changes, there is a lack of a fundamental understanding of how trust is forged and broken between individuals and institutions in a computer mediated communication environment. The emerging uses of social media technologies, such as Twitter, in contrast to traditional news media, have not been fully examined within the framework of state stability. Empirical analysis is needed to identify what processes are at work in cyberspace to spread true and false information, propaganda, and to effect beliefs, what processes effect self-policing in cyber-space, and to understand how these processes actually effect the socio-cultural environment and so state-stability. New technologies are needed to identify bots, determine the actual signal of what people are concerned with, and to detect changes in the beliefs and activities as signaled in the cyber-mediated environment.

**In this research we ask**, what role does the cyber-mediated environment play in state-stability? How are traditional and social media used by states and individuals to manage and understand change in this cyber-mediated environment? How can we asses and predict state stability, identify changes in what groups are at risk, and do so at scale given the vast quantity of changing data available on-line through the cyber-environment? What technologies are needed to assess cultural stability in the cyber-mediated environment?

### Approach:

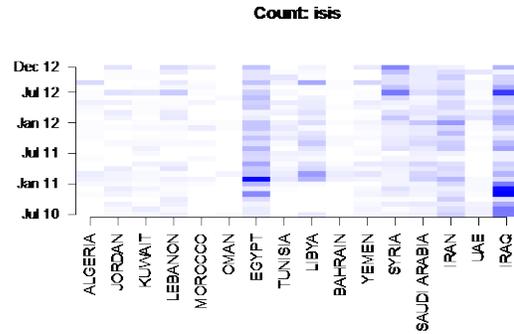
The basic approach is to couple big data network analytics with in-depth qualitative data to identify temporal, local, regional, cultural, and ethno-religious differences in role of media. This is a mixed-methods, multi-modeling approach used to support theory development, testing, and model validation. These methods include employing detailed ethnographic analysis, text-analysis in which text-mining using Latent Dirichlet Allocation techniques for topic identification, spectral analysis for clustering, geo-statistics, dynamic network analytics and visual analytics are used for reasoning about the extracted data. Machine learning and honey pots are used to develop bot detectors for data cleaning. These techniques

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*Anticipated period of performance:* Aug’ 13–Sept’ 18 (with option)

## Minerva Research Summaries: Ongoing Projects

	Adaptation	Nationalities	Protest	Terrorist Orgs	Ethnic Groups	Violence	War	Youth	
Bahrain	0	0	1	0	-1	2	0	2	twitter and not news
Egypt	1	0	1	1	-2	2	0	1	
Iran	0	1	0	1	1	2	0	0	more twitter than news
Iraq	0	0	0	-1	-2	0	-1	0	
Jordan	0	-1	0	2	1	0	0	2	neither
Kuwait	2	2	0	0	-2	0	0	0	
Lebanon	0	1	0	-1	1	2	2	0	more news than twitter
Libya	1	1	0	0	0	0	-1	0	
Saudi Arabia	2	0	0	2	-1	0	0	2	news and not twitter
Syria	0	1	1	2	0	1	0	0	
Tunisia	1	1	2	0	-2	0	0	1	
UAE	2	0	0	0	-2	0	0	2	
Yemen	-2	2	1	1	2	2	-1	1	



are used in a progressive and “stepped” fashion to first identify norms, the lines of balance, critical issues, and indicators of stability, balance, and trust. Then, secondly, we identify groups, topic foci for groups, changes in these indicators and characterize patterns of instability using geo-temporal network and visual analytics. Machine learning techniques are employed. Groups will be identified based on network structure, topic cohesion, and location using community detection technique that we expand to handle both actors and issues. and thirdly, a mixture of statistical approaches is used to characterize behavior, and estimate the likelihood of anomalous change.

Overall – the methodological approach is designed to leverage rich ethnographic description and analysis to provide explanations and interpretations of the statistical, network and visual analytics of the geo-temporally tagged social and knowledge (topic) network data that is extracted from multiple sources. Blending qualitative and quantitative techniques supports the automated coding of media data using text-mining techniques, in-depth analysis of outliers and overall interpretation utilizing culturally informed qualitative ethnographic assessments, and theory testing using traditional and new “big-data” statistical, network and visual analytics with particular attention to dynamic and incremental metrics for identifying critical actors, issues, messages and groups of interest. These methods are applied to mixed-source data (twitter, blogs, news, trade, geographic information, and archival ethnographic sources) encoded as a series of meta-networks linking people, groups, issues, activities, and location.

### Scientific Progress and Key Findings:

Conducted an in-depth analysis of news and Twitter by country. We found that increased activation (more messages) was a signal that a major event would occur. In association with this we developed a new event detection technology. We found that discussion of ethnic groups and war were more likely to occur in Twitter than in newspapers, but discussion of adaptation, violence and protests more in the news. This signals a different use of the media – see **Figure 4**. We found that news sources, though comprising only a small fraction of the tweeters, are among the most influential in the re-tweet network; whereas, local conversations using mentions are more likely to focus on government groups and individuals. We find that in high civil unrest countries Twitter is used to “get the message out” with higher levels of retweets; whereas, in low civil unrest countries Twitter is used to engage in general discussions and replies are used to maintain discussion.

Ethnographic work led to a deep dive on Syria and members of ISIS. We have identified patterns of activity related to recruitment of women. Current work is examining Jihad al-Nikah and finding empirical evidence in the twitter data. Images attached to tweets are one possible signal of propaganda. Empirically, we find significant references to ISIS as early as July 2010, with many of those being in Iraq – see **Figure 5**. In countries with an Islamist-reformist leader ISIS is much less likely to be mentioned in either news or Twitter; but when there is a religious leader ISIS is mentioned in news but not in Twitter.

Overall, this deep dive, and the broader study, we find that in at-risk countries more of the conversation focuses on providing information about what is happening rather than reasoning about change; and that the religiosity of the leader can serve to suppress discussion in the formal source e.g. news leading to more grass-roots discussion in social media. In Twitter, estimates place the number of bots at between 25% and 50% of all tweeters. This can corrupt the data. In addition, Twitter, sometimes based on the work of anonymous, will suspend accounts that are likely to be terrorists. This poses two problems: a) not all Bots are detected and removed leaving in actors not of interest and obscuring the signal, and b) actors we would want to have included as they are part of the public are removed. We find that for some countries, e.g., Algeria, the number of accounts suspended can be as high as 25% in some months. These two problems mean that the likelihood of the top ranked individuals in twitter actually being accurate is only about 70%. On the technology side, we developed a new method for Bot detection (BoostOR) that uses both precision and recall and tested this with historic data from Libya and the Arabix Honeypot. BoostOR outperforms leading approaches. As for the second problem, we have empirically assess the extent of the problem, and are working on new network metrics that are robust to both sampling biases.

#### **Other Research Activities:**

Data collection exceeded storage, so we applied for and received a DURIP. Received new data for 2014. We leveraged this work to develop a network snowball technique to identify members of ISIS, this led to a follow on grant. We are in the process of creating a new approach to topic-group identification based on topic, sentiment, and network features using spectral clustering. We also tested the basic sentiment extractors (Senti, Lyke, Vader) and found almost no overlap in words. We also found that they were insufficient for coding negative ties. We are working on a new affect approach for coding the valence of relations among actors.

#### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

The metrics for key indicators, social-topic network models and associated tools developed in this project will provide the DoD with a core operational capability to enhance predictive modeling for regime change, assess social and traditional media data, and assess changes in trust, stability and alliance. The tools and methods developed here, particularly those for capturing, visualizing, analyzing, and fusing information from social media and traditional media are of immediate value to joint HA/DR operations, public-relations and MISO operations, irregular warfare operations, intelligence efforts, and IO operations.

#### **Sharable data resources to be generated:**

Resources are described at “Multi-Source Assessment for State Stability” on page 170.

#### **Publications through this Minerva research:**

- Carley, Pfeffer, Liu & Morstatter (2014, forthcoming). Embassies Burning: Toward a Near Real Time Assessment of Social Media Using Geo-Temporal Dynamic Network Analytics. In: *Social Network Analysis and Mining*.
- Bloom and Walsh, 2014 accepted, A Qualitative Sentiment Analysis of Foreign Fighters in Syria (in progress working with Shaun Walsh) Accepted for Presentation, Conference: Society for Terrorism, Research, Paper September 18, 2014.

## Climate Change and African Political Stability\*

**Bobby Chesney**, University of Texas at Austin

Climate vulnerability: **Josh Busby**, University of Texas at Austin

**Clionadh Raleigh**, University of Sussex

Climate-conflict: **Cullen Hendrix**, University of Denver

**Idean Salehyan**, University of North Texas

Constitutional design and conflict management:

**Alan Kuperman**, University of Texas at Austin

Governance: **Ashley Moran**, University of Texas at Austin

Disaster response: **Jennifer Bussell**, University of California-Berkeley

Urban resilience: **Robert Wilson**, University of Texas at Austin

International aid: **Catherine Weaver**, University of Texas at Austin

**Mike Findley**, University of Texas at Austin

**Michael Tierney**, College of William and Mary

**J. Timmons Roberts**, Brown University

CCAPS Senior Program Manager: Ashley Moran, [amoran@austin.utexas.edu](mailto:amoran@austin.utexas.edu)  
<http://www.strausscenter.org/ccaps>

**Aim:** Analyze how climate change, conflict, governance, and aid intersect to impact African and international security.

**Countries examined:** Climate, conflict, and aid data continent-wide, including field research in 19 countries—Angola, Burundi, Egypt, Ethiopia, The Gambia, Ghana, Kenya, Malawi, Morocco, Mozambique, Nigeria, Senegal, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe. CCAPS research also includes conflict data for 13 countries in Latin America and seven countries in the Middle East (Spring 2016 release planned).

The Climate Change and African Political Stability (CCAPS) program works in three main areas to address the following questions:

- *Climate change and conflict:* Where and how does climate change pose threats to stability in Africa? What is the spatial and temporal relationship between climate vulnerability and patterns of conflict? Where, when, and how could climate-related events disrupt Africa's security and development?
- *Governance:* What is the role of government institutions in mitigating or aggravating the effects of climate change on political stability in Africa? How could political institutions buffer against conflict and other impacts of climate shocks? What is the capacity of African countries to respond to disasters?
- *International aid:* How effective are foreign aid interventions in helping African countries adapt to climate change? How can aid be effectively coordinated and implemented to contribute to crisis prevention and adaptation and reduce the need for global assistance?

### Approach:

The program conducts quantitative analysis, GIS mapping, case studies, and field interviews to identify where and how climate change could pose threats to state stability, to define strategies for building accountable and effective governance, and to assess global development aid responses in Africa.

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\* *Government Program Officer:* Micheline Strand, Army Research Office

*Government Point of Contact:* Lisa Troyer, Army Research Office

*Anticipated period of performance:* Jun'09–Dec'15

**Scientific Progress and Key Findings:**

The program has advanced tools for assessing climate security vulnerability in Africa by developing a new model mapping subnational vulnerability to climate change, developing a new regional climate projection model for Africa, conducting real-time conflict tracking continent-wide in Africa, and developing a new framework for identifying varied types of complex emergencies. Program case studies have produced new comparative research on the impact of constitutional design, democracy assistance, urban resilience, and disaster preparedness on building government capacity to respond to climate-related and other stressors in Africa. All data and publications are available at [www.strausscenter.org/ccaps](http://www.strausscenter.org/ccaps).

On conflict research in the past year, CCAPS researchers released version 5.0 of the Armed Conflict Location and Event Dataset (ACLED) that covers all African political violence from 1997–2014, and they continue to release 2015 conflict data weekly for 30 high-risk states and publish monthly conflict trends reports. The Social Conflict Analysis Database (SCAD) expanded this year both in temporal and geographic coverage, now including events in Africa and Latin America from 1990–2013. SCAD has also collected 2014 and 2015 data on Africa, 13 countries in Latin America, and 7 countries in the Middle East, which will be released in spring of 2016.

On conflict management research in the past year, CCAPS researchers published *Constitutions and Conflict Management in Africa: Preventing Civil War through Institutional Design*, published by The Pennsylvania University Press. The book explores the types of political institutions that can buffer societies from destabilizing changes that otherwise increase the risk of political violence.

On climate aid research in the past year, CCAPS researchers reviewed, coded, and analyzed all World Bank projects implemented in Sub-Saharan Africa for five years, from 2008–2012, to discern trends in climate change adaptation and financing in the region by one of the leading providers of development finance. Results confirmed a significant level of climate-oriented development financing, based on both the amount of World Bank committed funds and the number of its projects and activities. The team also applied food security coding for seven donors in Malawi from 2008–2014.

**Other Research Activities:**

The program released and continually updates online mapping platforms<sup>3</sup> that enable researchers and policymakers to visualize program data on climate security vulnerability, conflict, and aid interventions, providing the most comprehensive view yet of climate change and security in Africa.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

CCAPS aims to provide the Department of Defense and the wider U.S. Government with practical guidance on how to mitigate and respond to the security consequences of climate change in Africa. First, by identifying how climate change could trigger natural or man-made disasters and undermine state stability, program research could enable policymakers to act early, when the costs of taking decisive action are lower. Second, the program is identifying the strategies most likely to build state capacity and forestall state collapse; where state collapse has already occurred, the program identifies strategies to reduce violence, provide humanitarian aid, and foster political stability and good governance. Third, the program is evaluating the capacity of bilateral and multilateral efforts to reduce African countries' vulnerability to climate change. If domestic institutions and international aid efforts are more effective, the result should be fewer crises and, as a result, fewer calls for the U.S. military to take on the burdens of disaster response, peacemaking, peacekeeping, and post-conflict reconstruction.

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<sup>3</sup> All mapping platforms are available at [www.strausscenter.org/ccaps/mappingtool](http://www.strausscenter.org/ccaps/mappingtool).

**Future Work:**

The Robert Strauss Center for International Security and Law's new program on

Complex Emergencies and Political Stability in Asia (*CEPSA*), also funded by the Minerva Initiative, builds on the research and tools developed under CCAPS to explore how climate-related hazards can combine with other security risks to create complex emergencies. The program also allows researchers to compare how trends and findings identified in Africa hold or vary in other regions. CEPSA brings together researchers from the University of Texas at Austin, University of California at Berkeley, University of Sussex, and Development Gateway with the expertise to explore the causes and dynamics of complex emergencies in Asia and options for building government capacity to prevent and respond to such situations. (See pg. 15 for additional details.)

#### **Recent Academic Publications through this Minerva research:**

In the last year, CCAPS researchers have released publications on climate vulnerability, climate-conflict links, constitutional design and conflict management, urban resilience, national disaster response, and international aid intervention in a range of **academic journals** and other outlets. The CCAPS program has also actively published **research and policy briefs** on conflict trends, climate change and development, urban resilience, food security, and water security. The full range of CCAPS publications identifying chronically insecure regions, climate-conflict trends, and strategies for national and international response, as well as the program's data codebooks, user guides, course modules, and conference reports, are available at [www.strausscenter.org/ccaps/publications](http://www.strausscenter.org/ccaps/publications).

#### **Sharable data resources generated:**

More details can be found at “Resources for Climate Change and African Political Stability” on page 174.

- *Mapping tool and thematic dashboards:* The mapping tool allows users to visualize data on climate change vulnerability, conflict, and aid in Africa. Accompanying thematic dashboards combine mapping, trends analysis, tabular data, and data downloads for a comprehensive view of each thematic area of CCAPS research. The mapping tool and dashboards on conflict, climate security, and aid are available at [www.strausscenter.org/ccaps/mappingtool](http://www.strausscenter.org/ccaps/mappingtool).
- *Datasets:* All datasets and model outputs are available at [www.strausscenter.org/ccaps/data](http://www.strausscenter.org/ccaps/data).
  - *Climate security vulnerability model* identifies the locations of chronic vulnerability to climate security concerns in Africa.
  - *Armed Conflict Location and Event Dataset* tracks the actions of opposition groups, governments, and militias across Africa from 1997 to 2015.
  - *Social Conflict Analysis Database* includes georeferenced data from 1990 to 2013 on protests, riots, strikes, coups, communal violence, and other types of social unrest in Africa, as well as select countries in Latin America.
  - *Malawi Geocoded and Climate Aid Dataset* includes data on all active development aid projects in Malawi, from all donors in all sectors from 1996 to 2011.
  - *World Bank Climate Aid Dataset* includes all World Bank projects implemented in Sub-Saharan Africa from 2008 to 2012.
  - *Subnational African Education and Infrastructure Access Data* compiles data on education, water access, and other infrastructure data at the first administrative district level in Africa.

## The Evolving Relationship between Technology and National Security in China: Innovation, Defense Transformation, and China's Place in the Global Technology Order\*

Principal Investigator: **Tai Ming Cheung**, University of California–San Diego, [tcheung@ucsd.edu](mailto:tcheung@ucsd.edu)  
<http://igcc.ucsd.edu/sitc/>

**Aim:** Examine China's drive to become a world-class technological power, especially in the defense and dual-use sectors, and assess the implications for the United States and the rest of the world.

**Countries examined:** Although the major focus is on China, comparative research and analysis has included other countries such as Japan, Taiwan, India, Israel, Brazil, the European Union, and Russia.

A central research problem is to understand the key sources of innovation and barriers that are shaping China's technological development trajectory. The project looks at a diverse number of areas from the roles and relationship between the state and market, China's place in the global technology order, governance regimes and incentive mechanisms, the different elements of the innovation ecosystem, and the inter-relationship of the civilian and defense economies.

### Approach:

The project is organized into six research topics: 1) annual assessments of the reform and modernization of critical sectors in China's defense and dual-use science, technology, and industrial (STI) base; 2) comparing China's approach to technology development, defense industrialization and forging of a dual-use base with peer competitors and latecomers; 3) analysis of the political economy of China's defense science and technology (S&T) and technological rise; 4) China's technological development and implications for U.S. and international technology trade policies; 5) the nature of the structures, processes and leadership of the Chinese civilian and defense S&T systems, and 6) historical influences on contemporary Chinese grand strategic thinking on S&T.

### Scientific Progress and Key Final Findings:

This project has resulted in a large number of insightful findings. Some of the most significant include:

1. ***A nuanced typology of innovation*** that distinguishes eight different types of innovation beginning from simple duplication and ending with high-end breakthrough innovation. This framework offers a far greater degree of specificity and sophistication than was previously available to understand what is meant by innovation. According to this typology, much of what China, nationally and within the defense domain, is doing can be defined as advanced imitation, crossover innovation, and incremental innovation, although it is gradually making progress higher up the innovation ladder to architectural forms of innovation.
2. ***A detailed understanding of how China is able to take advantage of foreign technology transfers to develop its domestic technology capabilities.*** The project identifies and explains the Introduce, Digest, Absorb, and Re-innovate (IDAR) strategy. It then maps out a sprawling industrial economy of policies, organizations, and processes that China has built up to assimilate these foreign technological advancements and turn them into Chinese products and processes in a relatively short time. Understanding this IDAR strategy provides important new insights into how China is able to

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*Period of performance:* May'09–November 2015

catch up technologically much more quickly than has been previously thought by analysts.

3. *Identification of previously unknown and overlooked leadership organs* guiding major defense strategic S&T projects.
4. *Uncovering the profound impact of the 1999 U.S. bombing of the Chinese embassy* in Belgrade on China's strategic and defense science and technology programs.
5. *Probing the nature of the Chinese cyber-security ecosystem*, especially identifying key actors and its structure and process.
6. *Explaining the structure and process of high-level decision-making* on Chinese science and technology.

### Research Activities:

Some of the most fruitful research activities over the course of the project include:

1. In-depth analysis of China's human talent base development in science and technology, considering impacts on defense, education, science, engineering and cyber sectors.
2. Identification of key organizations and explanation of their role in guiding the development of major strategic S&T projects.
3. Mapping China's strategy and ecosystem for advanced technological and industrial imitation.
4. Development of a rigorous inter-disciplinary framework for defining and understanding innovation, especially defense innovation.
5. Population of a relational database on Chinese S&T actors and programs. To date we have collected more than 1,600 S&T organizations, 12,000 Chinese corporations, 4,240 people, 400 S&T projects, 290 S&T conferences, 210 publications, and 610 universities.
6. Development of an analytical framework to compare innovation capabilities in high-tech industries in China and the United States through a survey administered to industry, academic, and government experts, and tested in the integrated circuit design and electric vehicle sectors.
7. Development of a sophisticated framework for understanding China's defense research, development, and acquisition system and examining this through a series of case studies in defense industries including aviation, space, information technology, shipbuilding and nuclear sectors.
8. Assessment of the historical influences on contemporary Chinese grand strategic thinking to understand the relationship of S&T development to national security from the sixteenth century to the present day.
9. Examination of leadership perspectives on charting long-term policy directions for China's science, technology, and innovation development at the national and defense levels.
10. Assessment of the impact of corruption and other structural problems on the performance of the Chinese defense science, technology, and innovation system.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense:

The impact of this project for DoD capabilities and U.S. national defense interests is two-fold: 1) it has provided rigorous analysis and new data on China's military technological rise, one of the most important long-term challenges to U.S. national security; and 2) the project has cultivated a new generation of scholars and policy analysts knowledgeable on Chinese security and technology issues. In an era of economic constraints and national security challenges, having greater understanding of China's technological development will help policymakers make more effective use of limited resources.

### Future Work:

The project is due to be completed in November 2015. The focus in these final months is to complete the editing of a number of conference papers for publication.

New Minerva funding has been secured for a 3-year follow-up project focusing on “*Understanding China's Efforts to Become a Global Defense Science, Technology, and Innovation Leader*” (details on page 133). This funding provides support to conduct work on the following topics:

1. China’s Defense Research, Development, and Acquisition (RDA) System
2. Annual Review of China’s Defense Industrial Base
3. Applying Lessons Learned from China to Understand How Other Countries Become Military Technological and Industrial Powers

**Sharable data resources:**

Relational Database Analysis System (<https://igcc.ucsd.edu/research-and-programs/research/international-security/technology-innovation-security/innovation-technology-china/sitc-database.html>) to support graph-theoretic social network analysis to characterize the positions of individuals, organizations, projects, and technologies within networks, as well as provide general characterizations of the nature of these networks. This is the only database of its kind focused exclusively on Chinese science and technology programs, personnel, and organizations.

Learn more at “Relational Database Analysis System for Chinese S&T” on page 182.

**Selected recent Academic Publications through this Minerva Research:**

- Jon R. Lindsay, Tai Ming Cheung, and Derek Reveron, eds. *China and Cybersecurity: Espionage, Strategy, and Politics in the Digital Domain* (Oxford, 2015).
- Eric Anderson, Chen Ling, Barry Naughton, Wang Gangbo, and Xue Lan, “Measuring the Innovation Gap between China and the United States: An Expert Survey on the IC Design Industry”, *submitted to Technovation*, 2015.

## Explorations in Cyber International Relations<sup>\*</sup>

Principal Investigator: **Nazli Choucri**, Massachusetts Institute of Technology, [nchoucri@mit.edu](mailto:nchoucri@mit.edu)

Co-PI: **Venkatesh Narayanamurti**, Harvard Kennedy School

Websites: <http://ecir.mit.edu> and

[http://belfercenter.ksg.harvard.edu/project/67/explorations\\_in\\_cyber\\_international\\_relations.html](http://belfercenter.ksg.harvard.edu/project/67/explorations_in_cyber_international_relations.html)

**Aim:** In response to new 21<sup>st</sup> C realities shaped by the salience of cyberspace, construct a cyber-inclusive view of international relations (Cyber-IR System) – with theory, data, analyses, simulations – to anticipate and respond to cyber threats, impacts on power politics, and challenges to national security and international stability.

There is limited understanding of how cyberspace influences international relations and how power and politics in international relations influence the structure, process, and management of cyberspace. Dominant assumptions of the 20<sup>th</sup> century politics and policy are severely undermined by the 21<sup>st</sup> century and the cyber age with its dynamic and changing configurations. The knowledge gap is profound: There are excellent maps and visual materials for international relations and for different features of cyberspace. Missing, however, is an *integrated model* of the cyber and the “real” so critical for understanding contemporary strategic realities.

The research challenge to capture the *mutual and reciprocal interconnections of cyberspace and the international relations* and *create a body of knowledge* that:

- (a) clarifies threats and opportunities for national security, welfare and influence,
- (b) provides analytical tools for managing cyber based transformation, and
- (c) attracts and educates a new generation of researchers, scholars, and analysts.

The specific goal is to construct a set of models, develop new tools, and provide theory-driven and empirically based support for policy.

### Approach

The ECIR approach is *multidisciplinary* and *multidimensional* -- including not limited to Political Science, Economics, Business and Management, Engineering, Computer Science, Artificial Intelligence, and Law and Government. The *basic assumptions* are: (1) interdependence of technology and policy, (2) conjunction of uncertainty and regularity in human interactions, and (3) persistence of transformation and change in international relations.

The research design is *modular* (organized in core themes and cross-cutting issues), supported by a *multi-method* strategy that enables the “individual” components to connect to an overarching “whole”. This strategy is anchored in *empirical* analysis, buttressed by *modeling*, *simulations*, and the construction of *new tools* as needed, in conjunction with special attention to policy analysis and implications.

### Scientific Progress and Select Key Findings

The scientific results below are organized by core themes of ECIR research design.

**1. Integrated Framework:** We constructed the Cyber-IR System, an empirically ground *overarching model* of cyberspace and international relations (a) based on the intersection of the layers of the Internet and the levels of analysis in international relations (b) validated by application of SDM method, and (c)

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*Period of performance:* Mar'09–**June 2015 (project complete)**

subject so simulation tests. This Cyber-IR system is the *anchor* for ECIR that is, the reference for, and linkage among research activities. The system allows us situate actors, actions, and expected impacts.

In its static (system-state) form it provides a mapping of the joint Cyber-IR System. Dynamic analyses are undertaken on specific segments, addressing specific problem areas. Central to this and the above is the concept – and empirical investigations – of the “co-evolution dilemma”, the strategic, technological and related challenges and pressures on national and international politics due to the salience of cyberspace and its effects on the “real” systems.

**2. Control Point Analysis:** This method identifies how different states and other entities control *their own Internet experience*. Included are detailed results of US, China, and Google cases that show who, how, and where the state (or the firm) enables (private or public) controls on or management of its own Internet system, and with what effects. The traditional definition of politics in terms of *who gets what, when, and how* becomes simply a function of *who does what, when, and how*. It would seem that the technological tussle over control is ongoing, with no lasting victory for any side. One actor designs an application, other actors hunt for points of control, others design mitigations to the controls and so on. Related research point impacts of social media and messaging on strategic relations.

**3. Cyber Governance:** Based on institutional analysis, legal documents, memoranda of understanding and the Review System of the Internet community, we identified (a) the operationally *distributed and decentralized governance* mechanisms (b) that are based on authority granted largely by the Internet community, with (c) legitimacy predicated on actual performance. Anchored in three core functions (situated within ICANN and framed as the IANA functions). We found the ways in which the entire global system, managed by *private entities* to date, is already subject to global contention. We created a census of key actors and entities for the cyber governance domain.

**4. Conflict Dynamics, Cybersecurity, and Strategic Behavior.**

- (a) Our comparative analysis of *17 case studies* of cyber conflict shows that the most dominant type of cyber-attack involve Distributed Denial of Service (DDoS). Others include email-based malware, and identity theft or defacement; and the sophistication of for-profit malware tools has been steadily increasing. Hackers have used email, known or unknown vulnerabilities in operating systems, deception, and outsourcing of traffic attacks, among other attack tools.
- (b) We have developed a new *taxonomy generation methods* and applied it to *cybersecurity* to generate an empirically based knowledge-profile drawn from large scale data bases (ie full records of published journals) applied to the issue of cybersecurity.
- (c) With respect to *strategic behavior*, by extending Lateral Pressure Theory to the cyber domain, we compared quantitatively the profiles of states and their behavior propensities with those in “real” domains. Differences are significant: *many states exhibit different profiles in cyber and real domain, with different propensities for expansion*. By definition profile changes are due to the differences in the underlying master variables; these differences also indicate different demands and capabilities in the cyber and in the “real” domains. The differences in the details are important for this demonstrate shifts in power base. (Note that Saudi Arabia that ranked 16<sup>th</sup> in real LP Index ranking drops to 45<sup>th</sup> in cyber LP index ranking indicating that in some aspects it has a weaker influence in cyberspace than in the real domain.)
- (d) *System dynamics modelling* of corporate responses to cyber-attacks show the effects patching and the impacts of delayed corrective measures.

**5. Institutional Developments:** Our focus on three new processes, showed the following results

- (a) Analysis of the CERT system, a new state-based institutional response to cyber threats showed the degree of incompleteness is the design of the system, the barriers to cumulative data on cyber threats, and importance of closing some critical gaps;
- (b) Tracing the evolution of strategic postures worldwide from Agenda 21, to WSIS, to NetMundial revealed both convergence and divergence in global cyber policy development. It also showed the emergent fault lines in world politics.
- (c) Our extensions of *resilient mechanism design* (i.e. alternative game theory) applied to conditions for improved international collaboration showed the possibilities associated with an overarching legitimizing authority – to some extent this is consistent with the results in item 3 above.

Other research focused on critical *drivers of change* for the Joint Cyber-IR System, and designing alternative *futures* based on empirical analysis and theory development, highlighting policy implications.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense

ECIR created new tools to (a) capture emergent dynamics of Cyber-IR cyberspace (b) anticipate, track, and clarify cybersecurity and cyber threats, (c) understand and manage worldwide cyber transformation. This enables uses of (d) enable “hands on” new analyses; (e) strengthen analysis of 21<sup>st</sup> Century realities, and (f) support U.S. Grand Strategy.

### Planned Future Work:

1. **Cybersecurity** definition , dynamics, structure, actors, capabilities, intents,
2. **Dark Markets** – specialized markets with controlled
3. **Comparative Analysis of Cyber Law**

### Sharable data resources

- **Cyber System for Strategy and Decision (CSSD)**. Second generation of MIT’s Global System for Sustainable Development, an ontology based system representing the Cyber-IR domain, and curated for an evolving knowledge base consisting or tagged searchable abstracts with links to original knowledge source.
- **Cybersecurity Wiki**. Harvard’s Berkman Center for Internet & Society (with Science, Technology, and Public Policy Program) <http://h2odev.law.harvard.edu/playlists/633>
- **ECIR Data Dashboard** designed to provide scholars, policymakers, IT professionals, and other stakeholders with a comprehensive set of data on national-level cyber security, information technology, and demographic data. (See <http://coin.mit.edu:8080/Dashboard>).
- **Computational Taxonomy Generation System** to extract taxonomies or ontologies from large scale data base systems of journals. Tested and applied to “cybersecurity” and “cyberspace”.

### Research Output: (see full Publication list at <http://www.ecir.mit>)

- 27 published articles and book chapters; 10 additional scheduled for publication or in press
- 11 policy publications and online editorials
- 7 theses and dissertations
- 4 books:
  - Choucri, Nazli 2012. *Cyberpolitics in International Relations*. Cambridge, MA: MIT Press.
  - Choucri, Nazli, David D. Clark, and Stuart Madnick et al., Editors. *Studies in Explorations in Cyber Politics for the Cyber Age*, in ms form.
  - Choucri, Nazli and David D. Clark. *The Co-Evolution Dilemma: International Relations in the Cyber Age*, completed, in manuscript form
  - Ellis, Ryan. *The Politics of Critical Infrastructure Protection*, book ms submitted for review, Summer 2015.

## ***Centroamérica Indígena: Land Rights and Stability in Indigenous Societies of Central America\****

Principal Investigator: **Jerome E. Dobson**, [dobson@ku.edu](mailto:dobson@ku.edu)

Kansas Biological Survey and Professor Emeritus of Geography, University of Kansas

**Peter H. Herlihy**, University of Kansas

<http://www.prmapping.res.ku.edu/>

**Research problems:** Determine what land and territorial use factors cause indigenous communities to be stable, unstable, or resilient enough to remain stable even under duress.

**Countries examined:** Fieldwork in Costa Rica, Guatemala, Honduras, Panamá; additional efforts in Belize, El Salvador, and Nicaragua.

Some 57,000 unaccompanied alien children (UACs) came to the U.S. in 2014 seeking refuge from violence, poverty, and deprivations in Central America (CA), mostly from the so-called northern triangle of Honduras, Guatemala, and El Salvador. Such migrations are extreme indicators of instability, which we were already in place to study. We emphasize indigenous communities and focus on their land ownership and territorial sovereignty. All suffer similar stresses (of discrimination, lumbering, land-grabbing, extreme poverty, and narco-trafficking), so how is it that some are thriving, protecting lands and natural resources, and maintaining their identities, while others are not?

We hypothesize that secure land ownership is a keystone factor among the many affecting the stability of communities. Certain related factors (state-sponsored environmental conservation, tourism, local autonomy, and certain types of land use and land cover) may promote stability and resilience. Conversely, lack of secure ownership and other factors (active colonization, certain commercial activities, and certain land ownership regimes) may promote instability. We work together with governments, indigenous federations, international NGOs; and our research has direct applications to current crises faced by each.

### **Approach**

Our study area covers all seven CA countries and methodologically works at two geographic scales. At the 1) regional (coarse) scale, we cover all 1,500 *municipios* of CA, first identifying the approximately 900 indigenous municipalities by language and other cultural variables. We employ publicly-available geographic and statistical information using geographic information systems (GIS) to build a geographic database of “stability variables” on all municipalities. At the 2) local (fine) scale, we investigate and map specific territorial jurisdictions of indigenous populations. Combining techniques of human geography and cartography, we employ participatory research mapping (PRM) methodology to engage indigenous populations directly in mapping their own resources and recording local knowledge about their new or old indigenous territorial jurisdictions. We are presently doing or beginning on-the-ground PRM in three study sites: a) the new *concejos territoriales* and biosphere reserves of La Mosquitia in Honduras, b) in the *tierras comunales* in Sacatepéquez, Guatemala, and c) in the *territorios indígenas* of Alto Chirripó in Costa Rica.

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*Anticipated period of performance:* Aug' 13–July' 18 (with option)

**Scientific Progress and Key Findings:**

- We established formal agreements and service contracts with governments, NGOs, and indigenous federations to conduct collaborative research and collectively address relevant policy issues.
- We established an office (*Mesa Geográfica Indígena*) at UNPFM in Tegucigalpa where we have four university students (three indigenous), working with a KU postdoc, graduate students, and faculty.
- We are producing innovative “transparent digital maps” and publishing them on our CA Indígena website that already are being used by indigenous, government, and NGO authorities. This pioneering use of ArcGIS and ArcGIS Online helps answer the project’s main research questions, while facilitating interaction with and understanding of indigenous populations. We incorporate remotely-sensed imagery to create a product that is updated frequently and automatically. Transparent digital maps of the Honduran Mosquitia are shared on our CA Indígena website [[link](#)].
- This year we studied and mapped the Katinasta *Concejo Territorial*, a new indigenous territorial jurisdictions, which combines over 40 villages into a single tenure unit. The category itself is so new and untried that it’s attracting great attention. Thus, we are working in close collaboration with the World Bank PATH II project, with the United Nations Development Project, with indigenous federations MASTA and FITH, the university UPNFM, NGO Mopawi, and Katinasta leadership. Mapping communal land ownership is quite different from privately owned land. Communal ownership is actually a collection of land use rights, hence we mobilized local communities and use our PRM methodology to map their own land uses and locations for hunting, fishing, gathering wild eggs, cutting timber, etc. (The results were announced in a press conference organized by UPNFM.)
- This year we will conduct similar efforts in Guatemala and Costa Rica. Indigenous communities in both countries defied pressure from activists in the United States (who portray our prestigious Minerva funding as “dangerous”) and voted to accept our assistance. So far, three out of three times the activists have opposed us, the indigenous people have defied them and welcomed us into their communities.
- We produced a 12 minute video that explains what we are doing on our Minerva grant and vividly depicts communities mobilized and organized to map their own lands and resources (for video link, see <http://www.pmapping.res.ku.edu/index.html>).
- We have made significant progress building and analyzing a region-wide GIS database composed of newly-developed shapefiles and quantitative information on Central America developing digital maps and analyzing data to answer questions at the regional and local scales.

**Other Research Activities:**

We concluded an in-depth study of the *concejo territorial*, a new territorial jurisdiction and form of legally-recognized indigenous land tenure in the Mosquitia region of eastern Honduras. Our team of researchers, together with community-elected Miskitu representatives, Honduran indigenous university students, government agencies, and NGOs; mapped KATAINASTA, the first titled *concejo territorial*. Through innovative participatory research mapping (PRM), Miskitu community representatives were trained and empowered as “local geographers” to collect land use and resource surveys, place names; and to conduct a household census. The results were transferred onto conventional cartographic sheets, standardized, reviewed and validated in Miskitu community assemblies, and eventually converted into “transparent digital maps,” with a most sophisticated and detailed mapping of this territory’s communities and subsistence areas ([link to map](#)). The trained local geographers then received a university-recognized diploma from the Universidad Pedagógica Nacional Francisco Morazán, our host university in Honduras. Our pilot study was so successful that MASTA, the umbrella Miskitu political federation, has asked us to conduct PRM in all 12 of their *concejos territoriales* in Honduras that cover a remarkable 15 percent of Honduras!

Through this pilot project, we have gained insight into the *concejo territorial*, a new and unfolding indigenous territorial jurisdiction in Central America. The *concejo territorial* has awarded unprecedented extents of territory and local autonomy to the Miskitu indigenous group in Honduras. Its boundaries are permeable and allow for traditional overlapping resource use patterns among Miskitu communities while providing a political structure for local governance and resource management. Our maps display in incredible detail the toponyms and resource use of the Miskitu, but they are designed to be understood and useful by both the indigenous communities and the state as a negotiating tool for effecting Miskitu land claims and creating local resource management structures.

### **Anticipated Outcomes of Research**

We will develop digital cartographic and statistical assessments of land tenures and land uses and the related administrative, judicial, and legal powers using our new GIS database. We will assess land stability and determine both the pressures derived from governance, resource use, and other salient factors. We aim to (a) produce reliable, multi-scale (coarse to fine) digital geographic data, maps, and analyses using 20 or more variables related to stability; (b) develop a “land stability index” at the municipality level; and (c) document, digitally map, and rate the diverse territorial jurisdictions found in different parts of indigenous Central America.

### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

This research will provide new baseline information to support USG decision-making. DoD will gain new understandings to improve conduct of activities mutually approved by USG and CA governments. DoD will benefit from the openly-reported research and geographic information and a greatly improved cadre of regional experts. Our purpose is to improve U.S. understanding of CA lands and peoples and, thereby, to reduce misunderstanding, provide a knowledge foundation for resolution of conflicts, and improve humanitarian assistance in case of natural disasters, technological accidents, terrorist acts, and wars.

### **Future Work**

We will develop digital cartographic and statistical assessments of land tenures and land uses and the related administrative, judicial, and legal powers. We will gauge land stability and determine the pressures derived from governance, resource use, and other salient factors. We aim to (a) produce reliable, multi-scale (coarse to fine) digital geographic data, maps, and analyses using up to 20 different variables; (b) develop a “land stability index” of indigenous municipalities in Central America; and (c) document, digitally map, and rate the diverse territorial jurisdictions of indigenous municipalities.

### **Sharable resources:**

See “Resources for Indigenous Land Rights Project” on page 186.

## Identifying and countering early risk factors for violent extremism among Somali refugee communities resettled in North America\*

Principal Investigator: **B. Heidi Ellis**, Harvard Medical School & Boston Children's Hospital,  
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Co-PI: **John Horgan**, Georgia State University

**Aim:** Collect and analyze information on the ways in which openness to violent extremism takes hold in a diaspora community within North America.

As refugees continue to resettle in communities around the world, understanding what factors promote or prevent violent extremism among refugees will be critical to policy and programs targeting national security. Somalis have been one of the largest refugee groups to arrive in the U.S. every year over the past decade<sup>4</sup>. Since 2001, 49 Somali-Americans have been charged with leaving to join terrorist organizations abroad<sup>5</sup>. Most recently, involvement of young Somalis in ISIS has emerged as a national security concern. While recruitment of Somali youth into a terrorist organization is new and particularly threatening to U.S. security, it fits a larger pattern of 'home-grown' terrorism present in Europe<sup>6</sup>. 'Home-grown' terrorism refers to citizens or residents Western countries becoming radicalized, or adopting increasingly extreme views regarding Islam and religious justifications for violence, culminating in the willingness to support, use or facilitate fear or violence in order to effect societal change<sup>7</sup>. The empirical identification of early risk markers for individuals becoming more open to violent extremism is urgently needed. Prospective longitudinal data on attitudes towards violent extremism within key diaspora communities, however, is virtually absent from the field, in part due to the significant challenges of assessing sensitive information within communities that may be distrustful and difficult to research

### Approach:

The objective of our research is to collect and analyze information on the ways in which openness to violent extremism takes hold in a diaspora community within North America. In particular, we seek a greater understanding of how structural disadvantage and social bonds predict openness to violent extremism among Somali refugee youth ages 18–30 over the course of one year. We expect that trauma/perceived injustice and weak social bonds will predict later openness to violent extremism, and that weakened social bonds will mediate the effect of structural disadvantage/adversity on openness to violent extremism. We will further explore the role of mental health, gender and geographical location in openness to violent extremism, and through qualitative data seek to understand participant's perspectives on adversity, social bonds, community social control and attitudes towards violent extremism.

We will pursue the above objectives through a longitudinal mixed-methods interview design that builds on our long-standing research collaboration with the Somali community. First we will conduct a series of quantitative interviews to explore the study hypotheses. Each participant will complete two standardized interviews separated by one year. Following these interviews a sub-set of participants will be asked to participate in an in-depth qualitative interview designed to explore mechanisms of the relationships

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*Anticipated period of performance:* Jan'13–Dec'16

<sup>4</sup> Reference ORR 2010. (Contact team members for full references.)

<sup>5</sup> See <http://securitydata.newamerica.net/extremists/analysis.html>.

<sup>6</sup> Reference Sageman 2008

<sup>7</sup> Reference Precht, 2007

identified in the larger quantitative data. Data collection will take place in four Somali communities in North America that are diverse in size and characteristics: New England (Massachusetts), Minnesota, Maine, and Ontario, Canada (n = 440, 110/per community). Since our original proposal, we have leveraged additional funding through a grant from the National Institute of Justice that has allowed us to increase the scope of our project from three communities to four (adding Lewiston/Portland, ME), and from a sample size of 330 to 440. This increased sample size and additional community will further facilitate our overall goals and objectives through increasing statistical power and providing us with additional information about differences in geographically distinct communities. In addition, we have received approval for supplemental funding from the Department of Defense that will allow us to add a third time point of both quantitative and qualitative data collection.

### **Scientific Progress and Key Findings:**

The major accomplishment this past year was the completion of Time 2 data collection in each of the four communities (n=401 which represents 72% retention from Time 1). We have also started qualitative data analysis over the past year. We have been transcribing Time 2 qualitative interviews (n=40), and have developed a codebook that will guide our analysis of these interviews.

### **Other Research Activities:**

During Time 2 data collection, we continued to work closely with our community leadership teams in each location. Community leaders in Minnesota, Ontario, Massachusetts/Maine had been established as central partners in the study in the first year of the grant, and they have continued conducting community education and outreach regarding the purpose and procedures of the study and helping with recruitment strategy for Time 2. Both the investigative team and our community leaders have been meeting on a regular basis to review our findings and progress.

### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Our research goals are consistent with national security efforts to pursue comprehensive engagement by building meaningful alliances with our greatest assets (communities) in preventing the recruitment of community members into terrorism and the commission of terrorist acts in American soil. .

We anticipate providing empirical evidence of specific *modifiable* indicators related to changes in openness to violent extremism. Empirical validation of a model that can be used to explain the mechanisms that lead youth to be more or less vulnerable to potential recruitment into terrorist organizations would provide concrete, data-driven and evidence-led direction for prevention and intervention.

The 2011 National Security Strategy places significant emphasis on the importance of recognizing the diversity of race, region, faith and culture in our country and how strategic alliances need to place *communities* at the forefront of a smart and effective counter-terrorism toolbox. Our research goals are consistent with national security efforts to pursue comprehensive engagement by building meaningful alliances with our greatest assets in preventing the development of terrorism.

The Somali community resettled in North America is a critical resource available to law-enforcement personnel in stopping the flow of resettled Somali youth to al-Shabaab. Somali communities resettled in North America perceive high levels of discrimination and disrespect from both the mainstream society and, to some extent, law enforcement officers. These experiences may be undermining efforts to build partnerships with communities and to engage communities as partners in countering violence. Somali communities resettled in North America demonstrate a remarkable willingness to engage in dialogue

about the issues they face and to share their concerns and opinions. We suggest that partnerships built on respect and equality can yield high levels of engagement and that, in turn, prevention and intervention efforts will be greatly enhanced by the “ideas, values, energy, creativity, and resilience” of the Somali communities in North America.

**Future Work:**

Further work examining extending this two time-point study to include additional timepoints will allow us to examine change over time in support for violent extremism, and factors associated with increasing or decreasing support for violent extremism. We are current launching a third wave of data collection through supplemental support from DoD and the Minerva Initiative. We will further examine the role played by the use of internet in the vulnerability to being recruited into terrorist organization.

## **Detering Complex Threats: The Effects of Asymmetry, Interdependence, and Multipolarity on International Strategy\***

Principal Investigator: **Erik Gartzke**, UC San Diego

Co-PI: **Jon Lindsay**, University of Toronto;

**Michael Nacht**, UC Berkeley;

**Celeste Matarazzo**, Lawrence Livermore National Laboratory;

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**Aim:** Determine how the increasing variety of means available for political influence—and the complexity of their interaction—affect deterrence in theory and practice.

Tremendous uncertainty in the current and future threat environment, together with the practical challenges of integrating diverse instruments of power across domains, makes the complexity of strategy itself a major policy challenge. Of particular interest is how the emergence of new technologies in new domains, such as cyber and space—capabilities with strong dual use characteristics—influences competition and what that new dynamics of conflict implies for stability in older domains, particularly the nuclear domain. Our research focuses on how new military technologies and new combinations of existing means alter the mechanisms of deterrence, and more generally, how asymmetric capabilities, political, economic, and military linkages, and a wide-spectrum of actors, influence coercive strategies.

The development of nuclear weapons suddenly focused attention on deterrence theory as the primary conceptualization of high-stakes competition between the superpowers in the Cold War. Emphasis was necessarily on the credibility of ends in the means-ends chain of strategy. But the same imperatives that brought deterrence theory to prominence also proscribed its evolution. Deterrence theory stagnated as the focus remained on “peak” crises (brinkmanship) and formulaic patterns of partners and preferences. We relax some of these assumptions by also looking at a variety of consequences and different combinations of actors, where the properties of different means can become much more salient to ongoing bargaining relationships. Nuclear deterrence did not end political competition in the Cold War; it simply shifted competition into other arenas and encouraged actors to find technologies and practices to design around existing deterrence regimes to pursue their interests. Many of the low intensity and asymmetric challenges to US interests today in contested maritime and cyber commons, or on the land borders of military alliances, can, ironically, be interpreted as evidence of successful deterrence of traditional challenges.

Our goal is to develop a general theory of deterrence and of cross-domain deterrence (CDD) in particular, which is the use of threats or activity in one arena to prevent attacks in some unlike arena. When do actors choose their best response to a challenge in the same domain or shift to some other set of means? Though often thought of as twins, the goals of minimizing the risk of conflict and of achieving the best outcome possible, should conflict occur, may not be compatible. Different means may prove more useful for one objective or the other. Means are not necessarily politically fungible, but rather they may have different bargaining characteristics that shape the likelihood, evolution and outcome of political crises. How does increasing the portfolio of moves available to actors affect this calculus? As one begins to examine these dynamics, it becomes clear that actors have pursued CDD strategies throughout history. However, the complexity of options and interactions today is unprecedented, making an explicit theory

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*Anticipated period of performance:* Oct’13–Nov’18 (with option)

necessary.

**Approach:**

We begin our theory of CDD with a rationalist bargaining framework. This allows us to integrate with existing deterrence theory, but also leverage new insights from the bargaining perspective on war. Unit level deviations (culture, psychology, domestic politics) may be critical in practice, but this is a topic for follow-on research, once a logic exists that can make sense of CDD generally. Means matter only for calculating the distribution of power and the offense-defense balance in traditional deterrence theory. Players trade off “guns vs. butter.” In practice, however, policy makers must consider “guns vs. guns” as well, in establishing force structures, force postures, and in working through options for threatening or using force. The novel means they develop through this process can be complements to or substitutes for existing capabilities, which increases the combinatorial richness of the portfolio of options. Importantly, barriers to entry (resources, expertise, organization) vary across means—not all moves are available to all players. The key assumption of our approach is that different means and combinations affect different aspects of strategic bargaining. Estimates of power, costs, demands, disagreement outcomes, credibility, uncertainty, change, etc. Some means are better for changing the distribution of power while others are better for conveying information, reducing uncertainty and thus facilitating bargaining and limiting war.

We recognize a distinction between political strategy and military operations, or ends and means, and ask how the latter constrains and enables the former. We also distinguish between the different notions of complexity of interaction and the uncertainty this creates for policymakers and commanders, respectively. There is a recursive and complexity generating feedback between these two activities as states work through political tradeoffs between minimizing risk (warning) and maximizing gain (warning) while militaries focus on enabling battlefield victory. **Figure 6** depicts this conceptual approach.

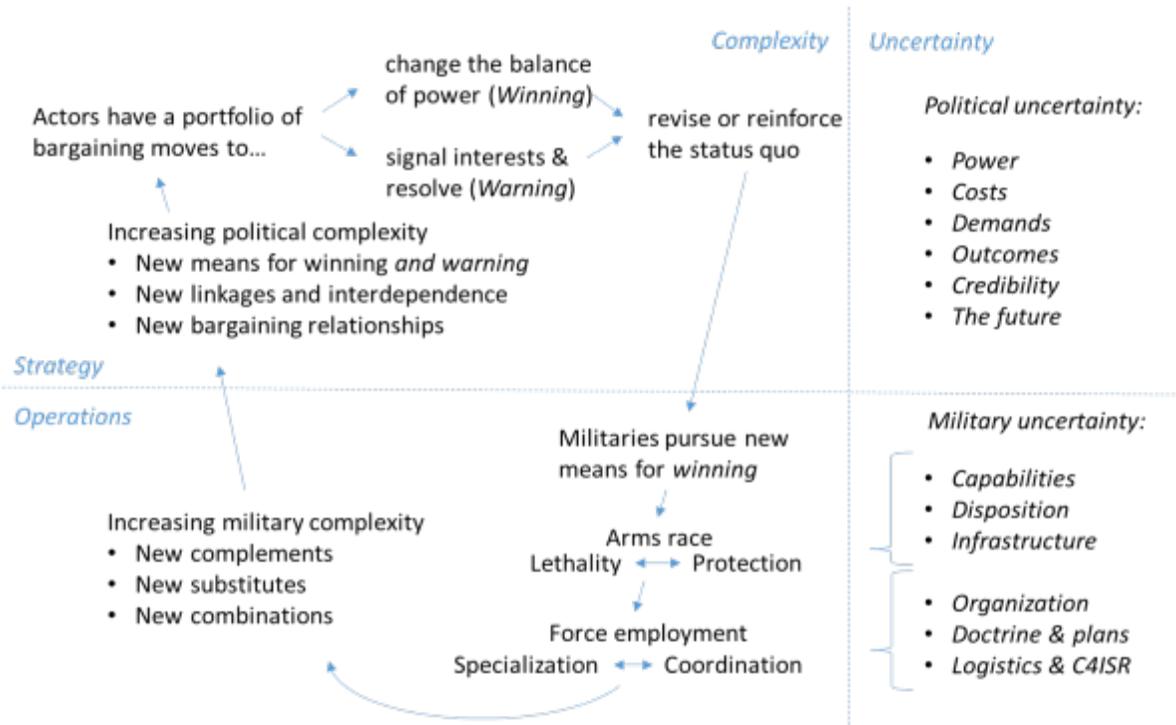


Figure 6. Conceptual divisions between strategy/operations and complexity/uncertainty.

## Minerva Research Summaries: Ongoing Projects

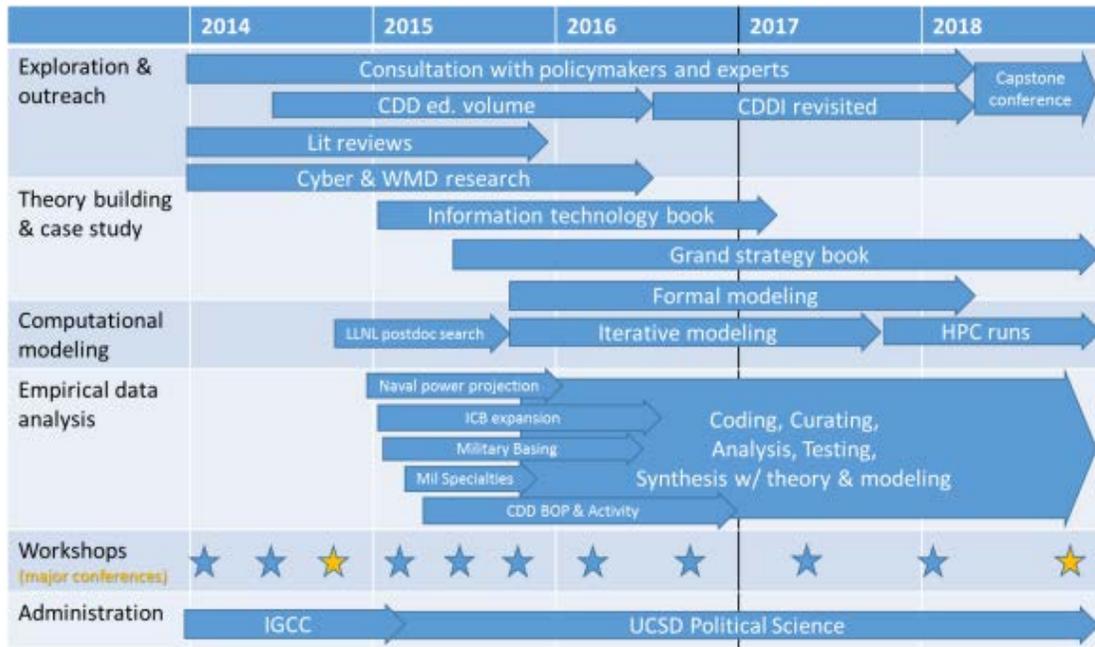


Figure 7. *Complex Deterrence* project components and timeline

### Scientific Progress and Key Findings:

In Year 1 (see **Figure 7**) we consulted with academic and policy experts to take stock of deterrence theory and come up with the basic concepts of CDD. This culminated in a major conference at UCSD with leading and emerging security scholars and experienced senior and practicing junior members of the defense policy community. The results will appear in an edited volume which problematizes CDD.

Our second year continued theory construction efforts, with particular focus on the cyber domain and weapons of mass destruction, since both of these have a unique and important role in constraining and enabling all other types of threats and uses of force. CDD is not new but has occurred throughout history, albeit with increasing complexity in the contemporary era. This realization has made it possible to launch a series of empirical data projects to test hypotheses about CDD. Significantly this includes a new partnership with the University of Maryland International Crisis Behavior project to code up domain-specific variables to examine escalation dynamics in the twentieth century.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense:

In asking these questions, we can assess how to make the US a skillful beneficiary of cross-domain deterrence theory and practice. One goal is to learn how to reinforce deterrence across domains, and to make sure that the US is not a victim of the skill of others.

### Sharable data resources to be generated:

The project is just beginning the process of collecting data. We are very excited about a set of initiatives that combine augmenting the International Crisis Behavior (ICB) dataset with other initiatives using events data and a planned effort using experiments to capture unobservable components of the bargaining process. Our partnership with Lawrence Livermore National Laboratories (LLNL) is designed to use dynamic and computational modeling to capture the complex strategic interaction resident in CDD.

### Notable recent publications through this Minerva research

- Gartzke, Erik, and Jon R. Lindsay. "Weaving Tangled Webs: Offense, Defense, and Deception in Cyberspace," *Security Studies* 24, no. 2 (2015), 316–348.
- Lindsay, Jon R. "The Impact of China on Cybersecurity: Fiction and Friction." *International Security* 39, No. 3 (Winter 2014): 7–47.

## The Strength of Social Norms Across Cultures: Implications for Intercultural Conflict and Cooperation \*

Principal Investigator: **Michele J. Gelfand**, University of Maryland, [mgelfand@umd.edu](mailto:mgelfand@umd.edu)

**Shinobu Kitayama**, University of Michigan;

**Klaus Boehnke**, Jacobs University Bremen (Germany)

**Aim:** Understand cultural differences in the neurobiology of social norm violation detection and the influence of societal threat on brain synchrony and behavioral coordination.

**Cultures examined:** China, the US

### Research Problem (Thrust I):

Humans are unique among all species in their ability to develop, maintain, and enforce social norms. It is likely, then, that humans have evolved cognitive and affective neuro-mechanisms to be able to detect norm violations very quickly, which affords punishment of violators and enforcement of the social order. Despite this fundamental aspect of human nature, however, there has been surprisingly little research on how norm violation processes are supported at the neurobiological level. While there has been neurobiological research on how humans react to violations of task-related expectations in non-social domains, research on neurobiological processes related to social norm violations is only in its infancy and, moreover, there has been a dearth of research on cross-cultural variation in the neurobiology of social norms. Thus, at present, we know little about how vast cultural differences underlying reactions to norm violations are realized at the level of brain mechanisms. This lack of any cultural neuroscience research on social norms represents a large limitation on our current understanding of group identities, cultural norms, and belief systems. Using EEG technology, our research seeks to address this deficit by investigating such questions as: How can we develop new measures of detection of social norm violations at the neurobiological level? Which cultures, individuals, and situations show stronger neurobiological reactions to norm-violating events? How are neurobiological processes underlying social norms violations related to behavioral processes, including implicit and explicit attitudes, self-control, cooperation, and creativity, among other behaviors? Do neurobiological indices of social norm violation mediate cultural differences in social behaviors? How can research on the neurobiological basis of social norms help to improve intercultural interactions?

### Research Approach:

Our project is employing EEG, surveys, and behavioral measurements across cultures in order to understand the neuropsychological foundations of social norm violations and their behavioral correlates. We developed a new EEG paradigm to investigate reactions to social norm violations wherein participants in the U.S. and China were asked to judge whether certain behavior are appropriate or on across numerous situations (e.g. Michael is in the library. He is studying; versus Michael is in the library. He is shouting). There were 34 behaviors, each of which was embedded in three different kinds of situations: appropriate, weakly inappropriate, and strongly inappropriate. Participants were asked to judge the level of appropriateness of behaviors in situations and their electro-cortical responses were recorded during throughout the task. In addition, we asked participants to engage in a series of behavior tasks and to respond to survey measurements (e.g. semantic congruency task, creativity task, and measures of tightness-looseness, ethnocentrism, self-control, among others) to test the relationship between the neurobiological basis of norm violation detection and other attitudes and behaviors. Our

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*Anticipated period of performance:* Nov'13–Oct'16

results show that:

- Compared with the non-violation condition, strong and weak violations induced a greater N400 (300-400 ms) in the *central* and *parietal* regions for Chinese and US subjects.
- Chinese subjects show a clear *frontal* N400 involved in differentiating between strong/weak and non-violation whereas US subjects did not evidence N400 in frontal areas, illustrating cultural specificity in the reactions to social norms violations. Chinese also showed much earlier detection of social norm violations in both the central and parietal and frontal areas.
- Frontal N400 and late component positively correlated with a series of behavior and attitudinal measurements, including tightness-looseness, cultural superiority, bias against deviates, and negatively correlated with creativity. Further mediation analysis showed frontal N400 mediated the effects of tightness-looseness in daily life on other behavior measurements.
- No cultural differences in N400 effect were observed in a semantic task, illustrating the unique cultural influence on social norm violation detection.

In all, these findings provided the first evidence for the neurobiological foundations of social norm violation detection and its variation across cultures. These findings have been written up and invited for a revision. Future research will employ fMRI (functional magnetic resonance imaging) techniques to examine brain processing across cultures when detecting and punishing norm violators as well as to examine how the brain changes as individuals acculturate to new contexts.

#### **Anticipated Outcomes of Research and Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

This is of the first studies to illustrate evidence of cultural differences in neural activity of detecting social norm violations and their behavioral correlates. It broadens cross-cultural psychology to include neuroscience methods, and broadens neuroscience to include culture. More generally, it contributes to the growing field of cultural neuroscience, and advances scientific contributions regarding the mutual constitution of culture, social norms, and the brain. Social norms, though omnipresent in our everyday lives, are highly implicit. Recent social neuroscience research has provided compelling evidence that neural indicators of attitudes can predict meaningful social behaviors above and beyond self-report measures. Thus, this research has the potential to facilitate the development of theoretical models and measures with improved predictive power of cultural norms. It also has the potential to make important scientific breakthroughs regarding the mutual constitution of culture, mind, and brain.

#### **Research Question (Thrust II):**

In this research thrust we are examining neurobiological responses to societal threat. Societies that face ecological and historical threats require greater social coordination for survival. Our computational research illustrates that agents under threat settle on coordination norms much faster as compared to agents that have low threat (Roos, Gelfand, Nau, & Lun, 2015). Using hyperscanning EEG technology, the current research seeks to address the following questions: Does societal threat afford faster behavioral coordination in humans? Does societal threat affect brain synchrony? Does brain synchrony mediate the impact of threat on behavioral synchrony? Neural evidence from intrapersonal EEG research has demonstrated that gamma band activity is involved in the processing emotional information and detection of threatening stimuli (e.g., snakes), reflecting the involvement of the quick subcortical route to the amygdala in threat processing (Luo et al., 2008). Thus, we examined if threat affects interpersonal coordination by modulating activity in the gamma band.

#### **Research Approach:**

To investigate how ecological threat modulates brain synchrony and behavioral coordination, we first

randomly assigned Chinese participants in Beijing with one of the three articles: 1) an ingroup threat article describing that their own country (e.g., China) was facing serious external threats from one of its neighbors (e.g., Japan); 2) an outgroup threat article describing a country on the African continent (e.g. Ethiopia) that was facing external threats from its neighbors (e.g. Eritrea); and 3) in-group control article (no threat) reporting China was predicted to become a market receptive to electric vehicles. After priming was conducted, each pair of participants was asked to play an interactive coordination game during which their electroencephalography (EEG) signals were recorded simultaneously. Our results show:

- At the behavior level, more synchronous behavior was observed after in-group threat priming as compared to the other two priming conditions.
- Relative to the other priming conditions, in-group threat priming induced more interbrain synchrony at 2000-3000 ms in the gamma band, suggesting increased coupling between brains may facilitate more effective interpersonal coordination in response to territorial threat.
- Correlation analyses showed a significant negative relationship between gamma band interbrain synchrony and the interpersonal time lag after the in-group threat priming condition, but not in the other two priming conditions.
- To further test the relationship between behavior, gamma synchrony, and threat, we conducted mediation analysis with PROCESS. The results showed that the gamma interbrain synchrony mediated the effect of threat priming on interpersonal behavior.

In all, our results suggest societal threat increases interpersonal coordination by modulating interbrain neural activity underlying emotion processing.

#### **Anticipated Outcomes of Research and Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

This is the first study to show that societal threat affects interbrain activity and behavioral coordination by using a new paradigm of hyperscanning techniques. It provides insight into the links between external threat and multi-brain activity and human social behavior which can help policy makers to understand how to increase human coordination in diverse military contexts.

#### **Notable recent publications:**

- Roos, P., Gelfand, M., Nau, D., & Lun, J. (2015). Societal threat and cultural variation in the strength of social norms: An evolutionary basis. *Organizational Behavior and Human Decision Processes*, 129, 14-23.
- Gelfand, M. J., & J. Jackson. (in press). Culture and social norms. *Current Opinion in Psychology*.
- Mu, Y., Han, S., Kitayama, S., & Gelfand, M. J. (2015). How culture gets embrained: Cultural differences in event-related potentials of social norm violations and their behavioral consequences. Manuscript under revision.

## Homeownership and Societal Stability: Assessing Causal Effects in Central Eurasia\*

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Jane Zavisca, University of Arizona

**Aim:** Determine whether, how, and why homeownership and other aspects of housing affect societal stability in semi-authoritarian contexts.

**Countries examined:** Azerbaijan, Kyrgyzstan, Russia, and Ukraine (all include fieldwork)

The US government promotes homeownership at home and abroad based on the proposition that homeownership promotes societal stability by improving living conditions, inducing respect for private property, and creating better citizens. However, there is little theoretical basis and scant evidence for these purported effects. To rectify this gap in scientific understanding of the effects of housing on stability, we have developed core hypotheses specifying how different aspects of ownership might affect the proximate causes of instability: political grievances, social grievances, civic norms, and ideology. Our hypotheses disentangle the discrete components of “ownership” that are often bundled together, and they include other aspects of housing status (quantity and quality of housing) that could affect the outcomes of interest independently of ownership. We also hypothesize how these relationships vary within and across countries depending on macro-level variables such as political regime, social climate, social structure, and culture.

### Approach:

We test our hypotheses empirically using original focus group and survey data from four semi-authoritarian countries: Azerbaijan, Kyrgyzstan, Russia, and Ukraine. These countries are uniquely suited for testing whether housing has causal effects on societal stability for the following reasons. First, they face elevated risk of experiencing various forms of instability. Second, they experienced a quasi-experimental distribution of homeownership as a result of Soviet-era housing distribution policies, post-Soviet housing privatization, and failed housing markets since the Soviet collapse. Third, property rights that in Western contexts are usually bundled together under “ownership” are often dispersed in these countries, producing a rare opportunity to test hypotheses about which specific aspects of ownership matter for which outcomes related to societal stability. Finally, variations in macro-conditions across these four study countries permit us to test hypotheses about macro-micro linkages.

We completed an initial wave of focus groups in each country in spring and summer 2014, and we completed the first round of surveys in January–May 2015. In addition to obtaining standard demographic and socio-economic information, the surveys include a wide array of questions measuring different aspects of each respondent’s housing situation, their (possible) political and social grievances, their levels of civic participation and social capital (both neighborhood-based and general), their views on issues such as the merits of democratic institutions, civic freedoms, and market vs. state-controlled economy, and their attitudes toward pressing political issues of the day such as the war in Ukraine, the foreign policy of the United States, and recent country-specific political controversies. Each country’s survey sample consists of 2400 respondents, including a nationally representative sample of 2000 respondents ages 18–49, plus the following oversamples of 400 to let us test specific hypotheses: internally displaced persons in Azerbaijan, residents of regions that have experienced ethnic violence in

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*Anticipated period of performance:* Aug’13–July’18 (with option)

the last five years in Kyrgyzstan, residents of regions with high concentrations of Muslims in Russia, and mortgagors in Ukraine. To carry out this major data collection, we have collaborated with teams of international researchers (one from each country) with experience carrying out survey and focus group research on related topics. We will next field another series of focus groups (in fall 2015) to explore in a qualitative manner anomalies and puzzles that emerge from our surveys, as well as views on the evolving political issues of the day in the four study countries. We will then repeat the process we have undertaken so far – focus groups followed by large sample surveys – in the period of fall 2016 through spring 2018.

### **Scientific Progress and Key Findings:**

We received the data from our surveys in June 2015 and thus far we have primarily been engaged in data cleaning, harmonization, and documentation. In light of the dearth of data on public opinion in these countries (particular those other than Russia) and the considerable interest in perceptions of the conflict between Russia and the United States, our first stage of analysis has focused on examining the effectiveness of the Russian government’s “soft power” efforts in the region. We are now turning to the task of exploring our hypotheses by analyzing the data using advanced statistical techniques. First, we will test whether each theoretically important component of housing status is exogenously distributed. Second, we will use structural equation modeling to develop precise measures of our theoretical constructs and distinguish direct from indirect effects of the different components of housing status. Third, to deal with potential endogeneity and identify causal effects, we will use techniques such as instrumental variable estimation, propensity score estimation with sensitivity analysis, and difference-in-differences estimates.

### **Findings from our focus groups** (six in Kyrgyzstan, four in all other countries):

- There was widespread hostility toward the United States’ foreign policy—seen as arrogant, self-interested, and meddling—but admiration for American institutions, economic and technological achievements, and high standard of living. Russians and Ukrainians were most interested in discussing the US; whereas Azeris and Kyrgyz viewed the US as remote.
- Housing is a source of grievances in all four countries, but the aspects of housing status that matter most vary across the region. In Russia and Ukraine, major concerns are housing autonomy for nuclear families and housing comfort and quality. In Azerbaijan and Kyrgyzstan, chief concerns were of the capacity of families to provide housing and land for each son, and access to basic utilities. Housing affordability is a major concern in all countries, and it drives labor migration, especially from Azerbaijan and Kyrgyzstan to Russia.
- Respondents in all countries viewed their governments as corrupt and failing to create the conditions under which families could meet their housing needs. Those in the more authoritarian countries (Russia and Azerbaijan) had greatest expectations of the state versus markets as being responsible for providing housing. Kyrgyz and Ukrainians were most open to markets and in particular mortgages as a possible path to housing mobility.
- Respondents in the more patriarchal societies (Azerbaijan and Kyrgyzstan) viewed housing as a major source of male discontent and familial and societal dysfunction. Women are expected to move into homes owned by their husbands or husbands’ families. Non-normative gender arrangements, especially when women own property, is widely frowned upon.
- Discussion of housing provoked social grievances, especially in Russia and Kyrgyzstan, where migrants and ethnic minorities were seen as competing for scarce housing and land.

### **Our initial analysis of the survey data** has yielded the following conclusions:

- Russian government propaganda efforts have been largely successful within Russia, particularly as concerns the purported malign intentions of the United States toward Russia and other

countries in the region. However, even within Russia public attitudes are heterogeneous: sizable minorities question standard Kremlin arguments regarding the illegitimacy of protests, the undesirability of foreign funding for NGOs, and acceptability of limits on freedom of assembly.

- Kyrgyz public opinion closely resembles that of Russia, most likely due to Kyrgyzstan's economic dependence on Russia and widespread reliance on Russian news sources. Moreover, the Kyrgyz view the Russian government as more effective than their own on a number of counts.
- The Azerbaijan public is more skeptical of Kremlin claims and arguments, most likely because of Azerbaijan's greater economic independence, lingering discontent over Russia's support for Armenia, and lower levels of Russian media consumption than in Kyrgyzstan.
- Ukrainian public opinion rather consistently rejects the Russian government narrative regarding the United States, the Ukraine conflict, the merits of protest, and the relative performance of the Russian government. These patterns hold across different regions and among both Ukrainian-speakers and Russian-speakers, which suggests that Russia's military in campaign has turned the population decisively against Russia.
- In all four countries, asymmetric ownership (where one spouse legally owns the home but the other does not) is widespread, which affects wellbeing and family stability.
- In Azerbaijan, there is a common perception that IDPs have received advantageous treatment by the government. At the same time, the public supports the government's policies regarding IDPs. Taken together, these findings could indicate that people are reluctant to criticize the government, or that they support government programs favoring IDPs. This is the type of puzzle we will explore qualitatively in the next round of focus groups. If the latter interpretation holds, it implies that government support for refugee populations can improve political stability in circumstances where the population is unified by a sense of national identity, which may be relevant in Ukraine and other countries.

#### **Other Research Activities:**

We have employed six different graduate student research assistants during different phases of the project. They have conducted reviews of recent literature on the theoretical and substantive topics of the study, participated in data processing and preliminary data analysis, reviewed focus group transcripts, and identified other relevant surveys for the purpose of comparative analysis. We have held two planning meetings with our foreign partners, during which we instructed them on the nature and purpose of the study, sought their input, and developed survey questionnaires for all four countries (including harmonized questions in all countries and subsets of countries and country-specific questions). We also worked closely with each foreign team to prepare a rigorous sampling strategy appropriate for the national context. We traveled to the countries to observe the focus groups and to oversee the final sampling procedures and interviewer trainings. We have presented our findings at several conferences, two SMA briefings, and in publications.

#### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

As a result of the study, leaders in the DoD and other branches of government will have improved capability of anticipating eruptions of societal instability and conflict in semi-authoritarian countries, particularly those in Eastern Europe, the Caucasus, and Central Asia. Military planners will understand the longer-term consequences of military actions that affect housing and gain insight into whether constructing housing and/or promoting ownership can help counter-insurgency campaigns. Policymakers will also have a better understanding of potential sources of stability and change within the populations of the four study countries, which have become important concerns of the United States in light of the recent increase in tensions with Russia, the war in Ukraine, a crackdown on civil society activists in Azerbaijan, and upcoming elections in Kyrgyzstan.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

As a result of the study, leaders in the DoD and other branches of government will potentially have improved capability of anticipating eruptions of societal instability and conflict in semi-authoritarian countries, particularly those in Eastern Europe, the Caucasus, and Central Asia. Military planners will understand the longer-term consequences of military actions that affect housing and gain insight into whether constructing housing and/or promoting ownership can help counter-insurgency campaigns.

**Sharable data resources:** (additional details on page 190)

- Focus groups on housing and politics in four Eurasian countries: Transcripts from approximately 50 focus groups. Eighteen have been completed, an additional 16–18 will be completed in fall 2015, and an additional 16–18 in spring 2016. The transcripts are in Russian or English.
- Comparative Housing Experiences and Social Stability (CHESS) Survey
- A harmonized survey data set containing the raw data from all four countries. We will archive the data from the study at the Inter-university Consortium for Political and Social Research at the University of Michigan, the “go-to” archive for social science data, one year after completion of the study. In addition, we will work with Minerva Initiative staff to make the raw data available via Minerva’s data dissemination tools.

## A Global Value Chain Analysis of Food Security and Food Staples for Major Energy-Exporting Nations in the Middle East and North Africa\*

Principal Investigator (as of 9/1/15): **Gary Gereffi**, [ggere@soc.duke.edu](mailto:ggere@soc.duke.edu)  
Center for Globalization, Governance and Competitiveness, Duke University  
**Lincoln Pratson**, Nicholas School of the Environment, Duke University (PI until 9/1/15)  
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**Aim:** Identify the energy-exporting countries in the Middle East and North Africa (MENA) whose grain—and particularly wheat—imports are at most risk to insecurity.

**Countries examined:** Saudi Arabia, Syria, Iran, U.A.E., Algeria, Morocco, Tunisia, Ukraine, and Kazakhstan; additional research including field work in Russia and Egypt.

Civil unrest in the Middle East and North Africa (MENA) has periodically affected oil and gas exports from the region, helping to drive global surges in fuel prices, and in turn food prices. If future food price spikes last too long, they could exacerbate the type of social unrest in MENA that leads to regional conflict and widespread malnutrition/starvation.

### Approach:

Wheat forms a major source of the caloric needs for the peoples in this region. We are identifying and quantifying the supply chains for wheat to determine their structure, size and scope, the players involved in them, and the drivers governing their operation, including market forces, environmental change, internal politics, and external geopolitics with other nations. The analysis includes the development of a database that is integrated with GIS so that spatial information on the supply chains can be mapped and analyzed geographically. The data and supply chain models will be used in scenario analyses to identify specific risks to the supply chains and suggest prioritized defensive and/or proactive strategies to deal with problems arising from wheat shortages in MENA. If successful, our approach should provide a framework for conducting similar security analyses involving trade in commodities elsewhere in the world.

### Scientific Progress and Key Findings:

At this point in the project, we have developed country-level value chain models of wheat for Syria, Egypt, Saudi Arabia, Russia and the Ukraine, and a value chain model of maize for Egypt (**Figure 8**). We have also carried out social network analyses of MENA's wheat trade network and of the impact of wheat embargoes by major wheat exporters to MENA. Furthermore, we have explored a variety of ways to quantify and model domestic and international risks to the wheat value chain for MENA with limited success. Given space constraints, we will limit our discussion of key findings to results obtained from fieldwork on the maize value chain in Egypt (this section) and the wheat value chains in Russia and the Ukraine (next section).

Due to increased consumption of beef and poultry in Egypt, maize use for animal feed has surged to 84%. In terms of food security, poultry now represents almost 40% of animal protein availability in Egypt. Unlike wheat, the Egyptian government is mostly absent from the downstream of the corn value chain, which is instead controlled by private companies. Trade, food processing and livestock businesses involving maize in Egypt are oligopolistic. For these maize dependent firms, recent high and volatile

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*Anticipated period of performance:* July'12–June'16

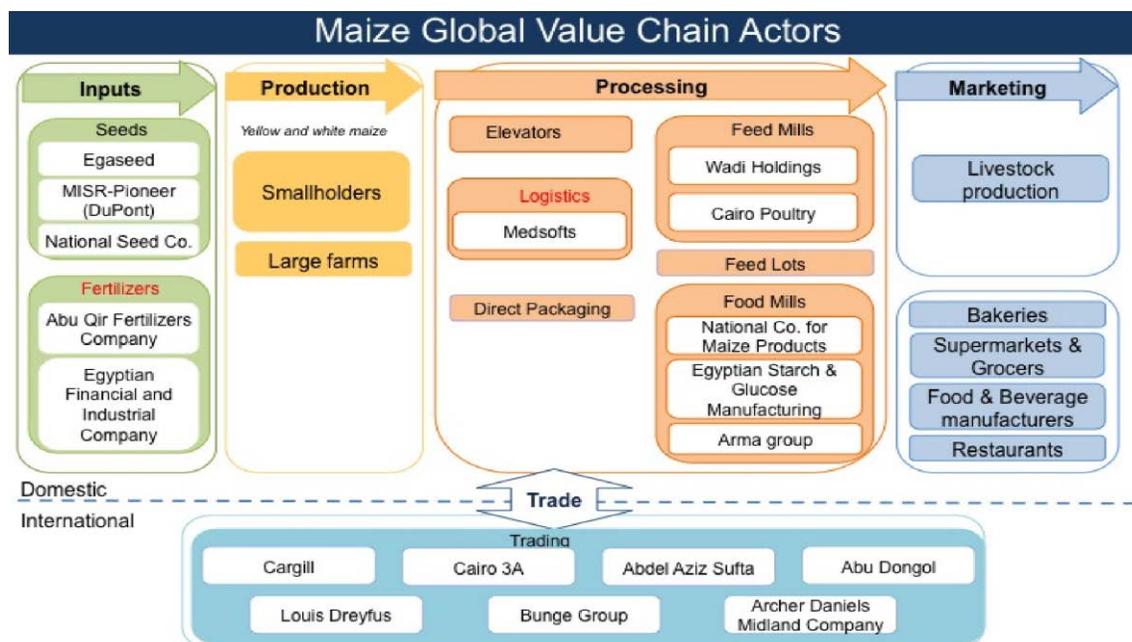


Figure 8. Egypt's maize value chain

international prices for maize are creating vulnerabilities for Egypt. These include a number of feed mills going out of business, inability of maize processors to pass higher maize costs on to buyers, and limited storage capacity for maize in Egypt to hedge against price volatility. Domestic maize-dependent firms are responding to these challenges in different ways. For example, both Cairo Poultry and Wadi Group have entered animal feed production as a result of vertical integration strategies aiming at reducing operational costs. Going further in the vertical integration process, Wadi Group is now investing heavily in transportation infrastructure and strengthening its links with maize suppliers. Through a joint venture, Wadi Group is currently building what will be the largest grain port facility in the MENA region and has announced plans to further invest in port infrastructure. Such steps are expected to reduce Egypt's infrastructure bottlenecks, and speed up the supply chain timeframe. Cairo Poultry on the other hand is trying to establish partnerships with Brazilian poultry-producing firms. The objective would be to produce poultry in Brazil, leveraging Brazil's competitive advantage in maize production, and to export them in Egypt for processing. Such a strategy will upgrade Cairo Poultry's position in the poultry value chain while protecting it at the same time from volatile maize prices.

#### Other Research Activities:

In the last decade, MENA countries have increased their reliance on Russian and Ukrainian wheat imports and are therefore vulnerable to price and supply fluctuations that occur in the Black Sea region. Both Russia and Ukraine have a long history of using trade policies to protect domestic wheat supply. In response to rising food prices in 2008, Ukraine banned wheat exports and Russia restricted exports by imposing a tariff to stem domestic inflation. In 2010, after a severe drought that devastated the region's wheat harvest, Russia banned all wheat exports for 6 months and Ukraine implemented a trade quota to protect domestic supply. More recently, as a result of the Crimea crisis and international sanctions that caused a surge in domestic food prices and the devaluation of the ruble, Russia has imposed a high tax on wheat exports essentially ending all shipments. These trade disruptions have significant implications for importing countries that are reliant on Black Sea wheat and often pushes these nations to purchase more expensive wheat from alternative partners. As shown in the value chain comparison in **Figure 9**, Russia and Ukraine have similar vulnerabilities in the processing link that each country is now attempting to rectify. In this aspect, Russia and Ukraine's strategies diverge. While Russia is inclined to make public investments in infrastructure to improve the efficiency of the wheat value chain, Ukraine has turned to the

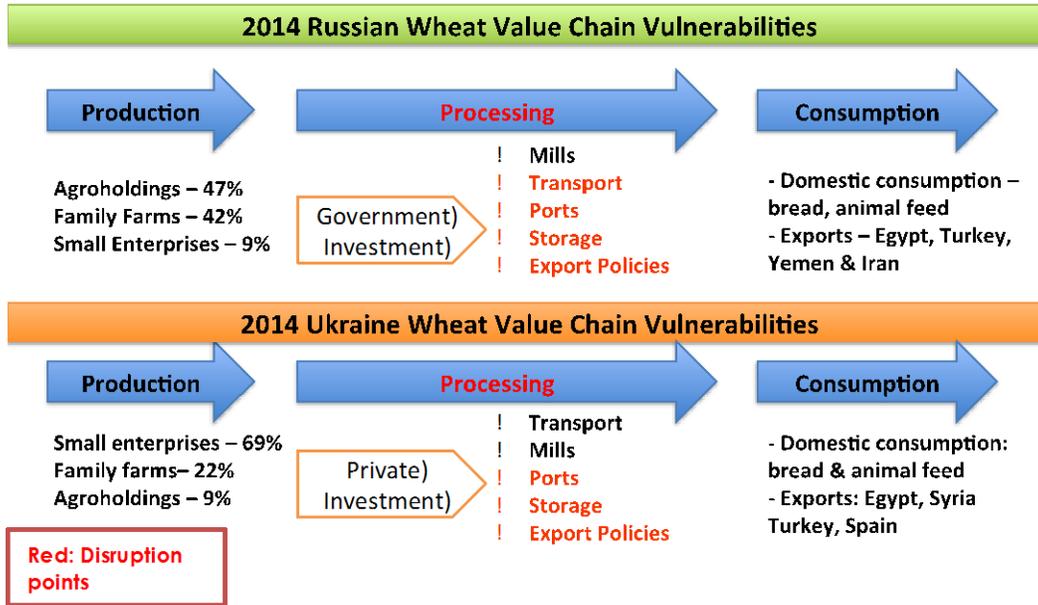


Figure 9. Russia and Ukraine wheat value chains

private sector to modernize its grain infrastructure. The results are thus far unknown. However it can be argued the efficiency and profit-driven nature of the private sector could prove to increase the proficiency of the wheat market in the region and improve the overall food security of importing countries.

**Anticipated Outcomes of Research:**

- A ranking for the food security of MENA countries in terms of socioeconomic factors and available information on the structure of the supply chains for major grain imports to the MENA region;
- Detailed models of the global value chains (GVCs) for wheat for six or more MENA countries whose wheat security is identified as being at significant risk;
- Identification of points of risk within the GVCs for the key grain imports to these countries and strategic options for managing these risks.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Through an in-depth understanding of the GVCs for food staples in major energy-exporting nations in the Middle East, we will develop models not only of risks to these supply chains, but where the threats exist within the supply chains, how the supply chains might be disrupted, and what the ramifications of those disruptions might be for other nations, from those dependent on the hobbled country’s energy exports to those that supply the country with food staples. Such information will aid DoD decision-making and policy efforts directed towards identifying and anticipating zones of unrest, instability and conflict, as well as allocating resources for defense efforts and humanitarian aid.

**Sharable data resources generated:**

See “Duke Minerva Data and Tools” on page 192.

## Forecasting Civil Conflict under Different Climate Change Scenarios\*

Principal Investigator: **Elisabeth Gilmore**, University of Maryland, [gilmore@umd.edu](mailto:gilmore@umd.edu)

**John Steinbruner**<sup>Ⓢ</sup>, University of Maryland;

**Halvard Buhaug**, Peace Research Institute, Oslo;

**Håvard Hegre**, Uppsala University and Peace Research Institute, Oslo;

**Katherine Calvin** and **Stephanie Waldhoff**, Joint Global Change Research Institute

**Aim:** Develop projections of armed intrastate conflict and other forms of social unrest under alternative climate change and socioeconomic scenario. This also requires developing forecasting tools and generating scenarios as well as enhancing the empirical evidence of the underlying relationships of climate and socioeconomic conditions on conflict.

**Regions examined:** Pakistan (includes fieldwork); global trends analysis

This project consists of two main efforts: 1) forecasting armed conflict along scenarios, and 2) developing empirical relationships of climate influences on different forms of conflict and vulnerability. First, we are integrating a forecasting approach and alternative scenarios for the future socioeconomic and climate conditions. Second, we are investigating how climate and socioeconomic conditions may influence conflict. Specifically, we are evaluating how food availability and access – one of the primary concerns under climate change – may influence different forms of armed intrastate conflict as well as other forms of social unrest. This is coupled with a case study of micro-level relationships of climate and conflict, specifically how changes in water flows affect the provisioning of social systems in Pakistan, a country that is highly vulnerable to conflict.

### Approach:

#### *Forecasting (simulation) approach*

We build upon the simulation approach from Hegre et al. (2013)<sup>8</sup>. First, we develop statistical models of the historical effect of key socioeconomic variables on the occurrence of armed intrastate conflict for each country. Based on these estimates, we then forecast the annual incidence of conflict over our alternative scenarios. This simulation procedure calculates the probability of transitioning to and from a state of conflict for a given year for all countries based on a realization of the statistical coefficients, draws a conflict outcome based on these probabilities, updates all conflict variables, and moves to the next year using the updated conflict history data. This is repeated for all years and for a large number of realizations of the estimated probability distributions of coefficients. By using this approach, we account for several dimensions of uncertainty as well as endogenous relationships, such as the updating of probabilities of conflict from having a neighbor in conflict.

#### *Scenario generation*

In our “proof of concept” effort, we forecasted the incidence of armed intrastate conflict along five alternative baseline future scenarios defined by the climate change research community as having greater or lesser challenges to mitigation and adaptation, known as the Shared Socioeconomic Pathways (SSPs). Additional scenarios, specifically climate mitigation policies, as well as additional variables that are relevant for conflict are now also been produced using an Integrated Assessment Model (IAM), the

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*Anticipated period of performance:* Sept’ 13–**July 2016**

<sup>Ⓢ</sup> Dr. John Steinbruner passed away in April 2015.

<sup>8</sup> Accessible at <http://havardhegre.net/items/prediction-isq/>.

Global Change Assessment Model (GCAM)<sup>9</sup>. Presently, we are extending the ability to project future food prices and access using GCAM, under different socioeconomic and climate policy scenarios. We are also developing climate mitigation policy scenarios to generate conflict relevant variables, namely oil exports and other financial transfers (e.g. carbon permits) that may be affected by the stringency and structure of climate policy.

***Developing empirical relationships of armed conflict and food access and availability***

First, we conducted a literature review and meta-analysis of the relationship between food prices as well as other measures related to food security and armed conflict. We are now in the process of identifying, modifying and testing food price datasets that will allow us to examine these relationships with different forms of armed conflict and social unrest. We have identified three existing food price datasets from the Food and Agricultural Organization (FAO) and International Labor Organization (ILO), which we have modified to correspond to existing conflict datasets. We will conduct formal hypothesis testing and empirical relationships of the potential associations between our variables.

***Case study of climate change and social systems in Pakistan***

We are also conducted a case study of how climate change may influence social systems in Pakistan. We have completed field research in various cities in Punjab and Sindh provinces in Pakistan. Forty eight semi-structured interviews were conducted with relevant actors, such as farmers in Punjab and Sindh, manufacturers and agricultural-products traders in Punjab, citizens and protestors in big cities (Lahore, Karachi, Islamabad, Faisalabad), and government officials in the ministries of Water and Power, Indus Water Commission of Pakistan, Water and Power Development Authority, Directorate of Climate Change, and Meteorological Department of Pakistan. We have also collected long-term data for weather as well as Indus river water flow for various stations throughout the country. We will now conduct process-tracing and analyzing the implications for social functions – agricultural irrigation, power generation, and urban water supply.

**Scientific Progress and Key Findings:**

We have finalized our initial ‘proof of concept’ by forecasting armed intrastate conflict along the five alternative socioeconomic scenarios outlined by the climate change research community known as the Shared Socioeconomic Pathways (SSPs). Projections for climate change as well as armed intrastate conflict depend on expectations of socioeconomic development, although conditions that promote peace may not necessarily facilitate mitigation and adaptation. Namely, while economic growth lowers the risk of armed conflict, this growth is generally associated with increased greenhouse gas (GHG) emissions and increased costs of mitigation policies. We found that the marginal pacifying effect of socioeconomic development is also much higher for the least developed countries, implying that poverty alleviation and investments in human capital in poor countries are likely to be much more effective instruments to attain global peace and stability than maximizing growth in wealthier economies. Further, we find that the sustainable development pathway that has lower challenges to mitigation and adaptation is as conducive to global peace as the higher economic growth associated with the fossil fuel based development pathway.

Our next set of efforts will investigate the joint effects of armed intrastate conflict and economic growth to evaluate the effect on development pathways and GHG emissions as well as how climate policy may directly affect armed conflict by changing the economic flows of both international transfers from climate mitigation policies (e.g. the purchase of carbon credits from developing countries) and the revenues from oil production. Both of these financial flows have the potential to lead to conflict through known

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<sup>9</sup> Accessible at <http://www.globalchange.umd.edu/models/gcam/>.

pathways of financial ‘rents’ affecting both the structure of the economy and political institutions. We will also continue to investigate the effects on the food prices on conflict and social unrest and develop additional future projections of food prices and access from GCAM as well as further our case study efforts.

#### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Quantitative efforts to evaluate the influence of climate change on civil conflict and other forms of violence through indirect pathways, such as economic growth and food prices, are relatively limited. Further, there are even more limited forecasts of how these risks may evolve over the century as a function of both climate and socioeconomic conditions. This effort addresses that gap by improving the understanding of these dynamics as well as projecting the occurrence of conflict over the next few decades. These projections will aid with developing interventions and adaptations to mitigate emerging risks from climate change, specifically as it relates to food prices as well as focus development and climate mitigation policies to reduce conflict.

#### **Publications through this Minerva research**

- Buhaug, H., et al. 2014. One Effect to Rule Them All? A Comment on Climate and Conflict. *Climatic Change*, in press.
- Hegre, H., Buhaug, H., Calvin, K. V., Gilmore, E. A., Nordkvelle, J., Nygard, H. M., Waldhoff, S.T. (2014). “Forecasting armed conflict along the Shared Socio-Economic Pathways,” Working paper, Presented at the International Studies Association, Toronto, Canada, March 25, 2014
- Gilmore, E. A., Buhaug, H., Calvin, K., Hegre, H., Steinbruner, J., Waldhoff, S. 2013. “Forecasting civil conflict under different climate change scenarios.” In: *Impacts World 2013 Conference Proceedings*. Potsdam: Potsdam Institute for Climate Impact Research, pp: 408. [\[link\]](#).

## **Dynamics of Sacred Values and Social Responsibilities in Governance and Conflict Management: The Interplay between Leaders, Devoted Actor Networks, General Populations, and Time\***

**Lawrence Hirschfeld**, New School for Social Research

**Scott Atran** and **Richard Davis**, ARTIS Research;

**Doug Medin**, Northwestern University; **Jeremy Ginges**, New School for Social Research

**John Alderdice**, University of Oxford

**Adolf Tobena** and **Oscar Vilarroya**, Universitat Autònoma de Barcelona

Project Point of Contact: Richard Davis, [rdavis@artisresearch.com](mailto:rdavis@artisresearch.com)

[www.valuesminerva.org](http://www.valuesminerva.org)

**Aim:** Understand the dynamic relationship between ethics-based and instrumental reasoning in general and, in particular, how political and advocacy groups manage values and responsibilities over time.

**Countries examined via field work:** Jordan, Israel, Palestinian Territories, Spain and Northern Ireland

**Self-funded but related fieldwork:** Iraq (ISIS/Peshmerga), France (post-Charlie Hebdo), Lebanon (Syrian Refugees+) and Jordan (ISIS/Syrian Refugees)

Most successful political and advocacy (e.g., environmental) groups must manage strong commitment to core values with the pressing responsibilities of governance or and implementation of advocacy issues. Perceived compromise over core values can undermine popular legitimacy, but practical compromise may be necessary to ensure the economic and social welfare of the people. How, then, do such groups maintain values yet meet responsibilities over time? Ever since Max Weber first posed this question as the fundamental moral and practical challenge for anyone having “a vocation for politics,” there has been relatively little systematic study or cumulative insight into a realistic answer. New studies by our multidisciplinary and multinational research team, as well as work by others, have focused on protected or “sacred” values that drive ambitions, policies and actions independently of calculated costs, risks or expected outcomes. Still, there has been little serious study of the dynamic relationship between deontological and instrumental reasoning in general and, in particular, of how political and advocacy groups manage values and responsibilities over time.

From the vantage of national and international security, few problems may be more pressing than understanding this dynamic as it relates, for example, to the future course of Israel/Palestine and the rise to power of ISIL in Syria and Iraq. As groups like ISIL, Hamas, Hizballah and others control territory they must engage with the local populations, which force them to consider how they will enforce and/or balance their values with the responsibilities of providing core functions of governance, like education, food, health and security. The theoretical and practical implications of the dynamic relationship between values and responsibilities potentially apply to a wide range of political and advocacy movements across the world, including in our own country.

### **Approach**

Our methodology involves a series of interrelated data elicitation and analysis techniques, including:

- Open and structured interviews with leaders of political and advocacy groups and committed followers and advocates, in different cultural settings and conflict zones, in order to generate and test specific hypotheses;

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*Anticipated period of performance:* Dec’13–Dec’18 (with option)

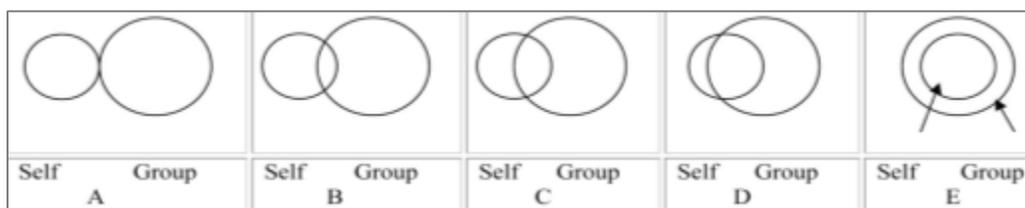


Figure 10. Pictorial Measure of Identity Fusion

- Lab experiments in the USA to experimentally refine the hypotheses for testing;
- Experimentally designed surveys to test hypotheses among different cultural populations;
- Neuroimaging experiments to: (a) characterize the neural processes underlying group conformity in decision making, and their plasticity under leadership, (b) identify the neural markers that distinguish sacred-value conformity versus compliance to social norms., and (c) characterize the neural processes underlying the attachment to concrete markers of sacred values and their plasticity under conditions of threat.

*Study Stages and Responsibilities.* This work progressively builds in overlapping stages: A) Participant observation and, semi-structured in-depth interviews, B) Structured interviews and psychological experiments, C) General surveys, D) Neuroimaging, E) Analyses.

### Scientific Progress and Key Findings:

#### 1. Willingness to Fight and Die (Commit Costly Sacrifices)

Two factors, identity fusion (**Figure 10**) and sacred values, interact to determine who is likely to become a devoted actor based on expressions of willingness to make costly sacrifices, including fighting and dying. In **Figure 11** summarizing results from a Moroccan community surveyed with links to militant Jihad, only those subjects who were fused with a family-like group *and* considered Sharia a sacred value were more willing than not to make costly sacrifices, being above the midpoint of a 7-point response scale from strongly unwilling to strongly willing. (*PNAS*, December 2014)

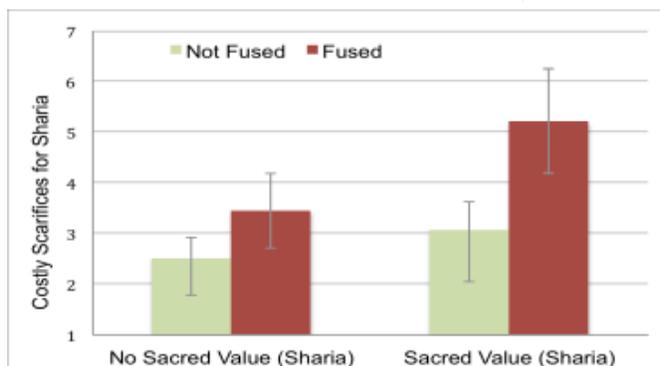


Figure 11. Results of survey of Moroccan community with links to militant Jihad. Error bars show 95% confidence levels.

Replication of the dynamics of Sacred Values and Fusion on willingness to commit costly sacrifices has occurred in France, Iraq, Jordan, Lebanon and Spain, amongst those who support ISIS, the Pakistani Lashkar-e-Tayyiba and other 'devoted' groups. We pursued this research in an effort to solve the problem expressed by DNI, James Clapper, and President Obama when they described 'willingness to fight' as an imponderable after 350 ISIS fighters defeated over 18,000 Iraqi Soldiers in Mosul in 2014. The implication of the research suggests that those individuals that fuse with an armed group and hold specific Sacred Values will fight harder and will be willing to commit greater sacrifice than those that do not. This should inform strategy, tactics and force recruitment and structure of those who fight against such groups. Further work on this dynamic is being pursued at this time.

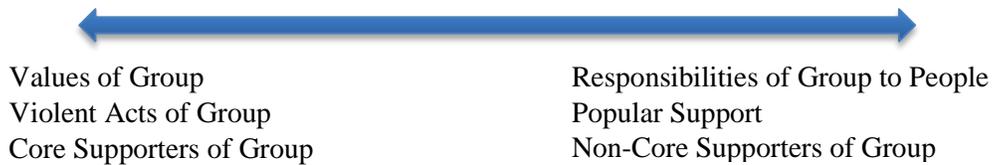
#### 2. fMRI Studies of Militant Populations

In the past few months, the research team has been refining behavioral measures for Pakistani subjects that expressed commitment to militant groups through various measures. Our pilot study with this

population will be finalized after the time of writing this summary but prior to the Minerva meeting. In these studies we are looking to identify the neural markers that distinguish sacred-value conformity versus compliance to social norms, amongst other things.

3. *Dynamics Between Insurgent Groups and Host Populations*

In an effort to better understand the relational dynamics between power-seeking insurgent groups, their host populations and the use of violence by armed groups, we examined Hamas’s use of violence over 20+ years and Palestinian popular support measures over the same period. We found that Palestinian Support for Violence predicts Hamas ground attacks against Israel. The statistical methodology used Clive Granger’s Nobel Prize winning times-series causal analysis. The finding counters the notion that Hamas serves as a vanguard of the Palestinian people, meaning that the group follows popular sentiment for violence against Israel. The finding extends to other conflict environments. The model shown in **Figure 12** was developed to explain the tension between the values of a power-seeking insurgent group and the responsibilities that it has to the host population.



**Figure 12. Max Weber Violence Spectrum**

On the Weber Violence Spectrum power-seeking insurgent groups move back and forth across this spectrum to strike the ‘right’ chord between the larger population and ardent supporters who do not want the group to compromise its values. Groups with territorial ambition must either engage with their host population or suppress it in order to project its influence internally and externally. Those that seek to engage with their host populations for the purpose of maintaining popular support must consider how to meet the demands of that population.

To the contrary, insurgent groups that suppress the host population interests or attempt to reshape its will through force are occupying powers that seek to marginalize popular support and interests to pursue values that are not widely shared. Such occupying insurgent groups might be able to suppress the will of the people for extended periods of time, particularly when those groups are able to ascend to the leadership of the state or forge a state in a region where existing states are failing, like Syria and Iraq. Stateless insurgent groups that attempt to suppress or reshape the will of the host population through violence must be particularly ruthless against the less violent host population in order to maintain their position. ISIS, for example, follows a strategy outlined in the *Management of Savagery* (Bakr 108) that details how they are to interact with the host-population and when they are to be ‘soft’ with their host population. (Routledge, in-press, expected early 2016)

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Our research is designed to address significant questions of both science and policy. The nexus of these two issues can be found in the current challenges faced by the United States Government and the Department of Defense. Scientific research in conflict zones with combatants and supporting populations provides the DoD with information that can be used to shape policy and operations that lessen harm to the warfighter and improve influence operations, amongst other things.

**Sharable data resources:** All data and publications will be available at <http://www.valuesminerva.org>.

## Moral Schemas, Cultural Conflict, and Socio-Political Action\*

Principal Investigator: **Steven Hitlin**, University of Iowa, [steven-hitlin@uiowa.edu](mailto:steven-hitlin@uiowa.edu)  
**Rengin Firat**, Georgia State University  
<http://moralityandconflict.com/>

**Aim:** Identify the social and mental mechanisms through which group-identity-based moral values motivate political action and cultural conflict.

**Countries examined:** the U.S., Turkey, France and South Korea

Literature suggests that moral values underlie cultural contention; perceived moral violations are fundamental motivators for socio-political behavior, especially violent extremism (e.g., Atran 2003; Atran, Axelrod and Davis 2007; Berns and Atran 2012). However, current scholarship still lacks an adequate understanding of the roles of culture and social identities in shaping value orientations, collective beliefs, and social movements. These established models leave little room to explain observed variation in how values diffuse and change (see Hitlin and Piliavin 2004). As such, policy makers lack a full array of tools for understanding social unrest and devising effective strategies to promote social stability and decrease violence. Our project addresses this gap by investigating the interplay of social and mental mechanisms for the relationship of moral values, group affiliation and political mobilization within a cross-cultural perspective comparing the U.S., Turkey, France and South Korea.

### Approach:

We employ a cross-cultural empirical approach combining social scientific survey methodology with neuroscientific brain imaging techniques to reveal the role of values in social mobilization. We will utilize a two-phase methodology that collects large-scale survey data from the U.S., Turkey, France and South Korea to identify important value dimensions for each culture (Phase 1), and then obtain neurological and behavioral data from the U.S. and Turkey while people respond (partnered with people who share or violate those values) to cultural conflict scenarios threatening these important values in a functional Magnetic Resonance Scanner (Phase 2).

Phase 1 surveys include measures of general value orientations (Schwartz 1992; Inglehart and Baker 2000), sacred values (Berns et al. 2012, Tetlock et al. 2000), locus of control (Mirowsky and Ross 1998), a novel moral groupness battery, a political/civic engagement battery derived from the General Social Survey, World Values Survey and the European Social Survey, and basic demographics. Phase 1 offers the potential for a broader understanding of the factors we are currently exploring by comparing nations that not only carry distinct religious traditions (Catholic, Protestant, Confucian/Buddhist, and Muslim) but also lie on the opposite axes of important value dimensions (like traditionalism or self-expression values). Rather than inductively labeling responses as 'values', we draw on well-established measurement to identify the ways respondents draw cultural moral boundaries. Phase 2 capitalizes on advanced fMRI brain imaging technique to (a) explicate the mental processes underlying moral identity commitments that contribute to socio-political action ranging from passive support to active mobilization, and (b) to elucidate how culture contextualizes these processes comparing the U.S. with Turkey. Phase 1 (survey) and Phase 2 (fMRI study) parts of our project complement each other by first identifying important value dimensions for each culture from a larger sample pool and then creating cultural conflict situations targeting these values. This methodology allows us to bring a nuanced understanding of the ways in which moral schemas relate to social action, and more accurately frame fMRI results within a proper

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*Anticipated period of performance:* Aug'13–**August 2016**

social scientific understanding of how values anchored in group identities trigger socio-political action.

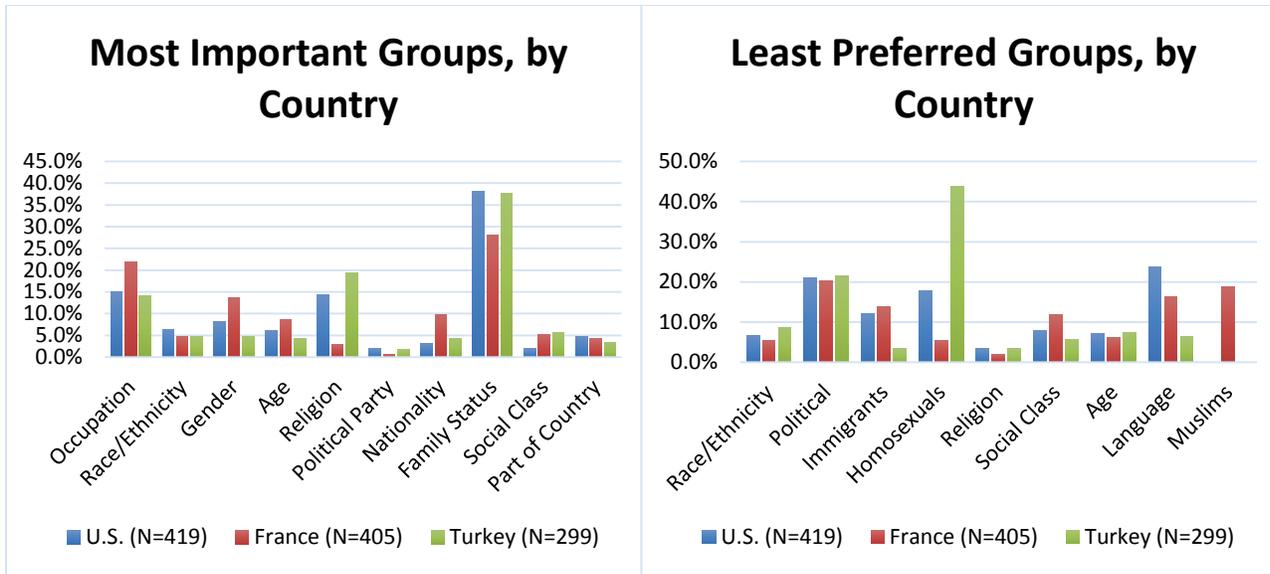
### **Scientific Progress and Key Findings:**

We have finished Phase 1 data collection from our local Iowa sample and nationally representative samples of the U.S., and France. National scale data collection in Turkey is also almost complete (current N=313, targeted N = 450). The U.S. sample size is 450 (average age 46 years, 50% men, 79% White, 42% with at least a college degree). The France sample size is 472 (average age 46 years, 51% men, 85% White, 51% with some college). Finally, the Turkey sample size is 313 (average age 36 years, 67% men, 83% Turkish, 75% with some college). We are weeks away from obtaining the remaining two samples, the local Turkish and national Korean samples.

Our novel measurement allows us to explore the groups respondents use to identify themselves, as well as those groups they define themselves against. Preliminary sample demographics find that a majority of our respondents from the US (38.1%), France (29.2%), and Turkey (38.1%) rated their family status (e.g., being a husband or wife, mother or father) as their most important group. For second and third highest, US respondents selected occupation (15.1%) and religion (14.4%), French respondents selected occupation (20.7%) and gender (14.1%), and Turkish respondents selected religion (20.0%) and occupation (14.3%). We also investigated the least preferred group (the most salient out-group) with a question asking the respondents to choose the group they would least prefer as neighbors. Accordingly, we found that the least preferred social group differed across our three samples. US respondents selected people who speak a different language (23.8%) as the least preferred social group, followed by people of a different political orientation (21.2%) and homosexuals (17.9%). French respondents selected people of a different political orientation (20.6%) as the least preferred social group, followed by Muslims (18.4%) and people who speak a different language (16.0%). A significant majority of Turkish respondents selected homosexuals (43.8%) as the least preferred social group, followed by people of a different political orientation (21.2%) and people of a different race/ethnicity (9.2%).

Using the Schwartz value typology (Schwartz 1992), we calculated average scores for ten general value orientations of the respondents (21-item Portrait Value Questionnaire, Schwartz et al. 2001) as well as their evaluations of whether or not these values were important for their in-groups and out-groups. Our analyses show that there are negligible differences regarding respondents' self-values across the three samples. The three most important values for all three samples were benevolence and universalism (value dimensions caring for others and prioritizing their welfare), and self-direction (emphasizing creativity and independent thought). Additionally, for all three samples, the least important value was power.

Similarly, the majority of respondents in all three samples rated self-direction as the most important value for their most important in-group. Despite this similarity, there were notable differences regarding the degree to which respondents had a consensus on the most important values for their in-groups. For example, 70% of French respondents selected self-direction as one of the most important values for their in-groups, while only 42% of US respondents and 46% of Turkish respondents selected self-direction. Other values selected by US respondents included benevolence (38%), achievement (34%), and traditionalism (34%). Other values selected by Turkish respondents included universalism (40%), benevolence (35%), and security (30%).



Note = Missing cases were list-wise deleted. Muslims category was asked only in the French sample.

Moreover, respondents clearly saw a distinction between their values and the values of their least preferred group. They indicated the values that were important to them and their in-groups were not very important for their out-groups, suggesting values as a propitious site for understanding where groups conflict. Interestingly, respondents’ selections regarding the most important values for out-groups varied across our three samples. There seems to be much disagreement among US respondents regarding the perception of the most important values held by out-group members (all values were selected by 19%-33% of the US sample). In contrast, French respondents have more agreement that traditionalism (46%) is one of the most important values of their out-group, followed by self-direction (38%). Still different, Turkish respondents identify self-direction (40%), hedonism (39%), and stimulation (33%) as the most important values of their out-groups.

**Other Research Activities:**

We are currently in the process of collecting survey data from a local Turkish sample (Istanbul sample) and designing and programing the Phase 2 fMRI experiments.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Our project offers a systemic comparison of how religion, cultural heritage, or East/West cultural forces shape the perception of contentious moral issues. We can begin to offer specificity about which values are held – and discounted – by members of a variety of cultures. We find that people in different cultural environments see their in-groups similarly, but use different values to identify disliked out-groups. Results from these comparisons will potentially contribute to better understanding and predicting how American messages, diplomatic communications, and inter-military contact are mediated through local cultural, moral meanings, thus shaping future communication strategies of American military.

**Sharable data resources to be generated:**

Six survey data sets from four countries (in .csv format), publications, and working papers will be available at the <http://moralityandconflict.com/> website.

## Household Formation Systems, Marriage Markets, and Societal Stability/Resilience\*

Principal Investigator: **Valerie M. Hudson**, Texas A&M University, [vhudson@tamu.edu](mailto:vhudson@tamu.edu)

**Donna Lee Bowen** and **Perpetua Lynne Nielsen**, Brigham Young University

**Rebecca Nielsen**, Yale University

<http://womanstats.org>

**Aim:** Examine several dimensions of household formation systems and their resulting marriage markets considered to be most strongly linked to societal stability and resilience.

**Populations examined:** Fieldwork in West Africa (Sierra Leone, Liberia, and Guinea); compiled data from 176 countries with populations over 200,000

Societies that encode this primacy through household formation strategies such as patrilocality and early age of marriage for females will be less stable and less resilient than those that do not. Furthermore such non-resilient societies will be easily destabilized by marriage market obstructions to which they are vulnerable, whether those arise by way of abnormal sex ratios, prevalent polygyny, or spiraling marriage costs. These obstructions create a standing pool of deprived young adult men with a vested interest in further destabilization of the status quo and a greater reliance on force to determine the allocation of societal standing and resources. In addition, the overall level of violence against women becomes a barometer of how stressed this unstable system has become over time.

### Approach:

After finishing data collection on each variable of interest (listed in the Sharable Data Resources section), we propose to (a) examine their statistical association, in isolation and in interactions with each other, with existing measures of state stability and resilience on a cross-national basis. This will allow us to assess the overall correlational validity of the theoretical approach, as well as its level of cross-national generalizability.

Next, we aim to (b) complement these aggregate statistical analyses with an in-depth case study conducted in West Africa. This analysis should allow us to (c) identify which factors are more closely linked to state instability, and trace the causal processes involved. In this way, we also hope to understand and minimize the impacts of confounding or potentially contaminating contrasts across a set of varied situations.

Finally, we will (d) address the policy implications of our research; that is, it may well be that some of the most powerful means to improve state stability and resilience revolve not around large ideological efforts, such as the export of democracy, but rather around concrete, even narrow, revisions to household formation systems, such as state efforts to facilitate clearing of marriage markets.

### Scientific Progress and Key Findings:

From September 1, 2014 to July 31, 2015, our team of undergraduate and graduate student researchers collected over 5,400 pieces of data on the following variables related to this project:

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*Government Point of Contact:* Lisa Troyer, Army Research Office, [lisa.l.troyer.ctr@mail.mil](mailto:lisa.l.troyer.ctr@mail.mil)

*Anticipated period of performance:* Sept' 14–Aug' 17

VARIABLE	NEW DATA COLLECTED	TOTAL EXISTING DATA POINTS
Abortion	58	1,171
Access to/Feasibility of Divorce	800	3,712
Age at First Marriage	1,023	4,316
Bride Price/Dowry	432	804
Cousin Marriage	137	519
Division of Assets in Divorce	10	559
Forced Marriage	340	2,059
Inheritance as Daughter	60	1,248
Inheritance as Wife	60	1,528
Land Ownership for Women	490	4,019
Marital Rape	840	2,811
Polygyny	104	2,350
Sex Ratios/Sex Age Population Structure	1,054	3,412
<b>TOTALS</b>	<b>5,408</b>	<b>28,508</b>

SCALE	NUMBER OF COUNTRIES EVALUATED
Son Preference/Sex Ratio	175
Practice of Child Marriage for Girls	173
Laws Concerning Child Marriage for Girls	174
Child Marriage Practice and Law	173
Polygyny	In Progress
Bride Price/Dowry	In Progress
Patrilocality	In Progress
Cousin Marriage	In Progress

These scales and maps can be found at [www.womanstats.org](http://www.womanstats.org)

#### Other Research Activities:

In March 2015, we sent a team of 25 undergraduate and graduate students to New York City to participate in the Beijing +20/CSW20 conference at the United Nations. While there, they gathered critical data on the variables directly related to this project by attending conference events and speaking with experts and country representatives.

The four co-principal investigators are currently developing a conceptual frameworks based in the theories of economics, political science, anthropology, and history.

#### Potential Impact on DoD Capabilities and Broader Implications for National Defense:

If our hypotheses are correct, the resulting insights may critically impact threat assessment and stability operations as performed by the Department of Defense. Planners who overlook the effects of household formation systems and their resulting marriage markets may find the efficacy of their strategies and tactics profoundly undermined. As a team, we intend to explore how the Department of Defense could use our research findings to improve monitoring and forecasting of societal stability and resilience, as well as to proactively craft measures designed to prevent and respond to deterioration caused by underlying dysfunction in household formation strategies and obstruction of marriage markets

**Sharable data resources generated:**

- The WomanStats Database (more on page 194)

Online database of eight indicators of household formation strategy and marriage market clearing:

- Sex ratios and sex-age population structure
- Prevalence of polygyny
- Brideprice and dowry
- Age of marriage for women and men
- Patrilocality
- Prevalence of cousin marriage
- Inequity in family law, including property rights
- Legal sanction for marital and domestic violence

**Policy Publications through this Minerva research:**

- Hudson, Valerie and Rose McDermott, “Why Polygamy is Bad for National Security,” *Politico*, July 16, 2015.
- Hudson, Valerie and Andrea den Boer, “When a Boy’s Life is Worth More Than His Sister’s,” *Foreign Policy*, July 30, 2015.
- Hudson, Valerie M., Donna Lee Bowen, and Perpetua Lynne Nielsen (2015) “Clan Governance and State Stability: The Relationship Between Female Subordination and Political Order,” *American Political Science Review*, Vol. 109, No. 3 (August): 535-555

## Aiding Resilience? The Impact of Foreign Assistance on the Dynamics of Intrastate Armed Conflict\*

Principal Investigator: **Paul Huth**

Co-PI and Point of Contact: **David Backer**, [dbacker@umd.edu](mailto:dbacker@umd.edu)

Co-PI: **Kevin Jones**

University of Maryland

**Aim:** Assess the relationship between foreign development aid and the dynamics of resilience to intrastate conflict.

**Countries examined:** 29 conflict-affected countries in Africa; Afghanistan; Colombia; Iraq; Nepal; Timor-Leste. Fieldwork planned in Uganda and potentially others. Other countries may be added in the event that necessary data become available.

This project addresses a set of fundamental issues linking security and development: Does foreign assistance affect resilience to intrastate armed conflict—and if so, where, when, and how? Existing scholarship typically approaches those questions from a country-level perspective, often treating aid in an undifferentiated manner, examining only certain aspects of conflict, and thus remaining remote from investigating causal mechanisms that could plausibly affect the dynamics of violence. Recent studies have begun to delve into these relationships in a more nuanced manner, looking at patterns within countries and offering evidence that the scale and protection of aid matters. Yet these analyses focus on small numbers of countries, which exhibit active conflict, and specific forms of aid.

The proposed research extends the scope considerably by evaluating the association between development aid and the likelihood, escalation, severity, spread, duration, and recurrence of violence, spanning the phases before, during, and after conflict. Aid is potentially beneficial in all these phases. Prior to conflict, aid can build the capacity of state and society, improving resistance to rebel mobilization. During conflict, aid can bolster state legitimacy and civilian loyalty, subject to good governance, prosperity, and effective service provision. After conflict, aid can mitigate grievances and facilitate implementation of peace agreements. In each phase, however, a risk is that aid may fuel conflict, due to capture or graft. Or aid may have no impact on conflict, failing to reach intended targets or achieve objectives. The effects likely hinge on interactions among characteristics of aid (source, type, amount, location), the orientations and behavior of key actors (state, opposition, citizens), and the surrounding environment (state security, corruption, social demographics, inequality). Available literature has not systematically tackled these dimensions, yielding mixed findings and leaving many gaps in understanding, due to nascent theory, narrow range of analyses, methodological limitations, and inadequate data on aid—issues this project addresses directly in novel ways, to better gauge the conditional impact of development aid on intrastate armed conflict.

### **Approach:**

The research design combines cross-national, subnational, and micro-level empirical analysis. The results will be integrated into simulations using computational modeling, to further probe aid/conflict dynamics and “what-if” counterfactuals. A distinctive advance is to employ a sizeable array of cutting-edge disaggregated data for most of Africa as well as select Asian and Latin American countries. These geocoded data, which are due to be expanded significantly through this project, permit extensive quantitative assessment that is finer-grained spatially and temporally, plus considers notable parameters

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*Anticipated period of performance:* Sept’14–Sept’17

of both aid disbursements and conflict events.

The project will be implemented collaboratively by an experienced multidisciplinary team of experts assembled from several academic institutions and non-profit organizations based in the US, the UK, Switzerland, and Sweden. Large cohorts of students at several levels will receive relevant training via and contribute markedly to the research.

**Scientific Progress and Research Activities:**

The project team has made progress in the following areas:

1. Bottom-up geocoding of locations of development aid projects for select countries [completed for Iraq and Nigeria; three countries in progress; two further countries to be completed during the fall];
2. Top-down geocoding of development aid projects for 29 African countries that were conflict affected from 2002-2013 [first phase completed for 24 countries; second phase to be completed during the fall];
3. Identification of the size, composition and base locations of government military and paramilitary forces for 34 countries on which the research is focusing;
4. Identification of the size, composition and base locations of peacekeeping forces deployed in any of 34 countries on which the research is focusing;
5. Initiation of collaboration with Minerva-funded project based at the University of North Carolina - Charlotte to incorporate information on military and peacekeeping forces into development of dataset on territorial presence of armed actors;
6. Creation of unified dataset of conflict events and country and population characteristics at the ADM1 level for the African countries on which the research focuses, to be used in statistical analysis;
7. Creation of unified dataset of conflict events, locations of military forces, locations of aid projects, and country characteristics at the ADM2 level for Iraq [work nearly finished] and Afghanistan [work started], to be used in statistical analysis;
8. Compilation of profiles describing patterns, trends and relationships of development aid projects and conflict events for several countries;
9. Fieldwork in Uganda, involving interviews with former members of armed groups to collect primary information at the micro level about knowledge of and targeting of aid projects;
10. Development of the theoretical framework, to be used in the statistical analysis and computational modeling.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

The products are expected to be valuable in guiding deliberations, decisions, and actions with respect to the allocation and programming of development aid and crafting related strategies of conflict avoidance, mitigation, response, and recovery in order to reduce the potential for harmful effects around the world. A primary benefit will be further insight into the geographical and temporal dynamics of intrastate armed conflict and the effectiveness of development aid and security interventions in contributing to resilience. This research is therefore germane to various actors concerned with the intersection of security and development issues, especially the Department of Defense and other US government agencies (State Department, USAID, USIP), as well as foreign (e.g., DFID, etc.) and international (e.g., World Bank, OECD, UN, etc.) institutions.

**Sharable data resources generated:**

Compilation of the following datasets is in progress:

1. Development Aid Projects: Geocoded locations of projects for 29 African countries that were conflict affected from 2002-2013, plus Afghanistan, Colombia and Iraq, added to existing datasets that include information on source, type and amount, compiled by AidData.
2. Security Presence (in progress): Identification of the size, composition and base locations (specific to the ADM1 level) of government military, paramilitary and foreign peacekeeping forces for 34 countries during 2002-2013.
3. Territorial Presence: Information on military, paramilitary and peacekeeping forces due to be incorporated into dataset on territorial presence of armed actors.
4. Explanatory Variables: Yearly dataset on potential factors (terrain, population, localized GDP, etc.) at the country or ADM1 level.
5. Unified Datasets: Merger of data on conflict events, aid projects, security/territorial presence, and potential explanatory variables at multiple levels of analysis (country, ADM1, ADM2).

## Culture in Power Transitions: Sino-American Conflict in the 21st Century\*

Principal Investigator: **Robert Jervis**, Columbia University

Co-PI and Point of Contact: **Gregory Mitrovich**, Columbia University, [gm2330@columbia.edu](mailto:gm2330@columbia.edu)

**Erin Jenne**, Central European University, Budapest (HU)

**Victoria Hui**, Northwestern University

**Aim:** Examine how the United States and China use “culture” to advance security interests and wage hegemonic competition in the 21<sup>st</sup> century.

**Countries examined:** China and the United States

International relations theory posits that the emergence of a rising challenger often presages hegemonic war. The rise of China as America’s chief rival and competitor in the 21<sup>st</sup> century has led to concerns that the 21<sup>st</sup> century will see increased instability and the possibility of military conflict; consequently, most analyses of the Sino-American rivalry focus on the shifting military balance of power between the two rivals. We contend that traditional “hard power” represents only one aspect of the evolving U.S.-China competition, that the battle of soft power will be an equally important contest between the two nations. Will the attraction to and promotion of Chinese culture and social-economic model succeed in undermining America’s socio-cultural dominance in the world today, and thus weaken America’s standing in the world? Will the soft power competition exacerbate hard power competition?

We will examine how the United States and China use “culture” to advance their security interests and wage their hegemonic competition in the 21<sup>st</sup> century. The project will employ long-range historical analysis to generate qualitative case studies and qualitative and quantitative datasets of attempts by both states to use culture to achieve high-level national security ambitions.

Our qualitative case studies and quantitative analysis will identify the various system effects resulting from the American and Chinese use of soft power, focusing especially on the reactions of the rivals to both hegemonic aspirants. One of our chief goals is to distinguish those instruments that positively advance the security interests of each nation from those instruments that engender negative international repercussions in order to discern the potential systemic instability caused by the emerging Sino-American rivalry. Co-investigator Gregory Mitrovich and project consultant Victoria Hui will provide the qualitative narratives regarding the American and Chinese cases, while co-investigator Erin Jenne will oversee the CATA study that will measure quantitatively the intensity of these global reactions. Through examination of official government pronouncements, news reports, declassified diplomatic papers, and social network sites we will create datasets that will enable us to compare the discourse surrounding reactions to America’s rise to power with reactions to China’s current ascent. Both sets of results will be combined to produce a theoretical framework regarding the strategic implications of the cultural conflict in power transitions and provide specific policy guidance to the United States government.

### Approach:

This project will combine qualitative with quantitative analysis. The first, American case will utilize the kind of close intensive case analysis, using process-tracing and the comparative method, of responses to American soft power in the 19th and 20th centuries in Great Britain, Germany, Japan, and France and will be compared to the second case of China. This will be augmented by computer aided text analysis (CATA). In combining these methodological approaches, we aim to prevent possible investigator bias

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*Anticipated period of performance:* Oct’14–Sept’17

from affecting our research aims.

CATA is a revolutionary analytical technique that has gained prominence as computer-processing power has increased over the past several decades. Traditional quantitative data collection and analysis are highly labor intensive and prohibitively expensive, and rely heavily on human judgment in both data collection and processing. Validity issues may arise when human coders are required to make frequent judgments or do not have sufficient training. Computer-assisted text analysis is virtually free of the reliability and replicability problems and considerably reduces the costs of assuring validity. Assumptions embedded in the research design determine the validity of CATA methods; if the assumptions are met in a given context, the method will produce valid results.

CATA makes it possible to analyze large amounts of text both quickly and at relatively low cost, which is especially appealing in settings where large quantities of text are available in machine-readable formats. The amount of text collected for any given purpose is often limited by text availability, and not by hardware, time, or labor costs. Units of text of interest can easily go into millions for micro-blogging services, and reach high, albeit lower, numbers for many other types of text, such as legislative speeches or newswire reports. Once the texts of interest are collected and pre-processed into formats suitable for the analysis, any number of suitable CATA techniques can be applied to them to do “document scraping.” The various CATA approaches rely either on a pre-prepared instrument -- e.g. a dictionary or a classification scheme, or analyze everything “in sample.”

#### **Scientific Progress and Key Findings:**

Phase 1 of our project began in January 2015 and focused on Gregory Mitrovich’s historical reconstruction of how the American cultural model paved the way for the rise of American power: a two-book analysis of the reasons for the success of the American cultural and reactions from the great powers of the 19th and 20th centuries. Research to date now demonstrates that the term “American Century” is a misnomer; by the end of the 19th century many nations considered themselves undergoing a process of “Americanization” leading us to conclude that there were two distinct periods of American domination, the first era extending from the end of the Civil War until the Great Depression based on what we today call soft power, and a second period after World War II based on a combination of hard and soft power. This has important ramifications for how we should consider the use of soft power today. Mitrovich has written completed half of book one and is in discussions with publishing houses.

Phase 2 began in June 2015 and includes: examination of the influence of the China model on the global community and CATA analysis comparing the use of soft power by the US and China. We have targeted several specific projects such as a study of the Asia Infrastructure Investment Bank, the Confucian Institutes, from which we will prepare articles for academic and policy journals.

#### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

The emerging Sino-American competition will decisively influence the course of the 21st century. We must examine whether or not cultural expansion is benign and can serve as a form of soft power if we are to understand the long-range implications of Chinese cultural expansion and continued American cultural predominance. Here exists a substantial, if unrecognized, difference of opinion. On the one hand, culture is considered a way for the United States to improve its relationships with the world. On the other hand, the historical record demonstrates that cultural expansion can be a significant force of instability and potentially a cause of war. If the latter is true, China’s cultural offensive may pose the most destabilizing aspect of its challenge to world stability in the 21st century. It is imperative for long-range American national security planning that a clear understanding be formulated regarding: how culture can be used to

satisfy national security interests, how the use of culture by China can undermine America's global predominance, how a culture war could destabilize international community, and how the United States can use its cultural assets to ensure American preeminence throughout the 21st century.

**Sharable data resources to be generated and outreach plans:**

- ***Offices of the Confucius Institute and Russkiy Mir.*** The primary purpose of the dataset is to track the spread (and roll-backs) of the offices of the institutes both geographically and temporally focused on the locations and organizational environments in which the branches operate, and their establishment (and termination) dates. This information will direct our collection of documents for textual analysis, and will also be matched with data on trade, demographics, and co-ethnics presence to identify their effects on the institutes.
- ***The structure of cultural institutes of major powers.*** The dataset incorporates information on the governing and funding structures, and mission statements of the Confucius Institute, Russkiy Mir, as well as the British Council, Goethe-Institut, and Institut Francais. The case of the Spanish Cervantes Institute is added as an example of an institute operating in post-colonial context. Text analysis of mission statements.
- ***Publications of the Confucius Institute and Russkiy Mir.*** Both the Confucius Institute and Russkiy Mir publish a large number of documents in multiple languages concerned with a variety of topics from academic research to current political events. The dataset collects these documents in a machine readable format for computer-assisted text analysis
- ***Articles mentioning the Confucius Institute and Russkiy Mir.*** The dataset collects articles from press media which mention the Confucius Institute or Russkiy Mir. The "Confucius" dataset consists of 1055 entries, while the "Russkiy Mir" dataset has 127 entries.

## Does Current Investment Predict Future Violence? Lessons from Afghanistan\*

Principal Investigator: **Ethan Kapstein**, U.S. Institute of Peace and Arizona State University  
[ekapstein@usip.org](mailto:ekapstein@usip.org)

**Aim:** Analyze the actions of entrepreneurs in conflict-affected regions, contributing to our understanding of the relationship between economic development and violent conflict.

**Country examined:** Afghanistan (includes fieldwork)

Over the past decade the United States and its allies have devoted significant blood and treasure to the stabilization of Afghanistan. But now that foreign troops are departing, how do we know whether the Afghan people are becoming more or less confident in the future political stability and economic growth of their country?

The purpose of this study is to examine domestic investment levels as a proxy measure for expectations concerning Afghanistan's future trajectory. Because they put capital at risk, domestic investors provide a promising window into future expectations. We therefore hypothesize that rising (falling) levels of investment today suggest future expectations of less (more) violence tomorrow.

### Background:

The economic development literature generally treats “security” as a binary variable. In this view, “security” is the sine qua non for investment and growth, while “insecurity” inhibits entrepreneurial activity and job creation. This perspective has also been adopted by the U.S. armed forces. According to the U.S. Army's Counterinsurgency manual (FM 3-24), for example, “counterinsurgents aim to enable a country or regime to provide the security ...that allow...growth of economic activity.”

Yet economic activity does not “stop” in countries that are experiencing violent conflict, including insurgencies; in fact, even casual empiricism demonstrates that the economy continues to function to a greater or lesser degree in most conflict-affected states. Some of that activity may be due to military spending by local and foreign forces, but other opportunities may arise for entrepreneurial investment as well. Presumably, this ongoing economic activity serves the interests of the local governments and the (foreign) counterinsurgents who are supporting a military campaign, as it provides a signal that stability is being achieved. Yet military planners have made little use of domestic investment-related data as a proxy measure for progress (or its absence) towards political stability and sustained economic growth.<sup>10</sup>

As many analysts have argued, it has often proved difficult to know whether a counterinsurgency campaign is succeeding—far more so than in a conventional conflict between states—because success depends critically on intangibles such as the attitudes (“hearts and minds”) of the local population. Government and military officials have yet to provide a reliable set of metrics relating to whether their objectives in conflict-affected regions are being achieved.

As already noted, this study builds on well-grounded political-economic theories of economic development, including the work of such scholars as Douglass North and Jakob Svensson, to help us

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*Anticipated period of performance:* Aug'14–**August 2016**

<sup>10</sup> See Ethan B. Kapstein, “Measuring Progress in Modern Warfare,” *Survival* (February–March 2012).

**understand how investors perceive long-run stability** in Afghanistan. For most of the postwar era, development economists have argued that long-run growth depends upon sustained investment by entrepreneurs that increases labor productivity. More recently, however, the political economy literature has hypothesized that investment rates and economic growth will vary with the quality of local institutions; that is, all potential investors (and not just “insiders”) must believe that the existing set of institutions will provide them with personal security, property rights, law and order, and other necessary protections. Furthermore, domestic (as opposed to foreign) investors and entrepreneurs are particularly sensitive to the quality of local institutions.<sup>11</sup> **In their analysis of 120 “young” democracies** (that is, democracies created since 1960, nearly half of which “failed” or reverted at some point to authoritarianism) **they found, using a hazard model, that local investors invested less in democracies that ultimately failed than they did in democracies that ultimately remained in place.** In short, at time  $t_0$ , investors already had a good sense of whether or not the democracy would endure into a business-relevant time horizon. These local investors, it appears, had “inside information” about the stability of the regime that had just been formed.

To put this in other words, investment data and new business creation may be viewed as a proxy measure for the future expectations of local citizens. When citizens make “lumpy” capital investments, they are demonstrating their confidence in the long-run stability of local institutions. When they “take the money and run” they are sending a strong signal about instability. Researchers have, in fact, demonstrated that capital investment tends to fall in the midst of political instability. Taking the case of Vietnam, the data suggest that investment in residential housing, for example, fell precipitously during the period 1966–1974. More recently, economic indicators of construction activity in Fiji indicate a collapse of activity in the year preceding the recent democratic reversal. Studies in such countries as Israel, Iraq and Sri Lanka have similarly found strong evidence of a linkage between levels of violence and political instability and investor confidence.

#### **Technical Approach: Measuring Investment in Afghanistan**

We propose to gather data and conduct econometric analysis of the relationship between economic activity (particularly investment by local entrepreneurs) entrepreneurship) and violence using a unique dataset drawn from a range of sources in Afghanistan. In so doing we will also contribute to a unique entrepreneurship “mapping” of the economy.

We propose to analyze the relationship between economic activity (particularly entrepreneurship) and counterinsurgency campaigns by asking whether investment decisions by the Afghan people provide a reliable leading indicator of long-run political stability. The political economy thesis that underlies this research agenda is that business investment and entrepreneurial activity provide a good “proxy measure” of whether a war-torn country, like Afghanistan, is becoming more secure and stable, thus inducing investors to put capital at risk.

Our proposed solution to the problem of measuring future expectations is to do so indirectly through the actions of investors. Those actions are reflected in investments, property prices, business loans, construction activity, capital flows, job creation and labor flows, emigration, and immigration. By tying these data to military and foreign aid operations we hope to gain some purchase over the critical policy issue of the relationship between counterinsurgency campaigns and political and economic stability.

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<sup>11</sup> See Kapstein and Converse. *The Fate of Young Democracies*. Cambridge University Press, 2008.

**Scientific progress and key findings:**

Our preliminary research in Afghanistan reveals, first, that provincial and district-level data for many types of economic activity (including cell phone activity) are available, many in time-series format, thus providing the foundations for a solid dataset; and second, that there is great disparity among Afghanistan's provinces at the present time regarding economic activity. Some provinces, like Balkh in the north and Hirat in the west, are relatively non-violent (as measured by kinetic activity or "significant actions" (SIGACTS)) and have enjoyed relatively high levels of investment and business and job creation (and, we should note, relatively low levels of foreign aid). In others, like Helmand and Kandahar, levels of violence remain high, and the business activity that exists is primarily generated by ongoing military and foreign aid operations. The hypothesis that these data suggest is straight-forward: as the Afghan people grow in confidence about their long-term security, they invest more in their economy. To put this in other words, investment today is a leading indicator of the changing security environment. Indeed, anecdotal evidence suggests that, for example, in Logar (south of Kabul), while violence spiked, property prices rose as well, leading to the possibility that investors may be betting on that region's economic growth in the medium and long term.

**Implications for defense:**

If we develop a better understanding of the relation between domestic investment and violent conflict, we may identify domestic investment as a "red flag" concerning future violence and instability, strengthen existing early warning systems, and improve the conduct of stability and post-conflict operations. Because they put capital at risk, domestic investors provide a promising window into future expectations.

Beyond Afghanistan, this study could have widespread **methodological significance** regarding the assessment of post-conflict environments. Investment levels could provide domestic officials and members of the international community with an important indicator concerning confidence in political and economic arrangements.

**Expected outputs:**

We intend to conduct outreach in various forms, aimed at influencing how domestic officials and the international community monitor progress and intervene in conflict and post-conflict environments.

- A series of papers for policy and academic audiences
- A set of briefings for various audiences (e.g. policy, academic, think-tank)
- Results will also be broadcast via social media.

## Understanding the Origin, Characteristics, and Implications of Mass Movements\*

Stephen Kosack, University of Washington, [skosack@uw.edu](mailto:skosack@uw.edu)

**Aim:** Determine 1) under what conditions mass movements aimed at societal change tend to originate, 2) the determinants of their characteristics—particularly whether they use violence as a tactic—and 3) implications?

**Countries examined:** 40 countries in Asia, Africa, and South America, detailed below.

Mass mobilization is the subject of a large interdisciplinary literature, including some of the most influential scholarship on political and economic change. But in contrast to studies of the causes and consequences of other features of politics such as political institutions, which have been able to draw on rigorous cross-national data on political institutions, systematic studies of mass mobilization have typically relied on case studies of particular movements or countries. Despite their many contributions to our understanding of mass movements, such case studies have difficulty uncovering general patterns: the political, economic, social, and environmental factors that are associated with mass mobilization and that influence how mass movements mobilize members, organize themselves, make decisions, and express their views—including whether they use violence. Nor do they allow systematic investigation into the characteristics of mass movements and their political and economic implications. Thus as a body of work, scholarship on mass movements provides inconsistent and often contradictory answers to basic general questions about mass mobilization. The result is that at a time of increasing mobilization and insurgency that is reshaping the political and economic landscape across much of the world, including many regions vital to U.S. security interests, we lack empirically verified theories of the origin, characteristics, and implications of mass movements.

### Methodology:

Since 2011, the Mass Movements Project has been developing the first comprehensive cross-national dataset of historical mass movements in developing countries, covering the nature and characteristics of all movements of more than 1,000 active participants from 1945 to 2010. Prior to Minerva funding the project had coded a dataset of 23 countries—the 19 countries of the Middle East and North Africa, as well as Brazil, Ghana, Thailand, and Taiwan. This Minerva project is gathering and analyzing data on **40 additional countries in Africa, Asia, and Latin America**, resulting in a geographically diverse sample of 63 countries.

- *In Africa:* Algeria, Burkina Faso, Cameroon, Chad, Djibouti, Eritrea, Ethiopia, The Gambia, Guinea-Bissau, Kenya, Mali, Mauritania, Niger, Nigeria, Senegal, Somalia, Sudan, South Sudan, and Uganda;
- *In Asia:* Armenia, Azerbaijan, Bangladesh, Cambodia, Georgia, Indonesia, Kyrgyzstan, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Tajikistan, Turkey, Turkmenistan, and Vietnam; and
- *In Latin America:* Bolivia, El Salvador, Guatemala, Haiti, and Nicaragua.

We will use the methods developed and validated by the Mass Movements Project to analyze these data; specifically, we will code each mass movement's characteristics yearly on 216 variables covering its purpose, scale and scope, organization, tactics, leadership, and degree of government affiliation; the

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*Anticipated period of performance:* Sept'14–Aug'17

resulting dataset will be a panel that will map the landscape of movements across time and space. Multiple researchers gather and integrate data about each movement from an extensive review of a wide variety of existing publicly available secondary sources in a five-step coding and verification process designed to ensure reliability.

**Anticipated Outcomes of Research:**

Statistical analyses of these data will enable us to rigorously examine the origin, characteristics, and implications of mass movements:

1. to identify factors that shape the emergence and survival of mass movements;
2. to identify external conditions and movement characteristics (e.g., organizational structure) that shape movement tactics, particularly violence; and
3. to better understand the consequences of mass movements on political change and economic and social performance (e.g., GDP growth, democratization, and improvements in education and health).

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

As ethnic, religious, and class-based movements and insurgencies reshape the political and economic landscape in many regions vital to U.S. national security, the military and intelligence communities have devoted significant effort to understanding the nature and dynamics of mass movements. This Minerva project will further this effort to understand mass movements in two important ways.

First, it will provide the opportunity to conduct empirical, historically grounded analyses of the nature and implications of mass movements. Rather than drawing lessons from prominent examples of particular mass movements (such as the FARC in Columbia or the Provisional Irish Republican Army), the Minerva project will allow the development of a generalizable understanding of how movements of different types emerge or adopt certain organizational tactics like violence, given social, economic, geographic, and other environmental characteristics—an understanding that will be based on the full historical record in a large, geographically diverse sample of countries.

Second, the data can be used to make probabilistic predictions about movements: the likelihood, based on historical patterns, of movements developing, the tactics they will employ, and their ultimate impacts on society. Thus analysts faced with a particular environment that seems ripe for mass mobilization, or a particular movement that appears to be turning violent, would have rigorous empirical data at their disposal to enable a more informed and accurate understanding about what to expect.

**Sharable data resources to be generated:**

All data produced by the Mass Movements Project will be released publicly through a project website, which will include the detailed coding sheets, with full sources, for each movement. The project team hopes the release of the data will encourage new advances in the study of mass movements by other scholars and analysts, as well as allow scholars and others the opportunity to check our assessments in an effort to further improve the quality and accuracy of the data itself.

## Motivation, Ideology and the Social Process in Radicalization\*

Principal Investigator: **Arie Kruglanski**, University of Maryland, [kruglanski@gmail.com](mailto:kruglanski@gmail.com)  
**Scott Atran**, ARTIS Research; **Claudio Cioffi Revilla**, George Mason University  
**Michele Gelfand**, University of Maryland; **Andrzej Nowak**, University of Warsaw  
**Jeremy Ginges**, The New School for Social Research

**Aim:** Understand radicalization as a social, cultural, and psychological process.

**Countries examined:** Indonesia, Morocco, Northern Ireland, Philippines, Sri Lanka (all include fieldwork)

It is increasingly apparent that although “kinetic”/operational measures are indispensable in the global war on terror, they cannot comprise the entire solution to the problem. Like the mythical hydra that grows new heads in place of those that were chopped off so to Al Qaeda and its affiliates seem to spring new branches even if AQ core isn’t what it used to be. But we have AQ, AQIM, AQAP, ISIL in Iraq and Syria, Boku Haram in Nigeria, Islamist extremists in Indonesia, Malaysia, the Philippines, Thailand, and China, as well as in Central Asia.

To understand why radical groups are appealing and how to counteract them, we need to understand radicalization as a social, cultural, and psychological process. We define radicalization as movement toward the advocacy of/engagement in activities that run counter to widely accepted norms and values, for example against the prohibition of killing uninvolved civilians. Not all those who hold radical attitudes necessarily engage in terrorism, but all who engage in terrorism are likely to hold radical attitudes, that is, attitudes that justify terrorism. Our project, therefore, is based on the premise that a viable program to combat violent extremism is to discover ways to prevent radicalization, and to reverse it where it has taken root, that is to promote effective deradicalization. This is what we aim to study in this project, and extract policy implications from our findings.

### Approach:

The research project involves three major thrusts: (1) field research in five sites across Middle East-North Africa, Europe, and South and Southeast Asia, (2) computational modeling, of radicalization and (3) derivation of suggestions for best practices on the level of policy. Toward accomplishing these thrusts, we have assembled a multidisciplinary team of researchers (i.e., psychologists, anthropologists, computational scientists, and policy experts). We have developed a conceptual model (i.e., Significance Quest theory; Kruglanski et al., 2014) of radicalization and deradicalization processes based on past research and theory. This will guide our data collection. However, data collection will be only partially constrained by this model, as we will also examine issues that emerge within the local contexts of our studies, and modify our model in their light if this seems indicated. Likewise, we will be carrying out computational simulations, and any emergent insights from these simulations will also contribute to further development/revision of our theoretical model. We will employ several data collection techniques in the field, including surveys, experimental studies, structured interviews, and consensus building techniques.

### Scientific Progress and Key Findings:

Two rounds of field surveys have been completed and analyzed in Morocco. One round of surveys has been completed and analyzed in Indonesia, with follow-up data collection currently in progress. One round of surveys has been completed in Sri Lanka among community members and former members of

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*Anticipated period of performance:* Jan’13–Dec’17 (with option)

the Liberation Tigers of Tamil Eelam, with data analysis currently underway. Data collections in the Philippines and Northern Ireland are currently being planned.

A key finding from Morocco, and then replicated and extended in Indonesia (as well as Lebanon and Spain), concerns the interplay of cultural values and group identity in violent extremism. These findings demonstrate that **individuals are willing to engage in extreme behaviors (e.g., costly self-sacrifice) on behalf of sacred values when their individual identity is fused with their group identity.** In Morocco, this led to individuals living in the Casablanca neighborhood of Sidi Moumen expressing increased extremism when they perceived Sharia Law as sacred and when they were fused with a close group of friends. In Indonesia, this effect was replicated among individuals living within the Java, Sumatra, and Sulawesi regions who were fused with Muslims. Moreover, Indonesia surveys specifically targeted individuals belonging to moderate organizations (e.g., Nahdlatul Ulama), Islamist organizations (e.g., Islamic Defenders Front), and Jihadist organizations (e.g., Jemaah Islamiyah). Analyses revealed that Jihadists expressed significantly greater fusion with Muslims, and significantly less fusion with Indonesians than members of the other groups. This is critical, as fusion with Muslims was positively correlated with Islamic extremism, whereas fusion with Indonesia was negatively correlated with Islamic extremism. This suggests that increased extremism amongst Jihadists may result from a combination of being highly identified as Muslims, and low in their national identification with Indonesia.

Whereas these findings focus specifically on the cultural and social aspects of the radicalization process, our theory also incorporates the individual motivational component, that is, the quest for significance (i.e., to feel like one matters in the eyes of others). Our model suggests that situations that induce this need for significance can motivate individuals to fuse with their group identities and view certain group values as sacred, thereby leading to extremism as a mechanism for fulfilling the significance motive. This notion is being tested via agent-based computer modeling that incorporates field data from Morocco. This model states that instances that induce a loss of significance (thereby activating the significance motive) place individuals in a mindset whereby they perceive the world in a clearly structured and defined manner (which has also been empirically supported in surveys and experiments conducted in Morocco, Sri Lanka, the Philippines, and the USA). As it pertains to extreme ideologies, this mindset both reduces individuals' willingness to remain non-committal on an issue, and also increases the tendency to accept extreme viewpoints. Preliminary simulations found this to be the case—the occurrence of global

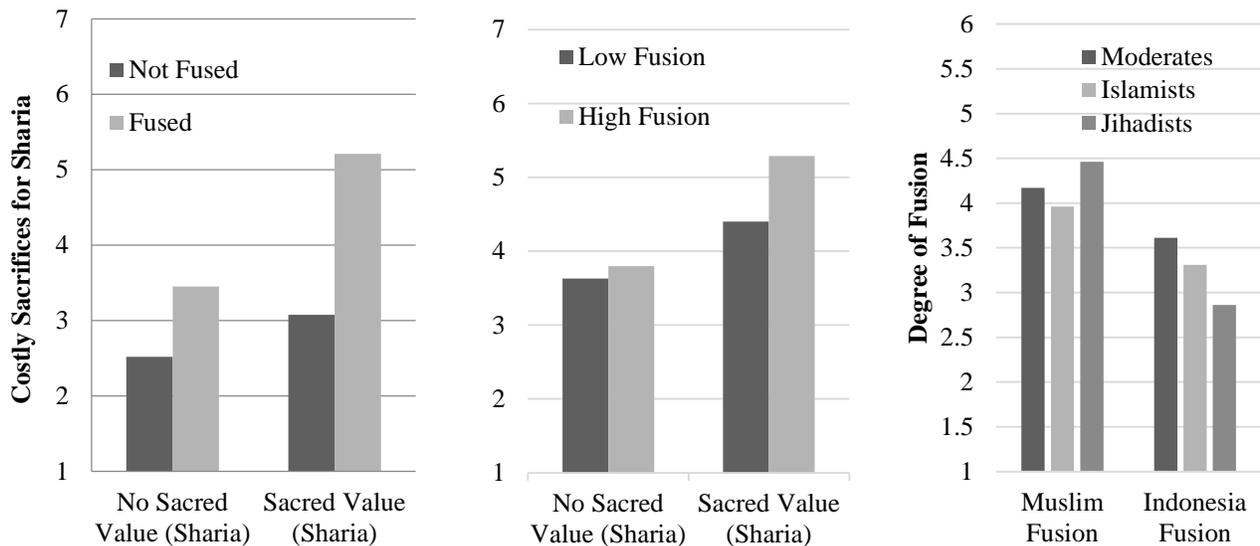
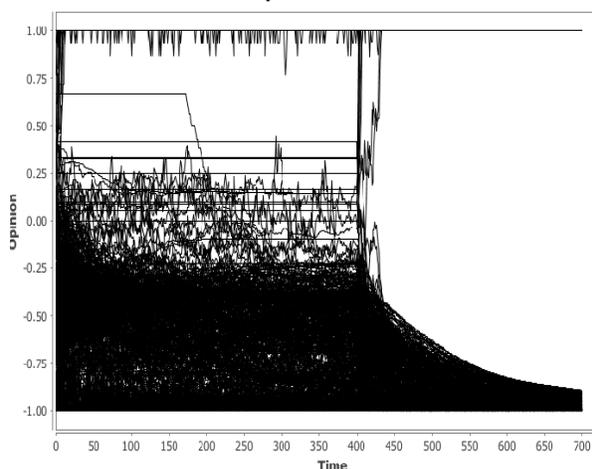


Figure 13. Morocco; Indonesia; Indonesia

significance loss events (Figure 14, left panel @ time 120), increased attitude polarization (extremism). Data were input to model this process within the sample collected from Casablanca, Morocco. Responses from surveys were used to identify baseline levels within the population. Polarization of attitudes occurred as a result of global significance loss events (Figure 14, right panel @ time 400).



**Figure 14. Preliminary Agent-Based Model simulations find that**  
 (1) the occurrence of global significance loss events (see Time 120 in left panel) increased attitude polarization, and  
 (2) polarization of attitudes occurred as a result of global significance loss events (see Time 400 in right panel)

Finally, a third effort is being undertaken to model how, after the collapse of an autocratic regime, the presence of mezzo-level structures impact whether a society transitions to democracy, turns to a new or old autocratic regime, or forms disassociated and competing clans/groups. This effort models the same social, cultural, and motivations constructs, but at the societal level. This model conceives of agents participating in three societal level networks: (1) governmental, (2) religious, and (3) social/civic. Modeling suggests that radicalization is likely to occur in response to governmental failure when there is a fusion of the religious network with administrative dynamics.

#### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Radicalization that turns into violent extremism poses a clear and present danger to national defense, whether that anti-American radicalization occurs in US territory or faraway lands. Understanding the conditions that prompt and prevent radicalization is a first step toward devising measures, programs, and policies for countering and reversing radicalization that are of first rate significance for national defense. The anticipated findings are likely to prove useful to understanding and—from an actionable perspective—systematically counteracting terrorist organizations' recruitment efforts and diverting the emotional and cognitive reasoning of potential recruits away from terrorism. In summary, the proposed work is likely to yield profound understanding of structural and psychological elements of terrorist networks of practical relevance to a broad range of national defense stakeholders.

#### **Notable recent publications through this Minerva research**

- Alizadeh, M., Cioffi-Revilla, C. & Crooks, A. (2015). Spatial social networks. *Computational and Mathematical Organization Theory*, 21.
- Atran, S., Sheikh, H., & Gomez, A. (2014). Devoted actors sacrifice for close comrades and sacred cause. *Proceedings of the National Academy of Sciences*, 111, 17702–17703.
- Davis, R. (in press). *Hamas, Insurgencies and the Will of the People*. London/New York: Routledge.
- Ginges, J. (2015). Sacred Values and Political Life. In J. Forgas, W. Crano, & K. Fiedler (Eds.). *Social Psychology and Politics*. New York: Psychology Press.

## Radicalization and Deradicalization of German Neo Nazis<sup>\*</sup>

Arie Kruglanski, University of Maryland, [kruglanski@gmail.com](mailto:kruglanski@gmail.com)

**Aim:** Understand the motivational, social, and cultural processes involved in radicalization and deradicalization of former members of Extreme Right organizations in Germany.

To help counter violent extremism worldwide, we need to understand the appeal that extreme organizations pose for the individual, and thus, understand the radicalization process whereby individuals move toward the advocacy of and engagement in extreme organizations. One type of extreme organization that is responsible for a prominent number of terrorist attacks in both Europe and the United States is the Far Right, or Neo Nazi movement. The goal of this project is to examine interviews conducted with members who have transitioned out of Far Right organizations in Germany. This will better our understanding of the psychological/motivational factors involved in both radicalization and deradicalization, as well as allow us to ascertain the cultural and social processes that influenced these decisions. Insights from this research can be integrated with empirical studies examining these same radicalization factors in various societies across MENA, Northern Ireland, and South and Southeast Asia (as carried out under the Minerva project “*Motivational, ideological and social processes in radicalization and deradicalization*”). Ultimately, these insights will provide an in-depth picture of cultural variation present in radicalization and deradicalization processes, and inform counter radicalization policies accordingly.

### Approach:

This research project involves an archival analyses of 60+ interviews conducted with individuals in Germany who have transitioned out of Far Right organizations with the aid of the NGO, EXIT-Germany. Founded in 2000, EXIT-Germany has established itself as one of the most successful programs of its type, and at last evaluation in 2012, was responsible for aiding 443 individuals in exiting the Far Right, with only a 2% recidivism rate. Most of EXIT’s clientele, and thus the source material for our interviews, come from mid- to high-level hierarchies within the organizations, including group and party leaders that had been active for more than 10 years. These interviews are semi-structured, and specifically follow the interviewees biological transition within the movement, starting with entry, moving to belonging, and ending with their exit.

The archival analysis will be carried out in a series of stages, the first of which is translation. All interviews were conducted in German, and will be translated into English so they can be content analyzed by researchers at the University of Maryland. We utilize a rigorous back-translation process that involves translating to English, and then having a second translator translate the document back into German, to ensure translations capture the intended meaning. The second stage is the creation of a coding scheme by which the interviews will be analyzed. The coding scheme includes top-down themes of interest, as derived from our theoretical model (i.e., significance quest theory; Kruglanski et al., 2014) that conceives of radicalization as occurring at the intersection of individual motivation, culture, and group processes. A bottom-up approach is also used to identify reoccurring themes from a subset of transcripts, and to contextually locate the top-down themes. The third stage is the coding of the transcripts. Two

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*Anticipated period of performance:* Aug’ 14–**July 2016**

This project was funded as an expansion of the project “*Motivation, Ideology and the Social Process in Radicalization.*”

researchers will independently analyze each transcript until an acceptable level of inter-rater agreement has been reached. Data analysis is the final stage. Basic analyses will focus on frequencies of various themes, and examine if certain subject characteristics (e.g., age, gender) are predictive of certain themes. Moreover, some of the codes include outcome variables, such as level of commitment to the extreme organization, or degree of violence engaged in as a member. Analyses will examine how the different factors of our model predict these outcomes.

**Scientific Progress and Key Findings:**

Substantial progress has been made on the first three stages. More than 20 transcripts have been fully translated, and the translation of the remaining transcripts is in progress. The coding scheme has been created. A subset of the translated transcripts were read and discussed by the research team to identify themes of interest and create coding categories. The resulting coding scheme consists of roughly 25 coding categories/themes, rated on both nominal and ordinal scales. Themes include personal grievances (or events that would induce feelings of personal insignificance), qualities of group membership that were desired by the interviewee or provided to members of the groups, mechanisms of recruitment, indicators of group commitment, and ideological structure, just to name a few. Finally, the coding process is underway. Undergraduate researchers have been trained on the coding scheme and are currently coding the transcripts. This process will continue until all transcripts have been coded, at which point, data analyses will commence.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Though military efforts and the thwarting of specific terrorist plots are indispensable at the tactical/operational level, it is increasingly clear that such efforts need to be complemented on a strategic level with effective programs to counter the swelling wave of radicalization in various parts of the world and implement effective methods of deradicalization of former extremists and reintegrating them into civil societies. The present research, in so far as it is likely to produce insights into factors that promote radicalization and deradicalization will serve as an important and rare quantitative database that would be highly useful in that enterprise.

## Neural Bases of Persuasion & Social Influence in the US and the Middle East\*

Principal Investigator: **Matthew Lieberman**, UCLA, [lieber@ucla.edu](mailto:lieber@ucla.edu)  
**Emily Falk**, University of Pennsylvania; **Bryan Gabbard**, Defense Group Inc

**Aim:** Extend the neuroscience of persuasion and influence in terms of: (a) the basic neural mechanisms involved, (b) the ability of affordable portable imaging technology to be used to predict outcomes, and (c) the feasibility of using this mobile imaging technology to examine persuasion and influence processes on site, within the Middle East.

Many aspects of geopolitical and military success around the world depends on the ways in which different groups in sensitive regions are influenced by other members of their culture, by neighboring countries, and by outside forces such as our military or other peacekeeping forces. The behavioral and neural bases of persuasion and social influence are still poorly understood. People often say they find something persuasive and yet their subsequent behavior does not reflect those self-reports. Neuroimaging can play a central role in advancing the study of influence as recent work demonstrates that functional magnetic resonance imaging (fMRI) can detect signals in the brain that predict when a persuasive message will be effective. Applying this approach in sensitive regions around the world depends on being able to rapidly set up and use neuroimaging equipment in remote regions around the globe.

### **Approach:**

As indicated, neuroimaging can be used to predict when persuasive messaging and social influence will occur. This approach was pioneered by our research team. The problem is applying this approach in remote places without easy access to magnetic resonance imaging scanners. We are addressing this problem in two ways in the current project.

First, we are comparing the results of basic persuasion and social influence paradigms using both fMRI and functional near-infrared spectroscopy (fNIRS). fNIRS measures an index of the hemodynamic response, similar to fMRI, however it does so using far more affordable and portable technology. While an MRI weighs several tons and costs millions, fNIRS can be sent anywhere in the world in a small box and costs \$50,000–\$100,000 per rig. We anticipate that fNIRS will capture some of the same signals previously observed with fMRI.

Second, assuming success with fNIRS, we will set up an fNIRS lab in the Middle East. Here we will replicate our persuasion and social influence findings and compare these results to those observed from participants in the United States. This will be the first neuroimaging assessment of persuasion and social influence in the Middle East.

### **Scientific Progress and Key Findings:**

In the first year of the grant, we have conducted an fMRI and fNIRS study of persuasion as well as an fMRI and fNIRS study of social influence. Both fMRI studies have been thoroughly analyzed. One fNIRS study has been analyzed, while the second is being analyzed currently. Overall the results have largely met expectations that (a) the fMRI studies would replicate findings from prior persuasion and social influence studies and (b) that fNIRS would be able to reproduce at least some of the same effects observed with fMRI.

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\* *DoD Program Officer:* Ben Knott, Air Force Office of Scientific Research, [benjamin.knott.2@us.af.mil](mailto:benjamin.knott.2@us.af.mil)  
*Anticipated period of performance:* Aug' 14–Jul' 19 (with option)

Our previous persuasion research has demonstrated that persuasive messaging about sunscreen use increases sunscreen use in the week following the testing session and that these increases are predicted by activity in a particular region of interest (ROI) in medial prefrontal cortex (MPFC). Both of these results were observed in our current fMRI persuasion study. In addition, we examined other factors to extend the basic neuroscience of persuasion by including: (a) messages indicating ‘why’ one should use sunscreen more and messages indicating ‘how’ one could go about implementing this behavior; (b) gain vs. loss focused messages; and (c) a comparison of those who began the study as sunscreen users or as sunscreen non-users. fNIRS data was also collected for this paradigm and is still being analyzed.

Our team’s previous social influence work has shown that four brain networks (reward, mentalizing, social pain, and self-processing) are all involved when learning about group norms changes one’s own attitudes. In the current fMRI study, both the mentalizing and social pain networks showed activity that was associated with successful social influence. This study also examined other factors to extend the basic neuroscience of social influence including: (a) the differential responses of individuals of high or low socioeconomic status and (b) the effects on one’s own behavior vs. message propagation effects.

Our team also conducted an fNIRS study of social influence in which the two components of the mentalizing system were examined. One of these components (dorsomedial PFC) showed a similar correlation with social influence outcomes to what was observed with fMRI, however, the other (tempoparietal junction) did not show this effect. This demonstrates that with fNIRS we can extract at least one of the signals that predicts social influence outcomes.

**Other Research Activities:**

In other relevant research activities, a biomedical engineer has been working in one of our labs creating a new set of analytical tools to use support vector machine (SVM) learning in order to be able to predict real world outcomes ranging from persuasion success over the next week to well-being and depression three months later, integrating data from neuroimaging, self-report, physiology, and genetics. In future years this will greatly enhance the precision of our persuasion and social influence findings.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Our results show the plausibility of creating affordable mobile neuroscience labs in remote regions of the world using fNIRS. This would allow for more effective testing of persuasive messaging campaigns in situ as well as open up a wide range of other neuroscience applications for the DOD.

**Future Work:**

Our future work will continue to follow the plan of our grant by (a) developing a more comprehensive neuroscience model of persuasion and social influence and (b) setting up an fNIRS lab within the Middle East to begin testing in that location.

## Tracking Critical-Mass Outbreaks in Social Contagions<sup>\*</sup>

Principal Investigator: **Michael Macy**, Cornell University  
**Clay Fink**, Johns Hopkins Applied Physics Laboratory  
**John Kelly** and **Vladimir Barash**, Morningside Analytics  
Project Point of Contact: [vlad.barash@graphika.com](mailto:vlad.barash@graphika.com)

**Aim:** Understand the dynamics by which social movements break out of a small, localized group to become nationwide phenomena, using the critical mass model of social contagions.

**Phenomena examined:** 2011 revolution in Egypt, 2011 Duma elections in Russia, 2012 fuel subsidy crisis and 2014 #bringbackourgirls protests in Nigeria, and the 2013 Gezi park protests in Turkey.

The collapse of the Soviet Union, the outbreak of Arab Spring, and the Democratic party's nomination of Barack Obama have in common a transformative social movement that goes viral and takes the experts by surprise. The dynamics by which social movements break out of a small, localized group to become nationwide phenomena are not well understood. We propose to analyze the dynamics of social movement mobilization with the help of the critical mass model of social contagion proposed in Barash, Cameron, and Macy [2012]. This mathematical model points to the existence of a statistical signature for the attainment of critical mass by social movements that could enable early detection before the movement goes viral. Our research has the potential for a significant breakthrough in the ability of scholars and policy makers to anticipate viral phenomena.

### Approach:

The critical mass model of complex contagions (Centola and Macy 2007; Barash, Cameron and Macy 2012) makes two claims: first, that costly social behaviors, such as participating in social movements, will initially spread among dense networks and have a hard time reaching a large audience; second, a few costly behaviors nevertheless reach "critical mass" at which point their reach increases dramatically and they spread rapidly through populations. We are testing the critical mass model on digital traces of social contagions. These include Twitter posts and conversations around a number of recent events: the 2011 Egyptian revolution; the 2011 Russian Duma elections; the 2011 subsidy protests and 2014 #bringbackourgirls protests in Nigeria; and the 2013 Gezi park protests in Turkey. For each dataset, we identify tweets from individuals - generally relying on the presence of topical hashtags in their tweets - that were mobilized in response to these events. Based on when a Twitter user becomes mobilized, we develop measures of information flow, network structure, as well as language usage to evaluate whether the observed aggregate activity matches the characteristics of complex social contagions that go viral, as described in the Barash et al. model. We then correlate these measures with mass media accounts of demonstrations and other offline markers of social contagion virality, and improve the model to be more in line with offline data.

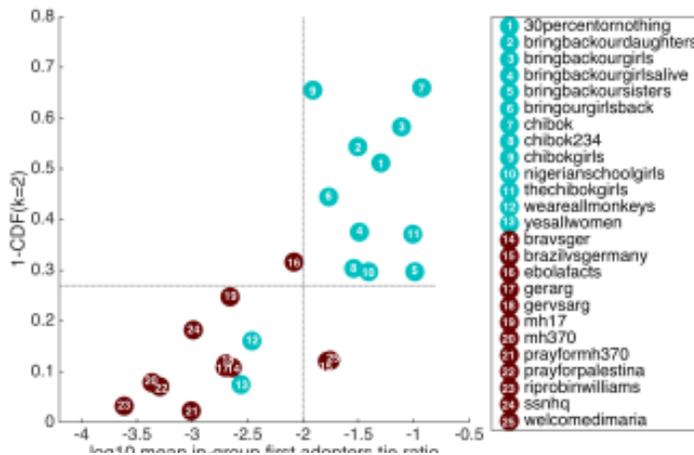
Our approach for identifying social contagions and the individuals mobilized therein is multipronged. We identify social contagions as bundles of Twitter hashtags and URLs and track overall adoption in terms of mentions of these objects by Twitter users; we identify community structure within the target datasets and analyze not only the global adoption patterns, but also the distribution of individuals adopting a contagion across different communities; finally, we then use natural language processing to look for changes in language usage (for example, anomalies in word usage, the use of affect laden language, and language associated with planning and coordination).

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<sup>\*</sup> *DOD Program Officer:* Ben Knott, Air Force Office of Scientific Research, benjamin.knott.2@us.af.mil  
*Anticipated period of performance:* Nov'14–Nov'17

**Scientific Progress and Key Findings:**

We have created a shared codebase on GitHub for programming and data analysis related to the grant, as well as a shared data repository on an FTP server. We have written code to identify digital traces of contagion in a Twitter dataset. We have also derived measures from complex contagion theory to gain insight into the types of trend or movement being observed, implementing code to calculate those measures for Twitter hashtags. We tested the robustness of our results across Twitter network information derived from multiple sources—follow versus mentions/retweet relationships, and found high correlation between computed measures using each network type. This finding is significant, because the mention/retweet network is much easier to extract and allows for a much faster rate of data collection and analysis going forward.



**Figure 15. Estimated “complexity” vs. density of connections for labeled hashtags**

Finally, we have tested our results on a set of empirical hashtags from Nigerian Twitter users active in 2014. **Figure 15** shows a subset of manually labeled hashtags related to events or news stories, with light blue corresponding to hashtags that were determined to have a sociopolitical component, be related to a movement, and/or to be risky to adopt; and red corresponding to hashtags that were judged to not have a sociopolitical component, not related to a movement, and not risky to share. The x-axis is the mean density of the network of connections among initial sets of hashtag adopters; the y-axis is estimated hashtag “complexity” (proportion of all hashtag

adopters that we measure to have adopted after more than 2 reinforcements). Complex contagion theory predicts that more costly behaviors like social movements will be more likely to be complex contagions and will initially spread among more dense networks. Our results are in line with the theory, with only two exceptions: #weareallmonkeys and #yesallwomen. These two exceptions are explained by the relevant data being outside the data frame for this analysis.

We have submitted these findings to the SNAM Special Issue on Diffusion of Information and Influence in Social Networks in August, 2015.

**Other Research Activities:**

Graphika has applied for and successfully received a human subjects exemption for its data collection efforts from WIRB (wirb.com). This exemption clears the way for Graphika to collect data prospectively for this project. Year two goals include the construction of a forward-looking social contagion monitor, which relies on prospective data collection, so the exemption clears an important hurdle in making progress on the next phase of the grant.

As part of the exemption application, Graphika put together a detailed procedure for anonymizing the data we collect. We believe this procedure may serve as a guide for other projects seeking to prospectively collect social media data, and are open to sharing the procedure and / or working with the DoD to incorporate it into social media data policy documents. We understand that each grant team has to secure

its own exemption / go through its own IRB process, as appropriate, and that our procedure does not guarantee exemption in every case.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

The outcomes of our proposal have direct applications for the Military Information Support Operations (MISO) community in understanding how messages propagate through a population, especially in the context of online communications. In particular, the contagion model can be used as a measure of effectiveness for operations, giving personnel a tool for determining which messages are playing well with a target audience. More generally, an understanding of the phenomena underlying the initiation of social movements and mass mobilizations, as well as methods for measuring these phenomena (to the degree that they are observable in public online communications), gives policy makers an additional tool in anticipating significant changes in the human terrain

**Sharable data resources generated to date:** (described on page 195):

- Dataset of hand-labeled Nigerian hashtags (early version, schema may be improved and further labels will be added)
- Dataset of aggregate statistics derived from complex contagion theory for popular Nigerian hashtags

The code base may also be available to share; contact the team to learn more.

## Military Transformation and the Rise of Brazil\*

Principal Investigator: **David R. Mares**, University of California, San Diego, [dmares@ucsd.edu](mailto:dmares@ucsd.edu)  
**Anne Clunan**, Naval Postgraduate School;  
**Harold Trinkunas**, Brookings Institution  
Project Manager: Ana Minvielle, [aminvielle@ucsd.edu](mailto:aminvielle@ucsd.edu)

**Aim:** Examine the conditions under which states are able to benefit from the interaction of science, technology, and military innovation to emerge as important powers in the international system.

**Country examined:** Brazil (including fieldwork)

We are interested in the intersection of technological innovation and emerging powers. From a social science perspective, it is the application of science and technology innovation in particular social, political, organizational and economic settings that allows some “potential” powers to develop a greater ability to impact the international system, and thereby rise in the hierarchy of states. Technology can be thought of broadly as the application of ideas to develop real-world capabilities. In the present day, scientific innovation is closely tied to technological development, and both science and technology have fundamental impacts on societies, economies, and state capabilities, including military capabilities. However, not all technologies translate into influence and power at the international level for all states at the same time.

Our goal is to examine the conditions under which states are able to benefit from the interaction of science, technology, and military innovation to emerge as important powers in the international system. We take as a given that scientific breakthroughs may produce far reaching changes, but want to examine the nature of the changes that matter for international politics and their impact on a state’s ability to project soft and hard power in the international sphere.

**Approach:** We use innovative social science to determine what domestic political, social, economic and organizational configurations support research, development and implementation of key technologies (nuclear and ballistic missile technology, avionics, and cyberwarfare) in potential powers that may provide states with greater influence in the international system. Research is oriented around four integrated projects that will provide insights into the nature, activities and long-term development prospects for military transformation in emerging states. Each project has its own relevant literature, will utilize distinct methodological approaches and has overlapping data requirements.

- *New Currencies of International Power* examines systemic dynamics that create opportunities for exerting influence at the international level.
- *Scientific and Technological Development and its Impact on Military Transformation* investigates how the national security definitions of dual use technologies affect cooperation between the scientific community and the military.
- *Military Transformation and Emergence as a Great Power* examines the importance of a scientific-technological-military network of sufficient connectivity and density to be capable of producing the desired output, the development of the political will or intentions to incorporate transformative military capabilities into a state’s approach to foreign policy, and identification of how elites construct the concept of “national interest.”

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*Period of Performance:* Aug’14–August 2015 (project complete)

- *The Impact of the Science-Technology-Military Complex on International Behavior* analyzes how the specific nature of the science-technology-military complex, the process by which it is integrated into state capabilities, and its influence on state intentions affect the determination of whether the rising power adopts system-enhancing or system-disrupting behaviors internationally.

**Scientific Progress and Key Findings:** Desposato and his co-authors conducted survey experiments in China and Brazil, the latter funded by the Minerva grant. The paper assessed the scope of popular preferences for peace with democracies. The survey randomly varies both the hypothetical target's regime type and United Nations authorization for military action, responding to concerns that regime labels may trigger unintended value judgments about the target's legitimacy. Surprisingly, they found that respondents in both Brazil and China are significantly less likely to favor attacking a democratic opponent. Even so, UN authorization has a much larger effect on a respondent's support for using force.

Diniz paper hypothesized that Status can be very important in non-crises, normal situations by buying time until reputation is established — especially when combined with other alternatives. Being recognized as a democracy gave Brazil a status advantage, due to expected working of informational and domestic audience-costs generation mechanisms, that, combined with then existing safeguards and commitments, bought time for a credible reputation as reliable nonproliferator to establish and for monitoring democratic consolidation. In time, reputation and domestic audience-related institutions have brought to Brazil a large maneuvering-room in nuclear-related activities — Resende, nuclear submarines, Model Additional Protocol, Iran.

Mares and Trinkunas are finishing a book MS that examines how Brazil attempts to combine hard and soft power to influence international governance. The MS focuses on security, economic and global commons domains. We found that the scientific-technological goals established for the defense sector are really more means to promote national development than to increase its military capabilities. We also conclude that the key obstacles to a sustained rise in Brazilian influence on the international stage lie in its domestic political economy rather than in efforts by current great powers to block Brazil's rise.

**Other Research Activities:** We have already produced some articles and conference papers. Individual researchers are continuing to work on articles. Of particular interest to Minerva would be the comparative work on China and Brazil by Scott Desposato and the comparisons between Russia and Brazil that Anne Clunan is developing.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:** Brazil is one of the few countries to have mastered the complete nuclear fuel cycle: it is able to export significant nuclear technologies, yet it is also critical of the international nuclear nonproliferation regime. Brazil in the future will become a significant source of defense-related and dual use technologies, yet is generally resistant to the highly restrictive export control regimes advocated by the US. This makes it important to understand whether Brazil's growing capabilities will lead it to do more to reshape international regimes to match its current preferences, or whether its achievement of major power status will lead it to adopt policy preferences closer to those of the US in an effort to restrict new additions to the major powers club.

**Future Work:** We will hold our final workshop at which we will discuss these questions in Winter 2016.

**Academic Publication through this Minerva research:**

James Clay Moltz, "Brazil's space program: Dreaming with its feet on the ground" *Space Policy* July 2015.

## Quantifying Structural Transformation in China\*

Principal Investigator: **David Meyer**, University of California, San Diego, [dmeyer@math.ucsd.edu](mailto:dmeyer@math.ucsd.edu)  
**Victor Shih**, University of California, San Diego

**Aim:** Develop methods to quantify and model changes in the political/economic structures in China, to collect data on these structures, to apply the methods developed to the data, and to analyze the results.

The procedures for leadership transitions in China seem to be increasingly institutionalized, but they are still far from transparent. We propose to exploit several features of the Chinese Communist Party (CCP) system to develop novel quantitative analysis methods for CCP leadership dynamics. In particular, the hierarchical nature of the CCP is reflected in the ranking of the political elite so, for example, the several hundred Central Committee (CC) members and alternates are ranked, although starting with the 9th National Party Congress (NPC) in 1969, only the ranks for the Politburo Standing Committee (PSC) and the alternate members have been announced. Our first goal is to develop methods to quantify changes in (partially) ranked data that apply to the dynamics of the CC.

Conflict among the political elite in China is believed to be factional, where factional ties are social relations of mutual obligation, *guanxi*, primarily observable as a consequence of common birthplace, school, or work, *i.e.*, specific types of homophily. As correlations between factional strength and political rank have already been observed, we also seek to investigate whether informal ties between the political and military élites in China affect policy and personnel outcomes. To support this analysis, another goal is to develop novel quantitative methods to measure changes in such (multi-mode) social networks.

### Methodology:

Any metric on the space of permutations can be extended to give a (Hausdorff) distance between subsets of permutations. Defining these to contain permutations consistent with a partial ranking means we can construct a metric on partial rankings. We do this by composing an  $l_p$  norm with a “rank transform function” chosen to emphasize changes at the top of the ranking, and to control the effect of the size of the set being ranked.

Our approach for networks and for “thick networks” will be similar: Each can be identified as a metric space in its own right; then the Gromov-Hausdorff metric defines a distance between pairs of networks.

These methods will be applied to data recorded in a pair of datasets we are constructing: (1) A comprehensive set of biographies of Chinese élite, including CC level élite, provincial élite, as well as military élite from 1978 to the present. (2) A set of partially ranked listings for the PSC, Politburo, CC and CC alternates for the 1st through 18th National Party Congresses of the CCP.

Once we have constructed updated biographical data on the Central Committee and provincial standing committee elite, we will explore various measures of factional ties that best predict important personnel outcomes in the regime, such as promotions and removal. The updated data also allow us to explore the shifting foundations of elite social networks over time, including into the current administration of Xi Jinping.

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*Period of Performance:* Aug'12–**August 2015 (project complete)**

**Scientific Progress and Key Findings:**

We have developed a metric (distance) on partially ranked data that encodes the importance of higher ranks. We derived an efficiently computable formula for the distance between two partial rankings and wrote code to implement it. Using the second dataset described above, we have figures that show the distance between the partial ranking of the Party leadership after each NPC from the preceding one. We have compared these results with the historical record; perhaps the most obvious feature of this plot, the recently emerging 10-year periodicity in the curves, captures the increasing institutionalization of leadership transitions in China.

We use the first data set described above to calculate how many CC members have had ties with the party secretary general (PSG) of the CCP. We calculated the share of active military officers in the CC who had various kinds of ties with the serving PSG from the 1992 14<sup>th</sup> NPC to the 2012 18<sup>th</sup> NPC. At the 14<sup>th</sup> NPC, for example, seven military officers in the CC had been born in the same province as Jiang Zemin, and an additional five officers had worked in the same city when he was a Shanghai official. An additional 4 officers served in a military region, of which Shanghai was a part (Nanjing MR) during this time. In 1992, a total of 21 officers in the CC had ties with Jiang, but by the 1997 15<sup>th</sup> NPC, 25 officers had some ties with Jiang. The percentage of CC active duty officers with ties with Jiang rose from 25% in 1992 to 27.4% in 1997. This suggests that Jiang was able to increase his influence in the military over time. When Hu Jintao took power at the 2002 16<sup>th</sup> NPC, he had ties with 43% of all active duty officers in the CC. This is not surprising given that Hu had served in many provinces, including the restive region of Tibet. Unlike Jiang, however, over his tenure, Hu Jintao was not able (or not willing) to increase the share of active duty officers with ties to him in the CC. At the 2007 17<sup>th</sup> NPC, the share of active duty officers with ties to Hu dropped to 34%. These data suggest that Hu Jintao was unable to further consolidate his control over the military during his tenure. Interestingly, there are no officers with direct work ties with Xi Jinping in the CC today. To be sure, Xi has a support network of officers who are princelings, which are not recorded here (although we are gathering this data). However, given Xi's effort to consolidate power within the military, one would expect to see that the share of active duty officers with ties with Xi to go up over his tenure.

The second main set of research accomplishment from this project involves the completion of the Central Committee biographical data set, which contains much more complete and updated information than any existing data. Second, we completed a novel biographical data base on provincial standing committee members from 1992 to 2015, which contains every publicly available attribute of this body of political elite. On the basis of this biographical data, we have begun to test the basis of factional ties since the reform in 1982.

In a paper using the new data, we inquire which of the four measures of factional ties mentioned in the literature predicted promotions most consistently from the 12<sup>th</sup> Party Congress to the 18<sup>th</sup> Party Congress. Our results show that a broad definition of faction (Ties 1) will not be the best factional indicator to use in many cases. The strictest definition of factional ties (Ties 4) significantly increases the probabilities of promotion by the most in most party congresses. Substantively, we uncover signs that the party institutions may allow deposed secretary generals some measure of influence over promotions even after their political demise. At the same time, strict retirement rules on lower level officials gave rise to a cohort effect that gave the general secretary greater influence over the promotion of alternate Central Committee members to the full Central Committee during their first term than in subsequent terms.

**Other Research Activities:**

In February 2015, the project held a conference on Quantitative Studies of the Chinese Elite. There were

two roundtable discussions and 15 original research papers presented. Nine selected papers from the conference are currently under review at the *Journal of East Asian Studies* as a special issue on Contentious Elite in China.

### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

The strengths of China's economy and military, both supported by scientific and technological capabilities on trajectories to becoming world-class, make understanding Chinese leadership crucial for US national defense planning. These data sets and analysis methods seek to transcend traditional views of political processes in this regime as a "black box" and systematically examine how formal and informal institutions interact together to produce important political and policy outcomes. Furthermore, the quantitative biographical data allow researchers to generate social network maps of any senior Chinese political leader. This makes the potential informal power base of Chinese leaders, both current and future, immediately transparent to US policy makers.

### **Future Work:**

Future work will continue to investigate the dynamics of factional politics in China. An ongoing paper seeks to investigate how the rise and decline of a high level patron impacts the careers of mid-level officials. Another ongoing project investigates whether the dominance of local officials at the provincial level results in different lobbying tactics for central government resources, which in turn affect the patterns of public goods provision and investment in a province.

### **Academic Publications through this Minerva research:**

- O. Bucicovschi, R.W. Douglass, D.A. Meyer, M. Ram, D. Rideout and D. Song, "Analyzing social divisions using cell phone data", UCSD preprint (2013). – awarded Best Scientific Prize in the Data for Development (D4D) competition at NetMob 2013, MIT, Cambridge, MA.
- L. Wilke, "Comparing partial rankings", UCSD Mathematics Senior Thesis (May 2014).
- D. Song and D.A. Meyer, "A model of consistent node types in signed directed social networks", proceedings *IEEE/ACM International Conference on Advances in Social Network Analysis and Mining (ASONAM)*, Beijing, China (17–20 August 2014) 72–80.
- D. Song and D.A. Meyer, "Recommending positive links in signed social networks by optimizing a generalized AUC", proceedings *Twenty-Ninth AAAI Conference on Artificial Intelligence (AAAI-15)*, Austin, TX (25–29 January 2015) 290–296.
- D. Song, D.A. Meyer and D. Tao, "Efficient latent link recommendation in signed networks", proceedings *21<sup>st</sup> ACM Conference on Knowledge Discovery and Data Mining (KDD2015)*, Sidney, Australia (10–13 August 2015) 1105–1114.
- D. Song and D.A. Meyer, "Link sign prediction and ranking in signed directed social networks", *Social Network Analysis and Mining*, to appear.
- D.A. Meyer, M. Ram and L. Wilke, "Circulation of the élite in the Chinese Communist Party", under review at *The Journal of East Asian Studies*.
- D.A. Meyer, V. Shih, J. Lee. "The Performance of Various Factional Indicators" under review at *The Journal of East Asian Studies*.

### **Sharable data resources:** Details on page 191.

- Partially Ranked Lists of CCPCC Members: 1<sup>st</sup> through 18<sup>th</sup> National Party Congresses
- A Biographical Database of Central Committee Members: 1978-2015
- A Biographical Database of Provincial Standing Committee members: 1978-2015

## **Taking Development (Im)Balance Seriously: Using New Approaches to Measure and Model State Fragility\***

Principal Investigator: **Jonathan Moyer**, [jmoyer@du.edu](mailto:jmoyer@du.edu)

**Barry Hughes, Erica Chenoweth, Cullen Hendrix, Oliver Kaplan, and Timothy Sisk**

University of Denver's Josef Korbel School of International Studies

<http://pardee.du.edu>

**Aim:** We aim to better understand the relationship between imbalances in development and abrupt socio-political change

Development imbalances—high levels of human development coupled with poor access to political decision-making structures—were a key driver of abrupt socio-political change in Arab Spring countries. Do development imbalances (coupled with intervening variables measuring governance capacity and social mobilization capacity) help us better understanding abrupt socio-political changes historically? What are the policy implications that can be drawn from a better understanding of this relationship?

### **Planned Methodology:**

Our team is working on a mixed methods approach for identifying and measuring (im)balances in a country's development, which we will find in existing theory and empirical analysis. We root ourselves in literatures, including those of modernization theorists and structural economists, arguing that development processes unfold in patterns. However, we understand that it is not always the case that “all good things go together.” Instead, as Arab Spring countries demonstrated, significant change in some domestic systems but not others—for instance, human development and not governance development—results in destabilizing imbalances. Because existing state fragility indices largely correlate with national income levels, they have repeatedly overlooked the possibility of socio-political turmoil in middle-income nations, where these (im)balances are perhaps the most pronounced.

We are establishing these relationships through a combination of statistical and algorithmic analyses of existing data sets, as well as qualitative case studies that will help us bridge the gap between macro-level and micro-level theory. We propose to use these findings to forecast prospective abrupt change using the International Futures (IFs) modeling system, an analytic tool used in recent National Intelligence Council's Global Trends reports and more broadly.

### **Anticipated Outcomes of Research:**

At the end of the third year of this research (currently finishing the first year) we plan to produce a quantitative forecasting platform that allows for scenario planning and trend analysis to better understand how macro-level imbalances and drivers of state fragility are changing issues in global security. We will produce new data related to Major Episodes of Contention (led by Prof. Chenoweth), gather large amounts of data on control variables, other replication studies, and theorized drivers of instability (and improve the DataGator Data Aggregator tool), and improve the International Futures integrated modeling platform to better understand how changes in drivers of instability are likely to interact with other variables to impact state fragility

### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

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\* *Government Program Officer:* Micheline Strand, Army Research Office

*Government Point of Contact:* Lisa Troyer, Army Research Office, [lisa.l.troyer.ctr@mail.mil](mailto:lisa.l.troyer.ctr@mail.mil)

*Anticipated period of performance:* Sept' 14–Aug' 17

Extant measures of state fragility poorly predicted the Arab Spring. An improved understanding of abrupt socio-political change is important for government policy related to diplomatic connections, strategic alliances, and humanitarian assistance.

**Sharable data resources:** (described on page 202)

- *Major Episodes of Contention (MEC) dataset:* The Major Episodes of Contention (MEC) data project will identify major episodes of mass nonviolent, violent, and "mixed" contention from 1945-present, with annual updates, so that researchers can better understand the origins and outcomes of contentious behavior.
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## Minerva Research Summaries: Ongoing Projects

- *DataGator Data Aggregator*: The DataGator data platform allows users to upload, merge, transform, and manipulate data uploaded by other researchers. It allows for heterogeneously structured data (across the dimensions of space, time, and unit of analysis) to interact with data produced by others to quickly produce data in various formats for more efficient quantitative analysis.
- *International Futures tool*: This project will fully endogenize the representation of state fragility in International Futures to incorporate more variables associated with developmental imbalances. This will extend the number of questions analysts can ask and answer associated with changes in agriculture, demographic, economic, education, energy, governance, health, infrastructure, international politics, and technology for 186 countries over long time horizons.

## **Terrorist Alliances: Causes, Dynamics, and Consequences**\*

Principal Investigator: **Philip Potter**, University of Virginia, [pbkp@umich.edu](mailto:pbkp@umich.edu)  
**Erica Chenoweth**, University of Denver; **Michael Horowitz**, University of Pennsylvania

**Aim:** Determine when and how terrorist groups ally with one another, states, and other non-state actors.

Recent scholarship challenges the image of the individual terrorist as a “lone wolf,” suggesting few terrorists truly exist in isolation. The same is true of terrorist groups. Examples from around the world suggest that alliances between terrorist groups represent the rule much more than the exception. Such alliances can enhance the capabilities of the linked groups. When and how do terrorist groups ally with one another, states, and other non-state actors?

Unfortunately, answering that question is difficult because there is no comprehensive, time series data on terrorist alliances, and little systematic academic work addressing their causes and consequences. But understanding these alliances is vitally important for those interested in U.S. security and counter-terrorism strategy. Intelligence organizations around the world already attempt, at the micro-level, to networks of terrorists within groups like Al Qaeda. We believe that a clearer understanding of the relationship between organizations will also yield significant benefits for those interested in reducing the capacity of these groups to inflict harm.

### **Approach:**

We began our dataset construction by generating a list of all terrorist groups known to exist from 1945–present. We have completed data collection and are now cleaning and validating the information. We have collected data on: 1) the onset of collaboration; 2) the type of collaboration (material, training, ideological/inspirational, or intelligence); and 3) the termination of collaboration. These data are linked to existing datasets on the activities of terrorist groups.

We adopted a three-tiered data-collection strategy. First, we drew on publically available declassified, media, and scholarly sources both to assess the validity of alliances identified in prior research and identify relationships missed by prior data collection efforts. We then supplemented these data with all available information on the genesis and decline of relationships in order to build a temporal dimension into the data. This element is largely absent from existing studies but is crucial for any work that hopes to make causal inferences. In a parallel process, we are using the same sources to develop brief case studies of key collaborative relationships. Qualitative analysis will further establish the motivations behind terrorist alliances, the processes that give rise to them, and the direction of the causal arrows in terms of the relationship between alliance and capability.

### **Implications for National Defense**

Our research speaks to issues of key concern to the defense community. First, given the demonstrated role of these networks in the spread of deadly terrorist tactics, understanding how these networks develop is crucial to disrupting them. For example, one issue of concern today is the spread of advanced improvised explosive device technologies from Iraq to Afghanistan and beyond. This research will help us to better understand how to prevent groups from forming alliances with more committed groups, helping the US government control the capability and lethality of both groups. Second, our project will be able to track changes in the behavior of alliance networks over time, such as the addition or subtraction of other

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\* *Government Program Officer:* Martin Kruger, Office of Naval Research, [martin.kruger1@navy.mil](mailto:martin.kruger1@navy.mil)  
*Anticipated period of performance:* June’12–**September 2016**

groups, recruitment patterns, the selection of certain tactics, and the effects of government response on the composition of the networks. Third, and finally, our project will be the first to systematically study the disruption and breakdown of terrorist alliances.

### Anticipated Research Products:

1. Terrorist Alliance Database described on page 206 (will be publicly available).
2. An interactive website containing the dataset, animations of relationship formation over time, a resource bibliography, and profiles on each terrorist group alliance.
3. Additional refereed articles explaining the rise and decline of terrorist group alliances based on our analysis of the data and case studies. These articles will include:
  - A paper on the founding of terrorist alliances, based on our new dataset.
  - A methodological paper on the design of the study of terrorist alliances.
  - A paper on factors that influence the end of terrorist alliances. This paper should be of particular interest to the Department of Defense since it will explore strategies that states have used to disrupt relationships between groups and the success and failures of those various strategies
  - A book bringing together the papers described above and including in-depth case studies and network maps of the terrorist alliance universe.

### Minerva Funded Research Products

1. Michael Horowitz and Philip Potter “Allying to Kill: Terrorist Intergroup Cooperation and the Consequences for Lethality.” *Journal of Conflict Resolution*, March 2014. [[link](#)]
2. Philip Potter “Terrorism In China: Growing Threats with Global Implications,” *Strategic Studies Quarterly*, Winter 2013. [[link](#)]
3. Max Abrahms and Philip Potter. “Explaining Terrorism: Leadership Deficits and Militant Group Tactics” *International Organization*, (2015) Vol. 69, No. 02, pp. 311-342.
4. Michael Horowitz, Evan Perkoski, and Philip Potter, “Tactical Diversity in Militant Violence.” *Under review*.
5. Michael Horowitz, Evan Perkoski, and Philip Potter, “The Life-Cycle of Terrorist Tactics: Learning from the Case of Hijacking.” *Working Paper*.
6. Max Abrahms and Philip Potter, “Learning Strategic Restraint.” *Working Paper*.
7. Meredith Blank and Philip Potter, “United We Stand, Divided We Fall: Understanding Intergroup Cooperation in Domestic Conflict.” *Working Paper*.

## Political Reach, State Fragility, and the Incidence of Maritime Piracy: Explaining Piracy and Pirate Organizations, 1993–2015\*

Brandon C. Prins, University of Tennessee, bprins@utk.edu  
and Ursula Daxecker, University of Amsterdam  
<http://brandonprins.weebly.com/maritime-piracy.html>

**Aim:** Develop systematic explanations and analyses of piracy globally- and regionally-speaking.

Research on maritime piracy consists largely of case studies of countries or regions with particularly pressing piracy problems. We therefore lack systematic explanations and analyses of piracy globally and regionally speaking. In part, this problem stems from the absence of comprehensive and systematic data on pirate attacks. While several international organizations (such as the IMB) collect information on piracy incidents, no unified data source exists to date. In addition, data on incidents collected by these organizations provide almost no information on the pirates and their organizational structure.

### Project Objectives:

1. Explore the structural and micro-level drivers of modern maritime piracy.
2. Geo-code all piracy incidents worldwide 1993–2016
3. Cross-check piracy incident data from the International Maritime Bureau (IMB) against other available data collection efforts (ASAM and IMO).
4. Build database on pirate organizations in four or five countries using expert surveys.
5. Use theoretical model to build country-level and sub-national (for several countries) risk indices.
6. Forecast piracy globally and in specific country-contexts.
7. Build a web-based portal to access incident level data on maritime piracy and map incidents (with filtering capability).

### Methodology

- Our research methodology consists of testing theoretical conjectures with **new geo-coded event data**. The first stage of this effort has been completed with all incidents reported by the IMB recorded and geo-coded from 1995–2014. We are currently comparing the IMB data to IMO and ASAM to assess the overlap in the events coded. We have finished years 2010–2014 for IMO and 2008–2014 for ASAM. We have added over 200 observations to our dataset that IMB did not have. Our initial dataset can be found on the website in both excel and stata formats. We also have uploaded a Shapefile of our data. We currently are working on an online application<sup>12</sup> that can map the incidents and enable users to filter on important characteristics.
- To improve existing knowledge of pirate organizations, **expert surveys on pirate groups in four countries** will be conducted. Surveys include questions on pirate group location, size, ports used by the organizations, connections to insurgents and or terrorist groups, among others. The resulting data will be uploaded into a database that is publicly accessible.
- Our research project also employs methodological tools that allow us to **evaluate and forecast maritime piracy** both at the global level and in several piracy-prone regions and countries, such as Nigeria, Indonesia, and Bangladesh. We intend to use our theoretical model to establish a risk index of piracy-prone countries.

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\* *Government Program Officer:* Martin Kruger, Office of Naval Research, martin.kruger1@navy.mil  
*Anticipated period of performance:* Nov'13–Aug'16

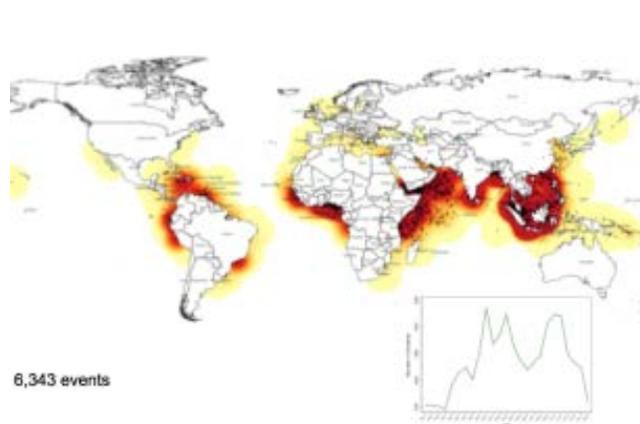
<sup>12</sup> A beta version of this application can be found at <http://mpmap.mappingpiracy.net/#/map>.

**Scientific Progress & Key Findings**

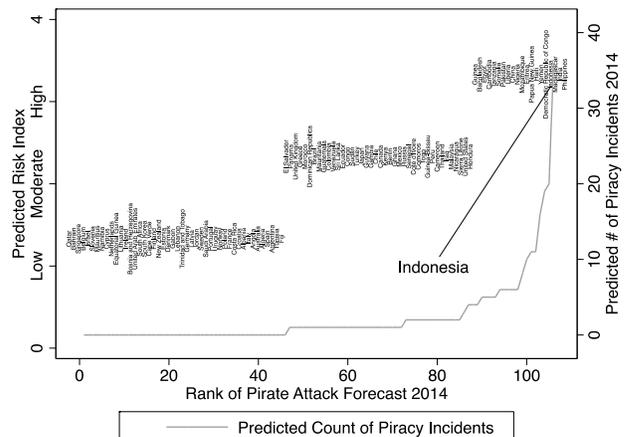
- We observe that countries experiencing piracy have government fragility scores that are on average 65% higher than countries not suffering from piracy. Similarly, opportunities (or lack thereof) in the legal economy affect the prevalence of piracy. Unemployed youth (especially males) provide the foot soldiers both for insurgencies and pirate gangs. Per capita gross domestic product (current \$US dollars) for countries experiencing piracy is only \$5,172. The value for countries without piracy is more than three times higher at \$17,753.
- One part of our Minerva Project assesses the ability of governments to project power over distance. That is, it is one thing for a state to provide law and order in and around its capital city. It may be quite another to provide law and order far away from the center of government. We are interested in gauging how far governments can project the power they have. Our evidence shows the effect of state weakness on piracy increases with increasing distance between capitals and coastlines. Since weak states cannot project power over territory effectively, pirates strategically locate outside of a government’s political reach. We see that as state strength increases, piracy moves farther away from capital cities.
- We see that the value of a country’s fish catch associates with piracy. As the price of fish increases, piracy declines.
- Preliminary evidence shows piracy and insurgency to correlate with one another. This finding may indicate that insurgents use pirate attacks as a fund-raising arm of their movements.

**Trends in 2014**

- Global piracy counts in 2014 down 7% from 2013 and 44% from 2011
- Greater Gulf of Aden piracy drops dramatically from 2011 (152 incidents) to 2014 (3 incidents).
- Piracy in Indonesian waters doubles from 2011 to 2014
- Nigerian piracy increases by over 160% from 2011 to 2013, but drops by 40% in 2014
- Bunkering of transport oil now a threat not only in Guinea Gulf waters but in SE Asia as well.
- Success rate of pirate attacks over 90% in Indonesian waters but only around 50% in the Gulf of Guinea (location of attack important. Only 15% of attacks in Indonesian waters occur while ships are steaming.
- Over 75% of attacks in Nigerian waters occur while ships are steaming).



**Figure 17. Maritime Piracy Event & Location Data Project Shapefile, 1993–2014**



**Figure 17. Country Risk Index, 2014**

**Trends in 2015 (January–June)**

- Global piracy counts in first 6 months of 2015 up 30% from 2014.
- Piracy in Indonesian waters up 37% (and hijackings up 50%) in first six months of 2015 compared to 2014.
- Piracy in Vietnamese waters up a staggering 1200% in first six months of 2015 compared to 2014.
- Piracy in Filipino waters up 150% in first six months of 2015 compared to 2014.
- Hijackings up 130% in Malaysian waters in first six months of 2015 compared to 2014.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Maritime piracy represents a post-Cold War challenge to U.S. and international security and remains underexplored. Yet understanding the incidence and evolution of maritime piracy in multiple contexts is essential for developing effective government policy and clarifying public perceptions of the pirate threat. In order to craft effective counter-piracy strategies, governments need to know where and why incidents are occurring, but also how pirate groups are organized and carry out their attacks. Improving our understanding of the determinants of piracy thus has several implications for national defense. Our research also explores both the securitization of the US relationship with Africa and other underdeveloped countries and connections between piracy and insurgent and terrorist groups. Importantly, our recent findings suggest that counter-piracy efforts have additional benefits, such as reducing conflict violence by eliminating a funding source for insurgents. While substitution effects for forms of resource appropriation not included in our model (e.g. petty crime) remain possible, our results for oil and diamonds show that insurgents cannot easily replace loot from piracy with gains from other natural resources.

**Selected publications:**

- Ursula Daxecker & Brandon Prins. 2016. “Enforcing Order: Territorial Reach and Maritime Piracy.” Forthcoming in *Conflict Management and Peace Science*.
- Ursula Daxecker & Brandon Prins. 2015. “Searching for Sanctuary: Government Power and the Location of Piracy.” Forthcoming in *International Interactions*.
- Ursula Daxecker & Brandon Prins. 2015. “The New Barbary Wars: Forecasting Maritime Piracy.” *Foreign Policy Analysis* 11(1): 23-44.
- Brandon Prins. 2014. “What Drives Piracy in Sub-Saharan Africa.” Published online at Piracy-Studies.org, November 11, 2014. <http://piracy-studies.org>.

**Sharable data resources:** (descriptions on page 208)

- Global Piracy Incidents Data Project
- Maritime Piracy Event & Location Dataset
- Maritime Piracy Mapping Application)<sup>13</sup>
- Mapping Pirate Organizations Database (MPO) – Survey data on pirate organizations in four or five piracy-prone countries.

<sup>13</sup> New in 2015. Access beta version at <http://mpmap.mappingpiracy.net/#/map>.

## Who Does Not Become a Terrorist, and Why? Towards an Empirically Grounded Understanding of Individual Motivation in Violence and Non-Violence\*

Principal Investigator: **Maria Rasmussen**, Naval Postgraduate School, [mrasmussen@nps.edu](mailto:mrasmussen@nps.edu)

**Richard English**, University of St. Andrews, Scotland

**Rogelio Alonso**, King Juan Carlos University, Madrid, Spain

**Aim:** Determine why individuals, even some supporters of supporters of armed militancy, eschew violence?

**Countries examined:** Colombia, Germany, India, Indonesia, Ireland, Italy, Lebanon, Mexico, the Philippines, Scandinavia, Spain, Thailand, Turkey, Oman, and Yemen

This project aims to examine an important question: Why do individuals eschew violence? Since the 1990s scholars have periodically conducted fieldwork among terrorists in order to understand the motivation of individuals who decide to engage in violence. The body of literature that resulted from these endeavors has been too deterministic. In every context we find many individuals who share the demographic, family, cultural, and/or socioeconomic background of those who decided to engage in terrorism, and yet refrained themselves from taking up armed militancy, even though they were sympathetic to the end goals of armed groups. The field of terrorism studies has not, until recently, attempted to look at this control group.

This project is not about terrorists, but about *supporters* of political violence. Our goal is twofold. First, we propose to study supporters of armed militancy, in order to describe the panoply of activities they are willing to undertake short of violence, and the determinants of those actions. At the same time, we aim to contribute to theory building in the field of individual radicalization by looking at a control group that has, so far, never been studied.

### **Approach:**

Our research design is straightforward. The research team worked on various iterations of a questionnaire of closed- and open-ended questions to be used in fieldwork. The questionnaire attempts to cover four major explanations of why individuals become radicalized, and also attempts to gauge why, in the case of terrorist supporters, that radicalization was interrupted.

In 2014-15, team members conducted fieldwork in Colombia, Germany, India, Indonesia, Ireland, Italy, Lebanon, Mexico, the Philippines, Scandinavia, Spain, Thailand, Turkey, Oman, and Yemen. Each case study involved extensive interviews with activists and militants in parties and NGOs who, though sympathetic to radical causes, chose a path of non-violence. This research yielded over 100 life histories.

Following the fieldwork, the team recently met for a workshop in which authors discussed preliminary findings from their interviews. Currently, case study authors are revising papers, and the co-PIs expect to have a finished manuscript by Spring 2016.

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*Anticipated period of performance:* July'13–June'16

### **Scientific Progress:**

Preliminary findings from this study point in two directions:

1. Support for violence is not an absolute concept. It ebbs and flows, it mutates, depending on a number of conditions.
2. There is no single factor that explains an individual's rejection of violence. Rather, the decision not to engage in violence appears to be a combination of several factors. Structural and ideological reasons are present, but appear less significant than family influences, emotional responses, or the cost-benefit analysis of the utility of violence.

### **Anticipated Outcomes of Research:**

This study will fill a huge gap in the literature on terrorism and counterterrorism on two counts:

1. It is generally accepted that terrorists cannot function without support from the population among which they hide. Yet that group of individuals, the terrorist supporters, has never been studied before. This project will attempt to explain for the first time why, how, and under what sociopolitical conditions, individuals will support terrorism without actually joining a terrorist group.
2. The terrorist supporters share with the terrorists a number of demographic, cultural and socioeconomic characteristics. Yet the supporters choose not to join the terrorist groups. Instead, they opt to assist and not to engage in violence. By looking at the motivation of terrorist supporters, the research team will be able to refine the existing theoretical explanations of motivation in terrorism.

### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

This study, and the resulting manuscript that analyzes the main findings from systematic, cross-regional and cross-national comparisons, will broaden our knowledge base on the subject of support for violence, and thereby inform sound policymaking in the area of counter-radicalization and counter-terrorism.

In the last decade, the U.S. government has made a number of assumptions about the main determinants of violent behavior. Government policy has emphasized creating a counter-narrative to those ideologies of hate that we assume motivate the terrorists. Yet personal accounts from Ireland to Indonesia reveal that family, kin and peer groups are significantly more important than ideology in the making of a radical. Therefore, the results of this study have direct applicability to defense missions and national security.

## Terrorism, Governance, and Development\*

Principal Investigator: **Jacob Shapiro**, Princeton University, [jns@princeton.edu](mailto:jns@princeton.edu)

**Eli Berman**, University of California at San Diego;

**Joshua Blumenstock**, University of Washington; **Jason Lyall**, Yale University;

**Joseph Felter** and **David Laitin**, Stanford University

Project Manager and Point of Contact: Kristen Seith, [kseith@princeton.edu](mailto:kseith@princeton.edu)  
<http://esoc.princeton.edu>

**Aim:** Enhance understanding of how to implement governance and development policies to more efficiently (re)build social and economic order in conflict and post-conflict areas. We use new data from a range of locations to extend and test current theories and provide empirically-based findings to inform policy decisions about terrorism, governance, and development.

**Countries examined:** Via fieldwork: Colombia, India, and Northern Ireland; without Minerva-funded fieldwork include AFG, COL, EGY, IND, IRQ, KEN, MEX, PAK, PHL, and VNM.

There is a tremendous need to better understand how our efforts to rebuild social and economic order in conflict and post-conflict regions can effectively reduce violence. Although billions of taxpayer dollars are spent on aid interventions each year in conflict zones, and billions more are spent on military assistance and military interventions, these activities have rarely been subject to independent, rigorous evaluation in the manner that domestic social programs have been. This need is only growing more critical, as the world's major powers emerge from the end of the wars in Afghanistan and Iraq, yet still struggle on how to build stability with smaller military footprints in a number of regions.

### Approach:

Over the past six years, the research group supported under the Minerva Research Initiative's grant, "Terrorism, Governance, and Development" (TGD) has demonstrated the value of rigorous analysis of micro-level data on conflict and the policies implemented to prevent or resolve them. From Afghanistan, to Iraq, to the Philippines, to Pakistan, recent papers exploiting careful econometric approaches have contributed to basic social scientific knowledge, as well as to the evaluation of tactical, operational, and strategic issues in national security policy.

Our methodology is based on using game-theoretic models to generate refined predictions about specific interactions (e.g. aid and violence) that can be tested with careful attention to causal identification. Although this approach has been successful in analyzing non-violent social systems, only a small handful of researchers are bringing this powerful approach to the study of conflict. One major obstacle to employing this approach is that the highly-aggregated measures of terrorism and insurgency captured in most *existing* data do not permit researchers to quantitatively study the impact of sub-national factors, which leave scholars open to a host of ecological-inference problems. Therefore, we gather high quality research data from conflicts around the world and conduct new fieldwork.

### Scientific Progress and Key Findings:

- Governments (and their allies) who incur civilian casualties in their operations will face more attacks. Rebels face a symmetric reaction (causing casualties makes it harder for them to operate) in some regions but not all.
  - Afghanistan (NBER WP16152), Iraq (*American Journal of Political Science*)

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*Anticipated period of performance:* May'09–December 2015

- Findings briefed to GEN McChrystal and CJCS (March 2010)
- Poor economic conditions can be negatively correlated with violence and support for militancy.
  - Regions with high unemployment have less insurgent violence: Afghanistan, Iraq, and the Philippines (*Journal of Conflict Resolution*)
  - The poor are more negative towards militant organizations, likely because they suffer more from the externalities of militant violence: Pakistan (*American Journal of Political Science*)
- Small-scale reconstruction projects are violence reducing; large-scale ones are not.
  - Iraq (*Journal of Political Economy*), Vietnam (Working Paper)
  - Findings briefed to GEN Petraeus (November 2010) and USAID (various dates)
- The design of development programs is critical. (*American Economic Review Papers & Proceedings*)
- ICT-based election monitoring displaces corruption. (*American Economic Review*)
- We have developed a standard set of questions and innovative survey methods to elicit sensitive views, such as support for armed actors. Surveys were fielded in Northern Ireland and Colombia with TGD funding and in Afghanistan, Pakistan, Palestine, and the Philippines with other funding sources. This methodology is discussed in Kosuke, Rosenfeld, and Shapiro's forthcoming article (*American Journal of Political Science*) and these techniques are now being employed by other scholars and those conducting survey work for the USG in Afghanistan, Colombia, Iraq, Mexico, and Nepal.
- A refined theory of insurgency may serve as an alternative framework to previously under-specified military doctrines. The baseline model has been published in the *Journal of Political Economy*.

#### **Other Research Activities:**

- More than 40 publications in peer-reviewed journals provide new research findings on conflict topics.
- Research-ready, fine-grained geospatial data on aid, economic development and political violence in seven countries is now available via the Empirical Studies of Conflict (ESOC) website, <http://esoc.princeton.edu>.
- Data and metadata from the following countries are or soon will be posted on the ESOC website: AFG (2001–present), COL (1999–2011), EGY (2010–11), KEN (2007–08), IRQ (2003–present), MEX (2006–2011), PAK (1988–present), the PHL (1975–present), and VNM (1965–1973).

#### **Other Activities/Outreach:**

- Senior leaders in military and aid organizations (in the U.S. and abroad) have been introduced to new methods of evaluating the effectiveness of their policies.
- A cohort of new scholars (more than a dozen tenure-track placements at leading universities) have the theoretical tools, data, and contacts to execute fresh research.
- Eli Berman co-facilitated the Transforming Security Research Workshop that was held in Arlington, Virginia, February 26–28, 2013. The workshop was jointly hosted by three major funders: the Department of Defense Minerva Research Initiative, National Science Foundation, and the UK Research Councils. The workshop compared diverse approaches, sought synergies, and identified breakthroughs and barriers to advancement in this evolving field, particularly longer term, transformational opportunities.
- Practitioners have received training on how to analyze current and emerging challenges, including one workshop on using emerging ICT technologies to combat corruption and enhance governance.
- TGD Researchers published press articles for the general public through New York Times editorials and online articles in CNN, Foreign Affairs, Foreign Policy, the Washington Post and VOX.
- TGD publications have been cited in key policy documents including the June 8, 2011 House Foreign Relations Committee report, entitled, "Evaluating U.S. Foreign Assistance to Afghanistan."

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Rebuilding social and economic order in conflict and post-conflict areas will remain critical tasks for the U.S. and allies who seek to defeat violent organizations and prevent new non-state threats. Minerva TGD scholars have provided research and analytical support to government organizations, including ISAF Counterinsurgent Advisory and Assistance Team (CAAT), Defense Advanced Research Projects Agency, USAID, and USIP. These engagements build the human capital for analyzing social systems within DoD.

**Future Work:**

- To reach a much broader audience, we are writing a book, "Information in Counterinsurgency" which draws on the TGD team's work over the last six years to explain how and why development contributes to COIN and CT under certain conditions and not others.
- Several investigators are continuing to collaborate under a new Minerva grant entitled, "Deterrence with Proxies," led by Eli Berman (UC San Diego) to develop a game theoretic model to analytically support an overarching doctrine of sub-state threat suppression through proxies. The research in India is a direct extension of work funded under the TGD.
- In the spring of 2016, we will hold the next ESOC Annual Meeting. This two-day event, which will be cosponsored by the National Science Foundation and the United States Institute of Peace, is a critical element to maintaining innovation, enhancing cross-disciplinary collaboration, training graduate students, creating research opportunities, and engaging the policy community.

**Sharable data resources generated**

The investigators of the Minerva "Terrorism, Governance, and Development" (TGD) grant maximized the investment by the Department of Defense by establishing a research network called the Empirical Studies of Conflict project (ESOC). By combining the resources of the TGD grant with other funding and a broader network of interdisciplinary researchers, ESOC has declassified or otherwise collected data on more than 1,000,000 discrete geo-located incidents of violence in ten wars over seven countries in conflict since 1950. The project has produced **95 original datasets** building on these data and other sources, including: precise information on aid spending in five conflicts; surveys of more than 225,000 respondents across five countries; intelligence flows to government forces in three; insurgent payments to thousands of individual fighters in one; interviews with thousands of surrendered rebels in one; and government force levels over time and space in four. The result is a data compilation that is unprecedented in its depth of objectively-measured information about the dynamics of armed conflict in the modern world, and the collection is growing all the time.

Many of these data (GIS and tabular format), publications, and working papers are available at the ESOC website: <http://esoc.princeton.edu>. To date, the website focuses on seven countries (Afghanistan, Colombia, Iraq, Mexico, Pakistan, the Philippines, and Vietnam) and includes the following:

- 38 GIS datasets for download
- 20 tabular datasets for download
- Over 60 publications and 20 working papers
- Over 50 links to external archives/data sources/data repositories relevant to ESOC research

### Academic Publications through this Minerva research.

The publications supported by this Minerva research (listed below), as well as other articles published by ESOC-affiliated researchers, have been cited more than 2,400 times according to the google scholar account, where they are tracked: <https://scholar.google.com/citations?user=bqKSAqEAAAAJ&hl=en>

### Twelve peer-reviewed publications in 2015 as of August:

- Berman, Eli and Aila M. Matanock. 2015. "The Empiricists' Insurgency." *Annual Review of Political Science* 18: 443–464.
- Calderón, Gabriela, Alberto Díaz-Cayeros, Beatriz Magaloni and Gustavo Robles. "The Beheading of Criminal Organizations and the Dynamics of Violence in Mexico." *Journal of Conflict Resolution*, 1 June 2015, doi: 10.1177/0022002715587053.
- Callen, Michael and James D. Long. 2015. "Institutional Corruption and Election Fraud: Evidence from a Field Experiment in Afghanistan." *American Economic Review* 105(1): 354–81.
- Cilliers, Jacobus, Oeindrila Dube, and Bilal Siddiqi. "The White-Man Effect: How Foreigner Presence Affects Behavior in Experiments." *Journal of Economic Behavior and Organization*, 2 July 2015, doi:10.1016/j.jebo.2015.03.015.
- Dafoe, Allan and Jason Lyall. 2015. "From Cell Phones to Conflict? Reflections on the Emerging ICT–Political Conflict Research Agenda." *Journal of Peace Research* 52(3): 401–413.
- Fair, C. Christine, Ethan Bueno de Mesquita, Jenna Jordan, Rasul Bakhsh Rais, and Jacob N. Shapiro. "Measuring Political Violence in Pakistan: Insights from the BFRS Dataset." *Conflict Management and Peace Science* September 15, 2014, doi: 10.1177/0738894214542401.
- Heger, Lindsay L. 2015. "Votes and Violence: Pursuing Terrorism While Navigating Politics." *Journal of Peace Research* 52(1): 32–45.
- Kuhn, Patrick M. and Nils B. Weidmann. 2015. "Unequal We Fight: Between- and Within-Group Inequality and Ethnic Civil War." *Political Science Research and Methods* 3(3): 543–568.
- Lyall, Jason, Yuki Shiraito, and Kosuke Imai. 2015. "Coethnic Bias and Wartime Informing." *The Journal of Politics* 77(3): 833–848.
- Shapiro, Jacob N. and David A. Siegel. 2015. "Coordination and Security: How Mobile Communications Affect Insurgency." *Journal of Peace Research* 52(3): 312–322.
- Shapiro, Jacob N. and Nils B. Weidmann. 2015. "Is the Phone Mightier than the Sword? Cell Phones and Insurgent Violence in Iraq." *International Organization* 69(2): 247–274.

### Notable Recent Outreach:

On April 17, 2015, Eli Berman (UCSD), Steve Biddle (George Washington), Joe Felter (Stanford) and Jake Shapiro (Princeton), on behalf of ESOC, briefed a bipartisan group of 60-70 congressional staff on the past five years of their research covering civil wars, insurgencies and terrorism. Topics included cost effective development in conflict zones and best practices in counterinsurgency, covering research results from Iraq, Afghanistan, Pakistan and a half dozen other countries. They spoke for 20 minutes, followed by an engaged 70 minutes of questions and answers.

Patrick B. Johnston testified before the House Financial Services Committee on November 13, 2014. Johnston's testimony, "Countering ISIL's Finances" was given during a hearing entitled "Terrorist Financing and the Islamic State." (ESOC Alumnus Johnston is currently a Political Scientist at RAND.)

Jacob Shapiro spoke on the basis of TGD research at a meeting the National Intelligence Council put together for the NSC Af-Pak team to hear views on Afghanistan post-2014, DC (January 2014).

## **METANORM: A multidisciplinary approach to the analysis and evaluation of norms and models of governance for cyberspace\***

Principal Investigator: **Howard Shrobe**, MIT CSAIL, [hes@csail.mit.edu](mailto:hes@csail.mit.edu)

Research Lead: **Roger Hurwitz**<sup>⊕</sup>, MIT CSAIL

**Martha Finnemore**, George Washington University; **Duncan Hollis**, Temple University

**Panayotis “Pana” Yannakogeorgos**, Air Force Research Institute

**Aim:** Understand of the roles and values of certain cyber norms and governance model in the active defense of the United States from cyber threats.

METANORM will provide a multidisciplinary analysis, reconstruction and evaluation of (a) the development, adoption, coverage, force, institutionalization and efficacy of current and potential norms for regulating international behaviors in cyberspace and (b) current models for Internet and cyberspace governance and the debates and trends regarding their futures.

The project leverages knowledge and methods in legal studies, political science, international relations studies, artificial intelligence and computer science to draw upon a variety of data in order to represent the norms and their meanings. The data includes national cyber laws and policies, intergovernmental agreements and discussions, frameworks for collaboration in the private sector and technological communities, scholarly literature, and interviews with key policy makers in government, private sectors, civil society and technological communities, both in the US and abroad.

At the macro level, the project will provide an understanding of the roles and values of certain cyber norms and governance model in the active defense of the United States from cyber threats. It will also develop an integrative model to evaluate the viability of such norms and their potential to sustain cyberspace as a commons and platform, for global economic, social, political and intellectual development, in the face of security motivated trends toward lock-downs at national and organizational levels.

This project intends to contribute to US cyber defense planning and capabilities, by developing a dynamic typology of cyber norms that enables both humans and machines to access information on norms relevant to a decision making problem, including the extent of their adoption and institutionalization. The typology will also help researchers identify inconsistencies and gaps in the norm space and provide a basis for developing within the project a norm domain expert system. This step will in turn enable the eventual development of autonomous software agents capable of both normative and goal-directed reasoning in response to cyber threats.

Other components of the project will investigate methodologies for norm-based signaling, escalation and de-escalation in the conduct of cyber conflicts, and also track how well DoD’s interests in norm development are being met in interagency and international processes.

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\* *Government Program Officer:* Martin Kruger, Office of Naval Research, [martin.kruger1@navy.mil](mailto:martin.kruger1@navy.mil)  
*Anticipated period of performance:* Sept’13-Aug’16

<sup>⊕</sup> Team research lead Dr. Roger Hurwitz passed away in May 2015. The team is currently regrouping to resolve the path ahead.

**Approach:**

In pursuit of these goals we are currently developing typologies of cyber norms, analyzing processes and cases in which norms emerge, and doing content analyses of texts, discussions and interpretations of generally accepted and proposed norms. Reflecting in part their different disciplines, each team member brings different insights to these traditional methods.

- Co-PI **Hollis**, a professor of law, seeks to typify norms according to the actors involved, the source of expectations for their behaviors, i.e., laws, professional standards, etc., the behaviors themselves and the contexts of actions.
- Aadya **Shukla**, a computer scientist specializing in informatics, is developing two tools: a) an intelligent repository for norms, drawn from international and domestic law, that will enable comparisons among them according to concerns, stakeholders and nations; and b) a framework for determining whether seemingly similar norms or implementations of the same norm by different actors refer to the same objects (are “semantically interoperable”). Both approaches can help illuminate conflicts between articulated norms and practices and suggest the many nuances of norms in cyberspace.
- Co-PI **Finnemore**, a political scientist with a focus on international institutions, is investigating A) high profile cyber incidents of the last decade and their impact on shaping expectations of appropriate behaviors by actors, and B) processes and platforms which have enable international norms to gain legitimacy.
- Co-PI **Hurwitz**, draws on international relations studies and game theory, to investigate the strategies behind recent successes and failures of efforts by states to gain acceptance for certain cyber norms.
- John **Mallery** is developing a methodology, that draws on computational planning, to assess A) how well certain proposed norms or confidence building measure can mitigate risk of an international cyber conflict (or its escalation), and B) the feasibility of their acceptance. These assessments are based partly on content analysis of his conversations with Chinese and Russian cyber experts and recent US-Russia and US-China track 1.5 discussions.
- Co-PI **Yannakogeorgos** employs content analysis on meeting transcripts, declarations, statements and other official texts to track support and opposition for existing and proposed norms at international forums on Internet governance, in the Department of Defense and ministries of defense of various US allies. He then uses his observation/ participation at some of these meetings to deepen qualitative understanding of the nuances and subtexts of the texts.

**Initial Findings:**

Proposals of norms and efforts to gain their acceptance have tended to be responses to high profile incidents—e.g., the DDoS in Estonia (2007); Stuxnet (2010), the Snowden revelations (2013)—rather than proactive initiatives to well-known or anticipated problems. Yet these responses are limited, because most international cyber incidents generate surprisingly little public reaction in contrast to international incidents in kinetic space. Development of a consensus for a proposed norm is further limited by efforts on its behalf being played out in a variety of forums (e.g., the UN) and frameworks (e.g., multilateral, bilateral and multi-stakeholder, with many participants), a reflection of the diversity of stakeholders in a stable cyberspace. Moreover, differences in how these actors envision cyberspace influence their preferences among proposed norms and the processes for their adoption. For example, those actors who understand cyberspace as a set of technologies whose use can be regulated by the state will prefer norms that extend existing international law, while those who see it a global commons are likely to see a need for norms tailored to it and applying to non-state actors, like service providers, as well as states. In any case, for a proposed norm to acquire legitimacy and some efficacy, relevant private sector and civil society actors as well as state actors will need to “buy” it, even when the norm is principally concerned with state behaviors.

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| <ul style="list-style-type: none"> <li>● Military Operations <ul style="list-style-type: none"> <li>○ Law of Armed Conflict (LOAC) generally</li> <li>○ LOAC specifically</li> <li>○ Use of Force (by States or their proxies)</li> <li>○ Computer network attack (CAN)</li> <li>○ Computer Network Exploitation (CNE)</li> <li>○ Rules of Engagement</li> <li>○ Arms Control/non-proliferation</li> <li>○ Deterrence</li> <li>○ Militarization of Cyberspace</li> </ul> </li> <li>● International Security (for state actors) <ul style="list-style-type: none"> <li>○ Sabotage / critical infrastructure attack</li> <li>○ Subversion / disinformation</li> <li>○ Political-military espionage</li> <li>○ Economic &amp; industrial espionage</li> <li>○ Proxies</li> <li>○ Peace time norms &amp; Confidence and Security Building Measures (CSBMs)</li> </ul> </li> <li>● Governance and Administration <ul style="list-style-type: none"> <li>○ Models: Multi-stakeholder</li> <li>○ Models: State-centric</li> <li>○ Models: Other</li> <li>○ Public-private partnerships</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>● Technological foundations <ul style="list-style-type: none"> <li>○ Coding Protocols</li> <li>○ Network Protocols</li> <li>○ Cryptographic standards</li> <li>○ Supply chain integrity</li> <li>○ Surveillance Anonymity</li> <li>○ Net neutrality</li> <li>○ Data retention</li> </ul> </li> <li>● Internet Freedom and Privacy <ul style="list-style-type: none"> <li>○ Information rights</li> <li>○ Blocking, filtering and content control</li> <li>○ Surveillance</li> <li>○ Anonymity</li> <li>○ Data retention</li> </ul> </li> <li>● Cybercrime <ul style="list-style-type: none"> <li>○ Unauthorized access</li> <li>○ Industrial espionage</li> <li>○ Piracy and intellectual property theft</li> <li>○ Fraud</li> <li>○ Spam</li> <li>○ International Cooperation</li> <li>○ Hackbacks</li> <li>○ Content controls – subversion and terrorism</li> <li>○ Content controls, e.g., child pornography, hate speech</li> </ul> </li> </ul> |
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Figure 18: Example Behaviors and Practices in Cyberspace Addressable by Norms

### Anticipated Outcomes of Research:

The integration of our methodologies and findings will provide means to identify needs and opportunities for constructive cyber norms, to estimate the feasibility and efficacy of a proposed norm and to suggest strategies for its sponsors to gain acceptance and effective implementation for it. Our research will also generate tools for a) comparing and testing the compatibility of seemingly similar norms and their implementations, as articulated by different state and relevant non-state actors; b) measuring the uptake and implementation of cyber security related norms by various governments, military organizations and relevant non-state actors, and c) tracking escalation, de-escalation and opportune moments for intervention and mitigation in cyber-conflicts.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense:

As the U.S. International Strategy for Cyberspace recognizes, broadly shared international norms on the use of information and communication technologies can contribute to the stability and security in cyberspace by enhancing predictability, decreasing misunderstandings of behavior and providing a basis for corrective actions when violations do occur. Our research will help defense theorist, planner and practitioner alike know how well a proposed norm can satisfy these functions while also supporting values and interests of the United States concerning cyberspace. Our research will also provide tracking and analysis of current and proposed norms that impact on Department of Defense equities and will aid or impede its role in protecting cyberspace.

## China's Emerging Capabilities in Energy Technology Innovation and Development\*

Edward S. Steinfeld, Brown University, [edward\\_steinfeld@brown.edu](mailto:edward_steinfeld@brown.edu)

**Aim:** Understand the exact nature of Chinese capabilities in the commercial energy technology development domain, as well as the relationship of those capabilities to technology innovation efforts conducted beyond China's borders.

Considerable debate exists in the U.S. policy community about China's purported rise as a technology innovator in the energy domain. Some experts believe China has developed world-class capabilities for energy technology innovation. Others counter that the nation – both in terms of the energy systems it is deploying domestically and the energy-related products it is exporting – is simply copying technologies absorbed from abroad. Indisputable is that for domestic deployments and global exports alike, Chinese energy technology firms are immersed in tight R&D networks with international commercial partners. What is being learned in these relationships? Who is learning? In what directions do different types of knowledge flow? What are the ramifications of such flows for the development of innovative capacity in the firms and nations involved?

These questions relate to theoretical concerns about the role of innovation in industrial development more generally. Traditionally, late industrializers such as Japan and South Korea were seen as engaging primarily in technology mimicry rather than what is generally understood as innovation. Technology was believed to follow the global product cycle, with innovation and new product rollouts taking place in advanced economies, and only late-stage cost reduction and secondary technology deployments – once the technology was fully mature – in developing economies. China's recent experience with energy technology, however, suggests that we may be observing a new form of late industrialization, one in which developing economies play a much more central role in delivering the innovations needed to bring new-to-the-world technologies to the market. Conceptually, we are pushed to reconsider the role that actual innovation is playing in late industrialization. Moreover, given the types of knowledge that Chinese firms seem to be generating (and the demand for such knowledge by advanced industrial counterparts), we are pushed to reconsider the importance of late-stage innovation surrounding technology commercialization not just for developing economies, but for advanced industrial nations as well.

On a related note, many observers now recognize that Japan, during its phase of rapid industrial growth from the 1960s through 1980s, initiated major changes in the way traditional manufacturing is organized. That changes, what came to be termed “lean production,” now represent best practice across a number of industrial sectors. At the time they were being developed, however, many observers failed to identify them correctly, instead ascribing Japan's gains at the time only to subsidization, unfair trade practices, and intellectual property rights violations. Many of the same accusations are being leveled at Chinese technology firms today. One major goal of this research is to determine whether Chinese firms are also developing news ways to structure production, ways that may differ substantially from Japanese-style lean production, but that are no less important for the long-term trajectory of global high-tech manufacturing.

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*Anticipated period of performance:* Aug'12–April'17

**Approach:**

This research has proceeded methodologically through firm-based, structured qualitative case comparisons across three energy technology domains: civilian nuclear power, solar photovoltaic cell/module fabrication, and wind turbine manufacturing. Each of these areas involves new technology development and extensive partnerships between overseas and Chinese domestic firms. The technology areas differ, however, in terms of their degree of standardization, the complexity of the systems integration tasks involved, and the degree to which China is their main global market. Interview-based qualitative data collected at the firm level is useful for explicating complex processes and extended mechanisms of causation.

Through the first phase of research, we have sought to explicate subtle patterns of knowledge creation, transfer, and dissemination – phenomena that cannot easily be identified at arms-length through measures such as patent filings, copyrights, or trademarks. This is particularly true for complex systems involving multiple firm-level participants. The most interesting data from our interviews have involved the nature of work flow, the division of labor, and the mechanisms through which coordination takes place. While we are open to and have indeed conducted large *N* survey work in our previous work, but we feel that this particular project -- with its emphasis on understanding the finer details of inter-firm coordination, capability building, and technology development processes – has been best served through in-depth qualitative interviewing.

During our first phase of research from 2012 to 2015, we conducted 107 interviews in China in the wind power and solar PV industries. An additional 117 interviews were conducted with participants in the wind and solar power-related production networks in Europe and the United States. We conducted another 67 interviews in China in the civilian nuclear power sector, with respondents spread across both Chinese indigenous and multinational firms. **We conducted additional corroborative interviews with technology firms operating outside of the energy sector, as well as with public officials and academics in China.**

**Scientific Progress and Key Findings:**

Our empirical data suggest that China-based firms in the renewable energy domain – namely in wind turbine production and solar PV cell/module fabrication -- have developed a unique form of innovative manufacturing, one based on the simultaneous management of tempo, scaling, and cost reduction. This form of innovative manufacturing is centered on engineering capabilities that reside at the intersection between upstream R&D (generally conducted by foreign firms based outside China) and downstream fabrication (which generally occurs inside China). This is not simply mimicry, it does not involve only mature technologies, and it does not happen at arm's length from global competitors or partners. Instead, much of this China-based innovation is being applied to frontier technologies and new-to-the-world energy systems, even while it is also applied to mature products and product platforms. Furthermore, China-based innovative manufacturing takes place not simply within the single firm, but across firm-level boundaries in complex multinational production and R&D networks. Learning takes place in these networks, but rather than flowing unidirectionally (i.e., from foreign technology leaders to Chinese duplicators), knowledge flows multidirectionally and recursively.

For particularly complex energy technology systems, such as civilian nuclear power plants, the greatest challenges involve not new technology development, but rather systems integration. In these domains, Chinese firms have not necessarily achieved significant advances. Moreover, experience in China has helped multinational systems integrators move into new domains of IT innovation, remote sensing, data management, and industrial software development.

**Anticipated Outcomes of Research:**

This research aims to generate precise maps of knowledge flows and inter-firm relationships in global R&D networks surrounding advanced energy technologies. At one level, this requires detailed this also requires ethnographic analysis of learning techniques within single firms. By exploring mechanisms across networks and within single key firms, the research will illuminate how innovation is proceeding in energy technology worldwide today, how particular forms of innovative capacity are being generated in China, and how country-level institutional arrangements influence these capabilities. The research will culminate in two book-length manuscripts on the topic.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Energy technologies, because they potentially reduce overseas reliance on energy sources and offer flexibility in the face of resource and environmental constraints, are strategic by definition. The ability to produce, deploy, operate, and improve these technologies within the U.S. business ecosystem is in the broadest sense a component of national security. Similarly, dependence on overseas suppliers for these technologies becomes a potential source of vulnerability. The proposed research, by carefully disaggregating the separate stages and skill sets associated with energy technology development, permits us to move beyond simple, binary assessments of whether the U.S. is or is not adequately meeting its national defense needs with respect to energy technology. In its emphasis on late-stage innovation surrounding commercialization, the research identifies particular weaknesses in U.S. civilian – and also potentially defense-related – high-tech manufacturing sectors.

**Select Publications:** (contact for access)

- Steinfeld, Edward S., “Teams of Rivals: China, the U.S., and the Race to Develop Technologies for a Sustainable Energy Future,” Watson Institute for International Studies Research Paper No. 2015-26, May 2015.
- Steinfeld, Edward S., “China, High Tech, and the ‘High Tempo Cost Out’ Revolution,” Tech Tank, Brookings Institution, May 2015
- Steinfeld, Edward S., and Troels Beltoft (2014). "Innovation Lessons from China." *MIT Sloan Management Review*. Summer issue.
- Nahm, Jonas, and Edward S. Steinfeld (2014b). "The Role of Innovative Manufacturing in High Tech Product Development: Evidence from China's Renewable Energy Sector," in Locke, R. and Wellhausen, R. (2014), eds. *Production in the Innovation Economy*. Cambridge, MA: MIT Press.
- Metzler, Florian, and Edward S. Steinfeld (2014). "Sustaining Global Competitiveness in the Provision of Complex Products and Systems: The Case of Civilian Nuclear Power Technology" in Locke, R. and Wellhausen, R., eds. *Production in the Innovation Economy*. Cambridge, MA: MIT Press.
- Nahm, Jonas, and Edward S. Steinfeld (2014a). "Scale-up Nation: China's Specialization in Innovative Manufacturing." *World Development* 54(0): 288-300.
- John Deutch and Edward S. Steinfeld, “Made in America, and Everywhere Else,” *The Wall Street Journal*, March 12, 2013.
- John Deutch and Edward S. Steinfeld (2013). “A Duel in the Sun: The Solar Photovoltaic Technology Conflict between China and the United States”. *Report for the MIT Future of Solar Energy Study*. Cambridge MA, MIT.

## Political Reform, Socio-Religious Change, and Stability in the African Sahel\*

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**Aim:** Analyze factors affecting stability and instability in a set of six African countries stretching across the arid Sahelian region.

**Countries examined:** Senegal, Mauritania, Mali, Burkina Faso, Niger, and Chad (all involve fieldwork)

The predominately Muslim countries of the Sahel are collectively among the least developed countries on earth. Historically of limited strategic significance, they also received relatively little scholarly attention; indeed they are among the least-studied countries in Africa. Recent developments in the region, however, have placed the Sahel at the center of significant international concern. The most significant of these initially were the terrorist threats posed by Al Qaeda in the Islamic Maghreb (AQIM) and various related groups, the aftermath of the fall of the Qaddafi regime in Libya, and in March 2012 the collapse of the political system in Mali and the subsequent occupation of the northern half of that country by radical *jihadi* movements. The ongoing activities of Boko Haram, the Movement for Unity and Jihad in West Africa (MUJAO), and other related groups underline the continued challenges posed by these groups. In addition to these threats, endemic underdevelopment and significant demographic changes continue to magnify the pressures on the states of the region. The research project focuses comparatively on factors influencing the capacity of Sahelian states to manage these pressures, and to maintain stability and ensure the social order and effective governance that serves as a bulwark against radical movements.

The research builds on an analytic framework that focuses on the interactive and reciprocal effects of political and institutional reform on social change, in an iterative process of “micro-transitions” that cumulatively build to potentially more substantial transformations in state capacity, and hence shape the prospects for stability or instability. As with virtually all of Africa, the Sahelian states were directly affected by the intense pressures for political reform in the name of “democracy” of the early 1990s. While their initial responses were quite varied, all were obliged to undertake significant liberalization, reflected primarily in reduced state capacity to shape and control social forces. As a result, in all six countries significant social transformations were set in motion, and their political systems are still being shaped by those forces. Given the large Muslim majority in the region the dynamics of religious change have been particularly important; in the era of democratization there has been a proliferation of new religious movements and voices, of varying ideologies, across the region. These new religious groups are among the key social actors shaping politics in these countries today.

### Approach:

The research is being carried out in a series of stages, by a research team at the University of Florida comprised of the PI and three advanced PhD students in Political Science with significant expertise on Africa, including two students themselves from the Sahel. It builds on the PI’s substantial previous research and strong network of ties in the region, on a three year State Department-funded project focused on elections in all six countries, and on the broader expertise of the University of Florida’s Sahel Research Group—the only such academic initiative on the region in the U.S.

The research involves multiple methods and a range of activities, including most centrally extensive fieldwork in all six of the study countries, being carried out primarily by the GRAs under the direct

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\* *DoD Program Officer:* Ben Knott, Air Force Office of Scientific Research, benjamin.knott.2@us.af.mil  
*Anticipated period of performance:* Sept’ 12–August 2016

supervision and close involvement of the PI. In preparation for fieldwork, a first stage of the project involved: substantial documentary research and the preparation of background papers on each country; regularly weekly seminars to develop the template for a fieldwork protocol; intensive consultation with visiting specialists from key countries; a conference-workshop which brought together one key scholar from each of the study countries to comparatively examine the politics of institutional reform in terms of their effects on state resilience. Scoping trips to all six study countries in summer 2013 prepared the groundwork for the necessary institutional affiliations and networks for field research. In June 2014 the research team co-organized a workshop on contemporary religious dynamics in the Sahel with the Center for the Study of Religions at the Université Gaston Berger in Senegal. With the final approval of the IRB protocols, the first stage of fieldwork began in August 2014; we anticipate completion in early 2016.

### **Scientific Progress and Key Findings:**

The 2012 collapse of the state in Mali and the resulting rapid expansion of jihadi groups in that country shortly before the beginning of work on the project led to an initial observation and reconsideration of the proposed framework, and that has been key to shaping the project as we move forward.

In each of the six countries, the interactive processes of institutional reform and social change that were carried out in the name of democratization led to an initial grouping of the six countries into three pairs on the basis of an observed outcome on the democracy dimension. Our work to date has clearly shown that the politics of democratization do intersect with processes of building resilient state institutions, but in complex ways that are in the end independent of the democratization outcome. Within each of our pairs, then, we identified one country where the process appears to have strengthened state structures and another where it has not done so, despite similarities in terms of the democracy variable. Fieldwork efforts have been largely aimed at trying to understand the processes that produce these varied results, and the variables we need to consider in trying to build a broader understanding of these processes. Intentional flexibility in our fieldwork protocol allows us to incorporate attention to the continued turbulence in the region—including the October 2014 overthrow of the government in Burkina Faso, the incapacity of the Malian state to reestablish security, and the expansion of Boko Haram activity into Niger and Chad in the region of the Lake Chad basin.

### **Anticipated Outcomes, Resources and Products of Research:**

We anticipate a number of significant outputs of both academic and policy interest from the project. These include a [website](#) focused on the region and intended to serve as a key resource for academics, policymakers, and journalists. A significant component of the website includes a major data resource with information and documentation on ten distinct dimensions of elections and electoral management in each of the six countries. This material was generated building on the State Department-funded *Trans-Saharan Elections Project* (2011–13) and further expanded and maintained by the work of the Minerva research team.

**A number of working papers by members of the research group and by visiting scholars are available on our website.** We anticipate the publication of additional working papers, articles and book chapters; an edited volume based on our conference on institutional reform in the Sahel is in progress; and the project also includes a concluding book analyzing the prospects for stability of the Sahelian cases in light of our conceptual framework. We are confident that the most significant enduring outcome of the project will be to institutionalize an ongoing university-based research and training program focused on producing the next generation of specialists on this crucial but poorly-understood region of the world. Three doctoral dissertations will be produced by the research team, each exploring a crucial dimension of the project: the effects on the state of the politics of institutional reform, especially elections; the emergence and dynamics of contentious Islamic movements; and the question of stability in electoral-

authoritarian regimes. The team has made a number of presentations on our findings to policy and other groups.

#### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

There are major security implications to the political stability and social harmony of the countries of the Sahel. This is evidenced by the development and significant investment in U.S. sponsored regional security arrangements now institutionalized under the “Trans-Saharan Counter-Terrorism Partnership” (TSCTP). All six countries in the proposed research project are members of the TSCTP. Beyond the immediate and significant concern with the evolving status of AQIM and its capability for establishing a solid base in the region, the fate of Sahelian countries will have major consequences for the stability of a huge swathe of West and Central Africa, with direct security implications for migration flows, economic development, illicit trafficking, and health concerns both for local people and for the broader international community.

#### **Outreach:**

UF Sahel Research Group website: <http://sahelresearch.africa.ufl.edu/> This incorporates *The Trans-Saharan Elections Project* website, a comprehensive source of information on electoral systems in the six study countries: <http://sahelresearch.africa.ufl.edu/tsep/>

The team has already made a number of presentations on our findings to policy and other groups and continues to accept invitations to do so. Information on research group presentations and other related activities is available on our [website](#).

#### **Notable recent publications** (these and others available on the project site)

- Villalón, Leonardo A. and Abdourahmane Idrissa, eds. (in progress). *Democratic Struggles, Institutional Reform, and State Resilience in the African Sahel*. Edited volume including contributions from distinguished scholars from each research study country.
- Villalón, Leonardo A. and Daniel Eizenga. (Forthcoming 2016) “Resisting the Inevitable: Popular Insurrection and Presidential Term Limits in Burkina Faso.” In Jack Mangala, ed. *The Politics of Presidential Term Limits in Africa: Power Strategies and Implications*. Atlanta: Pan African Institute for Leadership and CreateSpace.
- Villalón, Leonardo A. (2015) “Cautious Democrats: Religious Actors and Democratization Processes in Senegal.” In *Politics and Religion*. 8:2, pp. 305–333.
- Eizenga, Daniel (2015). “Political Uncertainty in Burkina Faso.” In Claire Metelits and Stephanie Matti, eds. *Ruling on the Margins: Democratic Performance in Small African Countries*. Lanham, MD: Lexington Books.
- Villalón, Leonardo A. (2013) “Islam, the State, and Politics in sub-Saharan Africa.” In *The Oxford Handbook of Islam and Politics*, edited by John L. Esposito and Emad El-Din Shahin. Oxford University Press, pp. 379–393.
- Villalón, Leonardo A. (2013). “Muslim Politics in West Africa.” In the *Routledge Handbook of African Politics*, edited by Nic Cheeseman, David M. Anderson and Andrea Scheibler. London: Routledge Publishers, pp. 133–146.

## Natural Resources, Transnational Crime, and Armed Conflict\*

Principal Investigator: **James Igoe Walsh**, University of North Carolina at Charlotte, [jwalsh@uncc.edu](mailto:jwalsh@uncc.edu)  
**Victor Asal**, University of Albany;  
**Justin Conrad, Jean-Claude Thill, and Beth E. Whitaker**, UNC Charlotte;  
**Michael Findley**, University of Texas at Austin; **James A. Piazza**, Pennsylvania State University

**Aim:** Understand how natural resources influence the likelihood, type, and duration of armed conflict in the developing world.

Non-state violent actors need resources—some combination of people, money, weapons, and territory—to sustain their activities. We analyze how variation in the source and scale of such resources influences rebel movements' strategic choices and violent behavior.

### Approach

Existing research has hypothesized relationships between the exploitation of natural resources, transnational crime, and the control of territory, and the actions of non-state violent actors. But data limitations make it difficult to determine if these relationships are specific to particular conflicts or regions of the world, and if these three factors have distinct effects on armed groups' choices and actions. For this reason, a key goal of our project is to develop and share data collected at the micro- and organizational levels (see below for details on data resources).

We also develop and test novel explanations of the consequences of variation in the sources of finance for armed groups. Existing work has implicitly assumed that different sources of income have similar consequences. In contrast, we theorize that the social relationship between armed groups and producers shapes the effect of resources on violence. Non-state violent actors have little incentive to avoid mistreating civilians or to engage in negotiations when they directly coerce or extort producers, as is often the case in artisanal mining and the cultivation of illegal drugs. In other situations, however, armed groups must secure the cooperation of others in order to generate income. For example, violent non-state actors that engage in illegal taxation must ensure that they do not throttle local economic activity. This should moderate their use of indiscriminate violence, make them more willing to provide local public goods, and reduce acts of terrorism that threaten current or future supporters.

### Scientific Progress and Key Findings

Published papers and works-in-progress suggest the following findings:

*Political Exclusion, Oil, and Ethnic Armed Conflict:* Political exclusion and the presence of valuable natural resources interact with one another to substantially increase the likelihood of ethnic armed conflict. Using data on ethnic group political exclusion and geo-coded measures of oil production and oil prices – the resource theorized to have the most robust effect on rebellion – we conduct a series of logistic regression analyses for the years 1946 to 2005. We find that exclusion, but not oil, alone increase the likelihood of conflict, while the interaction of these factors substantially raises the risk of war.

*Rebel Finance and Civilian Victimization:* Why do some rebel groups attack civilians, while others do not? One powerful explanation points to the sources of rebel finance. This paper introduces a new dataset

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\* *Government Program Officer:* Micheline Strand, Army Research Office

*Government Point of Contact:* Lisa Troyer, Army Research Office, [lisa.l.troyer.ctr@mail.mil](mailto:lisa.l.troyer.ctr@mail.mil)

*Anticipated period of performance:* Aug' 13–Aug' 16

that measures the extent to which armed groups in Africa and the Middle East exploit natural resources or rely on criminal activities to finance their violence. We find that rebels who earn income from natural resource exploitation engage in more violence against civilians, while those who rely on organized crime exercise greater restraint in their relations with non-combatants.

*Lootable Resources and Third-Party Intervention:* When rebels have access to lootable resources, third parties are likely to intervene on the side of the rebels and less likely to intervene on behalf of the government. This paper highlights the largely neglected role of economic factors in motivating intervention biased opposition groups. It further adds insights into the role of natural resources in civil wars by shifting emphasis away from domestic combatants towards the motives of outside states.

*Oil Wealth, Human Rights and Terrorism.* Countries with higher levels of oil production and real oil revenues experience higher levels of domestic terrorism. The study seeks to explain why oil countries are more terrorism-prone. It does so by considering six mediators – factors that are affected by oil wealth and subsequently boost terrorism – that are commonly discussed in the larger literature on conflict. These include decreased state capacity to project force, increased corruption, decreased democratic rule, increased income inequality, increased likelihood of foreign intervention, increased likelihood of separatist demands and a worsened human rights. It uses a structural equation modeling technique to determine which of these are potential mediators, and finds support only for one of the factors: worsening human rights. Countries with oil wealth have an increased risk of the national human rights climate worsening, which fosters higher level of social grievances that fuels domestic terrorism.

*Oil Wealth and Third Party Civil War Interventions.* Oil wealth facilitates greater risk-taking behavior by governments by weakening domestic constraints on foreign policy. This makes oil-rich states more likely to intervene in the civil conflicts of third countries. We find that countries designated as oil states (countries with higher than median levels of oil production and oil revenue) are 60 percent more likely in a given year to intervene in a third party’s civil conflict on the side of rebels. However, these interventions are more likely to be nonviolent in nature; meaning that they are more likely to involve the provision of aid rather than commitment of troops.

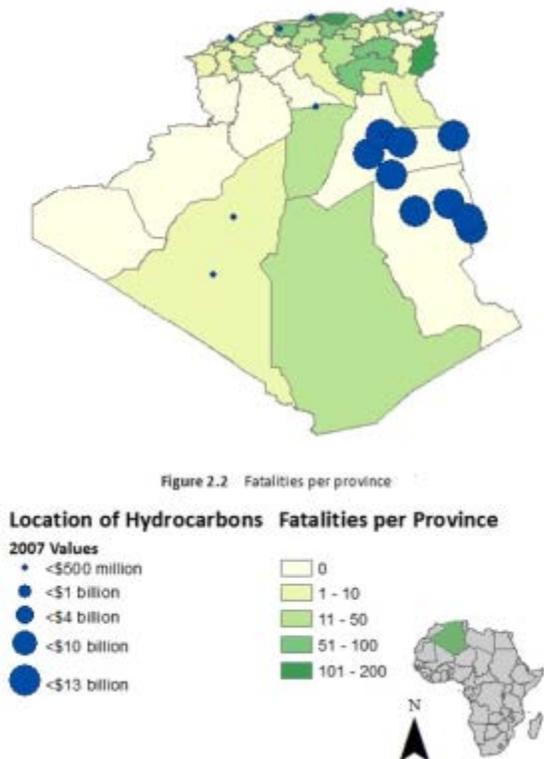


Figure 19. Locations of oil and gas output vs fatalities from political violence. (Algeria, 2007)

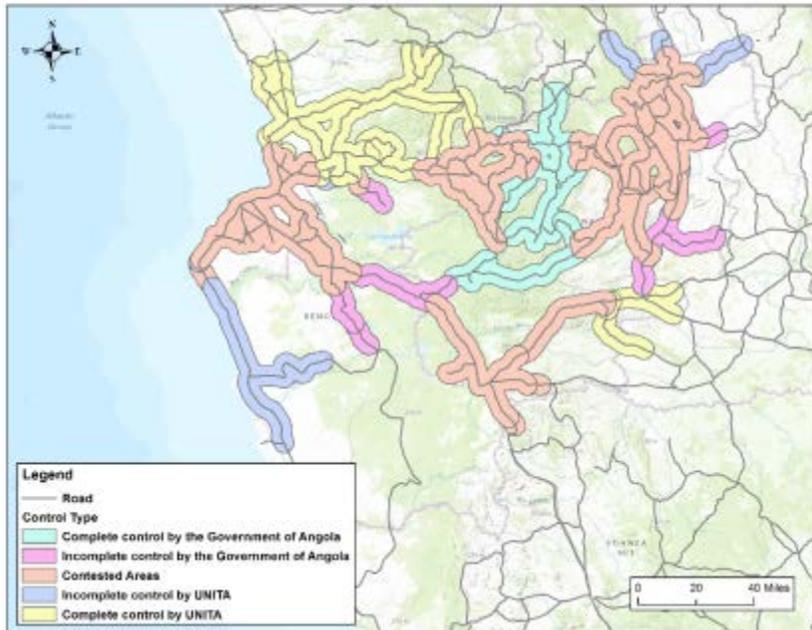
**Other Research Activities**

A major focus of this project is to develop data that geo-locates resources and violent activity. For example, we are collecting and analyzing data on the location and output of natural resource locations in Africa.

This data can also be combined with other geo-located data to generate insights and to test hypotheses. Consider **Figure 19**, which maps the location of oil and gas output and fatalities from political violence per province in Algeria in 2007.

Provinces where most revenues from oil and gas are generated in the south and east of the country experience little violence. Instead, violence

concentrated in more populous provinces along Mediterranean coast.



**Figure 20: Preliminary display of territorial control in central Angola during the years 1992–1993**

assumed to be under the influence of each armed group given information about geographic features, road networks, and travel times. The map in **Figure 20** is a preliminary display of territorial control in central Angola during the years 1992–1993.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense

Political instability and conflict in the developing world has been identified as a key security policy concern in the National Security Strategy of the United States. We know from existing research that natural resources are linked in some ways to such instability and conflict. Better understanding this link would place the United States in a stronger position to prevent conflict. In particular, understanding how control of resources influences conflict would allow the United States to identify and influence actors who control resource locations that are most likely to fuel conflict.

**Sharable data resources:** (descriptions linked and on page 213)

- *Natural Resource Exploitation and Armed Conflict Dataset:* Measures degree to which non-state violent actors earn income from extorting, stealing, or smuggling natural resources. Covers armed groups globally from 1990 to 2012.
- *Transnational Crime and Armed Conflict Dataset:* Measures degree to which non-state violent actors earn income from other criminal activities, including illegal taxation, piracy, kidnapping, and other illicit means. Covers armed groups globally from 1990 to 2012.
- *Natural Resource Locations in Africa Dataset:* Geo-codes specific location, resource, and output of natural resource locations in Africa.
- *Territorial Control and Armed Conflict Dataset:* Methodology for defining and measuring zones of territory controlled by state and non-state armed forces. This methodology is implemented to create a dataset measuring territorial control in sub-Saharan Africa from 1997 to 2010.

Case studies and theory suggest that conflict over control of territory influences the political and military strategies of state and non-state armed groups. We are also developing a methodology for measuring for territorial control in sub-Saharan Africa based on events data on battle outcomes combined with spatial data on terrain, population locations, transportation networks, and natural resources. The end result will resemble the mock-up below. The dataset will record the specific locations controlled by each warring party, variation in the degree of control, and the amount of surrounding territory than can be plausibly

## Political Language and Crisis: A Computational Assessment of Social Disequilibrium and Security Threats\*

Principal Investigator: **Leah Windsor**, University of Memphis, [leah.windsor@memphis.edu](mailto:leah.windsor@memphis.edu)

Co-PIs: **Art Graesser** and **Zhiqiang Cai**, University of Memphis  
<http://lac.cohmetrix.com>

**Aim:** Evaluate the language of authoritarian regimes and non-state actors to identify patterns of behavior related to conflict and socio-political instability.

**Countries examined:** Iraq, Afghanistan, Syria, Libya, Egypt, Morocco, Tunisia, Algeria, Bahrain, Saudi Arabia, Jordan, North Korea, Venezuela, Cuba, Rwanda, Fmr. Yugoslavia, China; All countries addressing the United Nations General Assembly (2004–2014)

What linguistic features identify authoritarian leaders' language, and how can they help us understand leaders' behavior, especially related to conflict and political instability? Can language patterns reveal when rebel groups are getting stronger or weaker? How do leaders use speeches to send credible threats or effectively bluff adversaries in international politics? These questions are particularly important given the unpredictability and opaqueness of rogue political actors, including autocratic leaders, non-state actors, rebel and terrorist groups, and nonviolent social movements, in international relations. Patterns of content, language, and discourse in speeches, documents, and social media can reveal important political information relevant to policymakers and national security strategists who are interested in predicting and responding to international events and crises.

Our research team conducts analyses of political texts in Chinese, Arabic, Spanish, and English using computational linguistics tools. We are pursuing three areas of investigation: (1) political crisis and language of state actors, (2) the distinction between credible threats and bluffs in national and international security, and (3) contentious political behavior amongst non-state actors, including social media, civil wars, social uprisings and protest movements, and genocide. The language of international actors, whether delivered by leaders of countries, by groups engaging in nonviolent social movements for political change, or by violent non-state political actors, is a rich source of data that can generate useful and actionable information for scholars and policymakers alike. We contextualize our language data with event data for selected countries and regions.

**Approach:** We rely on five methods of measuring language use: word count; language and discourse; topic modeling; speech act classification; and clustering analyses. We use Coh-Metrix to provide semantic and syntactic analysis of our data, specifically on five principal components of language: word concreteness; syntactic simplicity; deep cohesion; referential cohesion; and narrativity (Graesser et al., 2004; McNamara et al., 2014). We use psychological word count strategies for both the analysis of content (what is being said) and style (how it is being said). Our primary word count tool is LIWC (Pennebaker, Booth, & Francis, 2007).

### Scientific Progress and Key Findings:

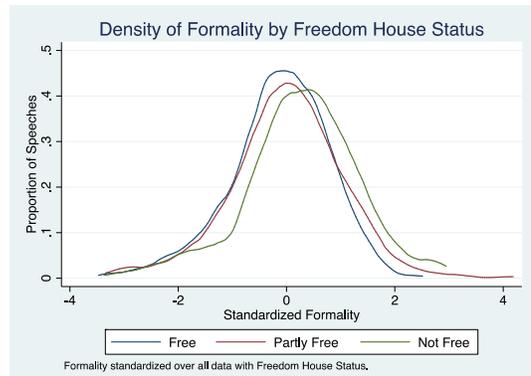
#### I. Political Crisis and Language

*Authoritarian and Democratic Language.* This project examines the systematic differences between authoritarian and democratic leader's language, using the forum of the United Nations General Assembly annual general debates as a platform. We find that democracies and autocracies differ greatly in the

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*Anticipated period of performance:* Oct'14–Sept'19 (with option)

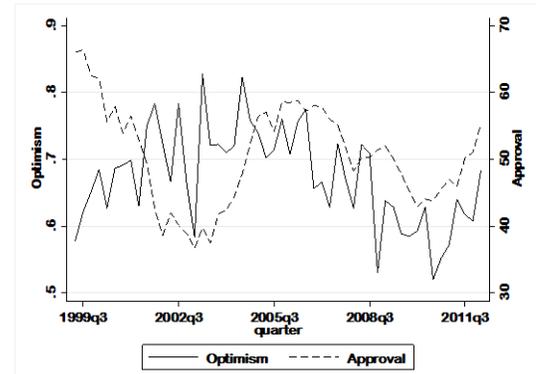
language they use, with democracies tending to use much less formal language, and autocracies tending to use much more formal language. We theorize that this is the case because democracies share more common ground with one another, and authoritarian leaders' language reflects the political chasm between their regimes and the rest of the world (see **Figure 21**). We also investigate four types of authoritarian regimes (personalist, party-based, military, and monarchy), and find systematic differences between them as well. We control for leader age and time in office, which are both statistically insignificant.



**Figure 21. Formality in Free, Partly Free, and Not Free Countries**

*Populist Language in Latin America*

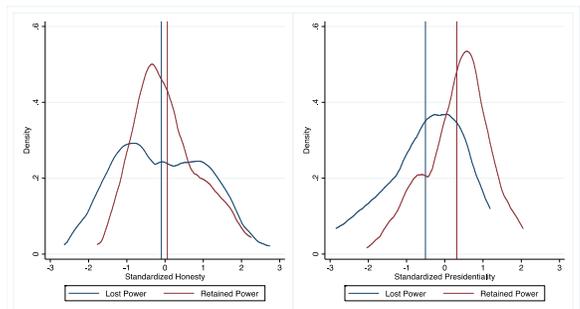
In analyzing Hugo Chavez' language (Venezuela), our results tentatively support the claim that he employs classic populist techniques indicative of a peripheral route to persuasion, like increased optimistic and angry language (see **Figure 22**). While our empirical models indicate leader discourse may strongly shape public approval we are somewhat hesitant to fully endorse this interpretation. We do find that language in previous quarters predicts current approval, and current language predicts current approval; however, this may or may not be for causal reasons.



**Figure 22. Language and Approval in Hugo Chavez' Venezuela**

*Arab Spring Leaders.* This project evaluates the language patterns of nine leaders of countries experiencing social unrest during the Arab Spring. We identify four differences among leaders during the uprisings:

- (1) Leaders using more repression remained in office;
- (2) Leaders who remained in office had been in power about half as long (14.6 years vs. 32 years) as those who lost power;
- (3) Leaders of monarchical regimes retained power, and leaders from party, personalist, and military regimes were unseated; and
- (4) Leaders who remained in power used more honest, more presidential, and more simplistic language survived the protests. (see **Figure 23**)



**Figure 23. Estimated Density Plots for Honesty and Presidentiality**

*Formality in Hereditary Autocracies: North Korea.* What language characterizes times of political turmoil in politically closed societies? Using data from North Korean state media, we find that formality increases during the tenure of Kim Jong Il, and that upon his death the language used became drastically less formal, when Kim Jong Un assumes office. Formality indicates either a central (high formality) route to persuasion, or a peripheral (low formality) route to persuasion. It also reveals the degree of common ground a speaker has with his audience. This pattern of language in North Korea is counterintuitive to theoretical expectations. In general, the linguistic formality of established leaders declines over time as they accumulate common ground. We find the opposite here; formality increases at the end of Kim Jong Il's tenure, and decreases precipitously when Kim Jong Un assumes office.

## II. Identifying Bluffs and Credible Threats

*State-level Threats and Bluffs:* The language of credible threats looks very different from bluffs. Bluffs tend to be much more formal in nature, whereas credible threats indicate very informal language. Countries with greater power tend to make more credible threats than do countries with less power, as indicated by the CINC (Composite Index of National Capabilities) scores below. The mean CINC score for credible threats is three times as great as for bluffing. This fits with accepted theoretical perspectives that democracies, which tend to be more economically developed, stable, and stronger than non-democracies, are capable of making credible threats because they have the audience accountability to caution against aggressive language toward potential adversaries, as well as the resources to follow through with their threats should their opponent choose to meet their challenge.

## III. Linguistic Profiles of Non-State Actors

*The Language of Genocide.* In this project we contrast two sources of genocidal hate speech: transcripts from the radio program Radio Television Libre des Milles Collines (RTLM) with printed media from the newspaper Kangura. We find that for RTLM formality spikes at the onset of the genocide, and steadily declines; for Kangura the opposite holds. Formality steadily climbs in the years preceding the genocide, and continues an upward trajectory.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense:

This project will help DoD to better understand the meta-linguistic relevance of leaders' speeches beyond the surface content of the words. Our software is able to identify subtle patterns of speech from leaders of opaque, authoritarian regimes and rogue political groups. This will help policymakers and defense analysts understand the deeper messages embedded in oratories and texts, like the intended audience, the credibility of threats, and patterns of contentious political behavior from non-state actors. Our project will provide better information for calibrating policy responses to likely threats, and identifying linguistic patterns that provide early warning for political crises and linguistic strategies for diffusing crises.

### Future Work:

*Threats, Bluffs, and Blusters in Economic Sanctions.* This paper distinguishes between credible threats and bluffs in international politics specifically related to levying economic sanctions. Much previous work has examined state-level political phenomena, especially using game theoretic methods, to analyze when actors are bluffing versus issuing a credible threat. This work will provide better information about when and where economic sanctions may be most and least effective.

### *Semantic Similarity and Topic Modeling: A New Method of Model Fit.*

Latent Dirichlet Allocation (LDA), or topic modeling, is a useful way to understand the composition of a collection of documents. Perplexity is one method of evaluating model fit. However, the process for deciding the appropriate number of topics is still often a process of guesswork. Using a corpus of 108,000 documents from North Korean state news media, we employ the semantic similarity of the key words generated within topics to model the appropriate number of topics for a given corpus

### Sharable data resources: (described on pg. 217)

- Linguistic corpora for authoritarian leaders, social media and social movements
- Topic Modeling Evaluation Tool (TMET)
- Sensitive Data Encoder (SDE) Tool

## Finding Allies for the War of Words: Mapping the Diffusion and Influence of Counter-Radical Muslim Discourse\*

Principal Investigator: Mark Woodward, [mark.woodward@asu.edu](mailto:mark.woodward@asu.edu)  
Continuing Co-PIs: Steven Corman, Hasan Davulcu, and Carolyn Warner  
Arizona State University

<http://csrc.asu.edu/research/projects/mapping-counterradical-discourse>

**Aim:** Enhance understanding of the structure of networks in the Muslim World working to *counter* violent extremism, the ideas on which they are based, social locations of their leaders and followers.

**Regions examined:** West Africa (UK, France, Germany), Western Europe (UK, France, Germany), Southeast Asia

This project has addressed deficiencies in our understanding of counter violent extremist (CVE) Islamic discourse and praxis by tracking and analyzing publicly observable formal networks and others operating under the radar screen. Our purpose is to enhance understanding of the structure of CVE networks, the ideas on which they are based, social locations of their leaders and followers. Specific issues addressed include: the social location and political environments of discourse producers and consumers; institutions and affiliations (local to transnational) that disseminate CVE messages; media used; the roles of local and global conflicts in their formulation; and Islamic sources on which CVE discourse is based.

The project's contribution is a multidimensional portrait of CVE networks across time and regions. A web portal accessing broad informational dynamics includes a CVE database and diffusion mapping.

### Methodology:

The project has been characterized by an integrative approach that brings together a broad range of disciplines and methods—Islamic and area studies; field research and discourse analysis; survey research; computer science and statistics—and triangulates methods to reveal patterns in CVE discourse at the local, regional, and global levels.

### Scientific Progress and Key Findings through original project performance periods:

A complex nexus of Enlightenment concepts—democracy, nationalism, religious pluralism, human and women's rights, Islamic theological and local cultural principles—inform CVE discourse systems. Gaining a more nuanced understanding of the interaction of these concepts and related practices is essential for recognizing Muslim organizations and movements opposed to violent radicalism.

We have located CVE groups in all three regions and sixteen transnational and transregional networks not described in the existing literature. Most are associated with long established religious movements/organizations with theological orientations ranging from Salafi to Sufi. We have shown that the level of religious tolerance or intolerance is better correlated with violence than particular theological views.

Methodological integration has yielded significant substantive findings. Multi-sited ethnography used common research protocols to facilitate understanding of similarities and differences across cases. It enabled us to track shifts in VE and CVE discourse patterns across regions. It also helped to confirm our hypothesis that the promotion of culturally specific Muslim practices is an effective mode of CVE discourse. Web mining and ethnography independently documented shifts in Islamic discourse since

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*Period of performance:* Apr'09–**April 2014**. One year expansion grant soon to be awarded.

2011 away from global jihad and the establishment of a global Caliphate and towards sectarianism and Sharia. Ethnography and surveys indicate substantial support for Sharia even Western Europe. Ethnographic follow up on survey findings showed that understandings of Sharia vary significantly. There is a basic distinction between those who understand Sharia as a theological concept and others who define it in juridical ways. Traditional Muslim scholars typical opt for the former, Islamists and Salafis the latter.

A substantial body of academic literature suggests that efforts by Saudi Arabia based Salafi organizations such as the Muslim World League have had a major impact on Muslim societies. However, our survey findings indicate that less than 2% of respondents fully endorse Salafi religious practices. Cross-regional ethnographic research indicates that local Muslims reject Salafi proselytization and counter it by increasing the scale and frequency of religious and events that Salafis condemn and moving them from private to public space

### **Outcomes:**

The project has enhanced theoretical understanding of relationships between religious doctrine and violence, and factors contributing to the emergence of nonviolent movements. We have developed enhanced web mining technologies, including a visual intelligence platform (LookingGlass) to track the online presence of VE and CVE movements. These technologies examine large numbers of texts, including Twitter streams, to discern contested topics. LookingGlass tracks the geographic regions, shifting positions, and diffusion of topics and perspectives discussed by people employing this mode of online communication. The platform has multilingual capabilities and enables rapid recognition of contested topics and the networks in which they are located. Learn more at “LookingGlass: A Visual Intelligence Platform for Tracking Online Social Movements” on page 184.

### **Next Steps (newly funded as of 09/1/15)**

#### **Study 1: *The Semantics of Intolerance***

The *Allies* project identified intolerance as the variable most strongly associated with violence. This study seeks to deepen understanding of these dynamics through qualitative analysis of the linguistic markers of tolerance and intolerance, then mapping these markers into computational tools for semantic analysis. Our aim to develop a scalable, unsupervised and domain-independent system that simultaneously extracts high-level relations and concepts, and learns a semantic network from text. Our proposed algorithm, seeded with expert knowledge, will utilize both syntactic and semantic corpus-based merging criteria that, if successful, will be able to identify semantic signatures of VEM and CVE discourses across countries and cultures.

#### **Study 2: *LookingGlass: Tracking Dynamics of Online Communities***

We will further develop LookingGlass’s technology to better understand the dynamics of virtual communities. Social movements are now located in cyberspace as much as on the ground and influence events from local to transnational levels. Understanding the dynamics of interaction between virtual and on-the-ground movements is an emerging challenge for the social sciences. To address this challenge, we will continue efforts to develop evolutionary clustering technologies to track evolving discourse patterns. Specifically we will develop technologies to: 1) track groups experiencing high change rates, 2) characterize the types of change, especially movement towards VEM or CVE positions, and 3) identify real-world events and issues that drive these changes.

**Study 3: *Demographics and Shari’ah***

Shari’ah is a focal point for VEM organizing. In this study, the focus is on assessing the factors that explain variation in support for shari’ah law across countries and across demographic groups within countries. We have found through preliminary analyses that Muslim lower and upper classes in non-Western countries support shari’ah law, whereas the middle class does not. We have found also that the reverse is the case in Western countries, that is, that Muslim lower and upper classes do not support shari’ah law, but the middle class does. We propose to do further analyses of the statistical data, interviews and focus group discussions conducted in *Allies* to explain these findings. Key questions we seek to investigate are whether support for shari’ah is, for most Muslims, motivated more by concerns about public morality (in civil society and in the government and in politics), or by the extent to which Muslims see shari’ah as an integral part of their lived faith, than about the social welfare benefits that shari’ah might be perceived to supply when the state has been failing in that area.

**Sharable data resources generated**

See “LookingGlass: A Visual Intelligence Platform for Tracking Online Social Movements” on page 184.

## Autocratic Stability During Regime Crises<sup>\*</sup>

Principal Investigator: **Joseph Wright**, Pennsylvania State University, [josephGwright@gmail.com](mailto:josephGwright@gmail.com)

Co-PI: **James Honaker**, Harvard University

<http://sites.psu.edu/dictators/>

**Research Problem:** Does foreign engagement of authoritarian governments decrease governments' willingness to use force against their citizens during times of crisis? And if so, which foreign policy tools are most effective in accomplishing this end?

**Groups examined:** All authoritarian regimes from 1990–2015

This research helps policy makers understand the influence of different foreign policy tools on the behavior of military and security organizations in dictatorships during periods of domestic unrest. It contributes to our knowledge of how domestic factors such as regime type and leadership-security ties interact with foreign interventions to influence government repression and democratic regime change.

### Approach:

The proposed project will gather global data on all authoritarian regimes from 1990–2015 to examine how foreign policy influences two outcomes in the context of domestic protest in dictatorships: state-led violence and regime instability. The project examines how foreign policy tools – such as economic aid, bilateral military ties, and diplomatic exchange – influence the behavior of autocratic governments during periods of crisis. It will account for two intervening factors, autocratic regime type and leadership security ties that influence these relationships.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense:

This project develops a better understanding of the relationship between foreign engagement of dictatorships, state-led violence in these countries, and the potential for democratic and non-violent regime change. The databases constructed for this research will have potential to contribute to research on international conflict in non-democracies; foreign relations with autocratic countries; the integration of government and rebel fighters when civil wars end; the behavior of foreign militaries after regime change; and counter-terrorism effort in autocratic countries.

### Initial results

We have identified three time-varying dimensions of autocratic rule using an annual cross-country data set. We show these dimensions – which measure the autonomy of the military, the strength of the supporting political party and the level of personalism – are orthogonal to commonly used measures of democracy.

### Manuscripts in progress

- Barbara Geddes, James Honaker, and Joseph Wright, 2014. “Measuring What You Can't See: The Latent Characteristics That Structure Autocratic Rule.” Paper presented at the Annual Meeting of the American Political Science Association (August 2014) Washington D.C.
- Thomas Brawner & Joseph Wright, 2014. "Introducing the Leadership Security Ties Data Base." Paper presented at the Annual Meeting of the American Political Science Association in August 2014; the “Institutions of Protection: The Organization of Security and Justice System Institutions in Autocracies” meeting at Juan March Institute, Carlos III University (ES) in June 2015.

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<sup>\*</sup> *Government Program Officer:* Martin Kruger, Office of Naval Research, [martin.kruger1@navy.mil](mailto:martin.kruger1@navy.mil)  
*Anticipated period of performance:* June'12–**December 2015**

**Sharable data resources:**

Two datasets, detailed at “Latent Dimensions of Authoritarianism” on page 218:

- **Latent Dimensions of Authoritarianism.** Using recently coded, time-varying data on autocratic regime characteristics for all dictatorships since 1946, we model the underlying structure of authoritarianism for use in applied research.
- **Leadership Security Ties.** A global database (1990-2015) that uses information on the leaders of military and security organizations in each dictatorship to measure the extent to which these organizations are connected to the regime leader through familial or ethnic ties.

## Minerva Research Awards Selected in 2015

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<b>N. Bouhana</b>	The Social Ecology of Radicalization: A Foundation for the Design of CVE Initiatives	127
<b>K. Carley</b>	Dynamic Statistical Network Informatics	130
<b>T. Cheung</b>	Understanding China's Efforts to Become a Global Defense Science, Technology, and Innovation Leader	133
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<b>C. Glaser</b>	Spheres of Influence, Regional Orders: Assessing Approaches for Understanding China's Rise	135
<b>P. Hensel</b>	Identity Claims: Expanding the Issue Correlates of War (ICOW) Dataset	137
<b>A. Lemieux</b>	Mobilizing Media: A Deep and Comparative Analysis of Magazines, Music, and Videos in the Context of Terrorism	139
<b>Z. Maoz</b>	The Effect of Shocks on Overlapping and Functionally Interacting Social and Political Networks: A Multimethod Approach	142
<b>M. Omelicheva</b>	Trafficking/Terrorism Nexus in Eurasia	144
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<b>M. Bloom</b>	Preventing the Next Generation: Mapping the Pathways of Children's Mobilization into Violent Extremist Organizations	125
<b>J. Horgan</b>	Understanding American Muslim Converts in the Contexts of Security and Society	139

### Pilot efforts:

PI	Research Project	Pg #
<b>K. Beardsley</b>	Data Expansion: International Crisis Behavior Update, 2008-2013	123
<b>E. Burger</b>	Pilot: Security Assessment Framework for E-Residency	129
<b>Z. Taylor</b>	Pilot: Intl University Research Ventures: Implications for US Economic Competitiveness and National Security	151

## Data Expansion: International Crisis Behavior Update, 2008-2013\*

Principal Investigator: **Kyle Beardsley**, Duke University, [kyle.beardsley@duke.edu](mailto:kyle.beardsley@duke.edu)  
<http://sites.duke.edu/icbdata/><sup>14</sup>

**Aim:** Update the International Crisis Behavior (ICB) dataset, adding 17 cases from 2007 to 2013 and training coders on another Minerva project to code pre-1918 crises.

**Countries examined:** Djibouti, Eritrea, Cambodia, Thailand, Russia, Georgia, North Korea, South Korea, USA, Syria, Turkey, Central African Republic, France, Cote d'Ivoire, Chad, Sudan, South Sudan, Libya

A state experiences “International Crisis Behavior” (ICB) when there is a threat to a basic value by another state, there is a finite time for action, and there is a heightened perception of armed hostilities. One characteristic that distinguishes the ICB crises from other data on international conflict is that escalation to armed violence is not a necessary condition for inclusion as a case, but the potential for escalation is a necessary condition. So, whereas the Uppsala Conflict Data Program<sup>15</sup> data requires a specific threshold of violence (25 annual battle-related fatalities), the ICB data include many cases of interest at a lower threshold of violence or that had the potential to escalate to violence but did not. Moreover, whereas the Militarized Interstate Dispute (MID)<sup>16</sup> data includes many cases of militarization that never posed much of a threat to the actors, the ICB data only includes those cases in which the leadership of at least one of the sides perceived a crisis.

The current version of the ICB data (Version 10) covers 1918 to 2007. These data have been used as the basis for analysis of dozens of research papers and books on armed-hostility escalation, crisis management, conflict resolution, conflict-recurrence prevention, and the analysis of grand strategy. We have identified 17 crises in the 2008 to 2013 time period and are nearing the completion of coding these cases and making them available for release in Version 11 of the data. We are also supporting efforts by the American University coding team overseen by Dr. Benjamin Jensen to code crises prior to 1918.

To code crises prior to 1918, we have trained the American University team. In the process, we have adapted the ICB codebook to fit the goals of Dr. Jensen’s project in order to capture the different international environment in the pre-1918 era and to streamline the process so as to maximize the number of cases that can be coded during the period of their grant. The resulting data set can be merged by users with the base ICB data, but it will be managed by Dr. Jensen and treated as an auxiliary set of cases.

### Methodology:

We have followed the procedures established by Brecher and Wilkenfeld (1997) in coding the ICB data. This includes assigning each potential case to two coders who use all available information to assign values to each of the variables in the actor-level and system-level components. The coders operate independently and only compare codes after they have assigned values for each of the variables. They then attempt to resolve any differences, with feedback from the project leaders as needed. This procedure

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\* *Government Program Officer:* Martin Kruger, Office of Naval Research  
*Anticipated period of performance:* Jan’15–December 2015.

This project was funded in support of two ongoing Minerva efforts building on the ICB dataset.

<sup>14</sup> This site is still in development and thus does not contain information on the new data release that will be ICB Version 11.

<sup>15</sup> Learn more at <http://www.pcr.uu.se/research/UCDP/>.

<sup>16</sup> Part of the Correlates of War Project. Learn more at <http://cow.dss.ucdavis.edu/data-sets/MIDs>.

reduces coder error and ensures consistency with the decisions made in the coding of the existing crises in the dataset.

To code crises prior to 1918, we have trained the American University team. In the process, we have adapted the ICB codebook to fit the goals of Dr. Jensen's project in order to capture the different international environment in the pre-1918 era and to streamline the process so as to maximize the number of cases that can be coded during the period of their grant. The resulting data set can be merged by users with the base ICB data, but it will be managed by Dr. Jensen and treated as an auxiliary set of cases.

**Anticipated Outcomes of Research:**

We will produce an updated ICB data set that will be verified for consistency and then disseminated publicly. We will also link our project to the final project from the team at American University, as well as to **Erik Gartzke's** Minerva-funded research on cross-domain deterrence. Once the data are completed, we will begin analysis on research related to the relevance (or irrelevance) of balance of power to crisis behavior, as well as on how the international system has changed since September 11, 2001.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

The data collected will help better characterize the sources of stability and instability in the international system in the past decade. One of our research papers that will use these data will specifically examine how patterns of crisis escalation across the globe have changed with the USA's shifts in grand strategy, especially after 9/11.

**Sharable data resources to be generated**

Version 11.0 of the International Crisis Behavior dataset (See description on page 166.)

**Outreach:**

We will organize a panel related to the analysis of the new version of the ICB data at the 2017 International Studies Association (ISA) conference.

## Preventing the Next Generation: Mapping the Pathways of Children's Mobilization into Violent Extremist Organizations\*

Mia Bloom, Georgia State University, [mbloom3@gsu.edu](mailto:mbloom3@gsu.edu)

John G. Horgan, Georgia State University; B. Heidi Ellis, Boston Children's Hospital

**Aim:** Determine mechanisms for children's mobilization, contrasts between children in VEOs and child soldiers, and impacts of this tactic on adult soldiers facing militarized children.

**Countries examined:** Afghanistan, Pakistan, Israel/Palestine, Iraq, Syria & Somalia (all include fieldwork)

Terrorism has long been considered a "weapon of the weak." In recent years terrorists have increasingly drawn on women and children to fight. Using child operatives provides the organizations with the element of surprise as well as psychological advantages. This project assesses the growing phenomenon of children's involvement in terrorist and violent extremist groups. It analyzes the different mechanisms for children's mobilization, contrasts children in VEOs with child soldiers, and briefly explores the impact that this tactic has on the soldiers facing militarized children. This research involves a 3-year enquiry into the processes whereby children are mobilized into terrorist movements.

In the first few months of the project, the PIs have created a codebook for use with child soldier biographies/autobiographies to begin the data collection and charted some of the preliminary differences between children in terrorist groups and child soldiers in terms of parental and community involvement, as well as the disparate pathways of involvement for each.

### Approach:

The project will collect and analyze primary and secondary data in order to create a multi-stage model that may guide the development of a set of recommendations for multi-level, culturally appropriate models for the intervention and prevention of children engaging in violent extremism. Cases will be developed using secondary, publicly available data for Afghanistan, Pakistan, Israel/Palestine, Iraq, Syria and Somalia. For Pakistan, however, we will seek to access anonymized data on children's experiences, collected by mental health professionals involved in rehabilitation efforts by NGOs. Furthermore, we will seek to contextualize the data by conducting interviews with those same mental health professionals. We will contrast the findings with children's recruitment in other contexts (gangs, cults, and by pedophiles) as well as examining children's involvement in political violence in Africa (Boko Haram) Northern Ireland (Ogra Sein Fein) and other historical Terrorists Groups.

### Anticipated Outcomes of Research:

We anticipate the development of a 6-stage model of children's involvement in violent extremism as well as assessing best practices for preventing such involvement. The major outcome of the research will be published articles and conference presentation leading to a book that will be published with Cornell University Press (already under contract) entitled: *Small Arms: Children and Terrorism*.

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\* *Government Program Officer:* Harold Hawkins, Office of Naval Research, [harold.hawkins@navy.mil](mailto:harold.hawkins@navy.mil)  
*Anticipated period of performance:* Feb'15–Oct'18

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

We are seeing younger and younger operatives in the battle-space and we know that there is little comprehension about how and when children are mobilized into terrorist and violent extremist organizations. The impact on national defense cannot be understated. The growing phenomenon of ISIS ‘Cubs’ and child suicide bombers in Boko Haram underscores the need to better understand the problem and find ways to combat it.

**Sharable data resources to be generated/workshops:**

We plan to develop a comprehensive data set on children’s involvement that will be shareable with DoD and other Minerva researchers.

**Other anticipated research products**

- The project will generate **literature reviews** about children and conflict in a variety of settings to glean lessons learned.
- There will be **“quick win” research summaries** that will be posted to the project website.
- The investigators (Bloom, Horgan, Ellis) will present preliminary findings **at academic conferences** and **publish with academic journals**.
- Bloom and Horgan will also publish **op-eds** on the subject to inform the public of the research findings in press outlets like the *Washington Post* Monkey Cage, *CNN*, *Vice News*, *Foreign Affairs*, and others.<sup>17</sup>

NEW RESEARCH AWARDS

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<sup>17</sup> See examples at

- <https://news.vice.com/article/this-is-how-the-islamic-state-manufactures-child-militants>
- <http://www.cnn.com/2014/01/07/opinion/bloom-horgan-afghanistan-girl/>
- <http://www.cnn.com/2013/03/27/world/asia/pakistan-anti-taliban/>
- <https://www.foreignaffairs.com/articles/middle-east/2015-02-09/rise-child-terrorist>,
- <https://www.foreignaffairs.com/articles/2015-07-21/cubs-caliphate>

## **The Social Ecology of Radicalization: A Foundation for the Design of CVE Initiatives\***

Principal Investigators: **Noémie Bouhana**, University College London, [n.bouhana@ucl.ac.uk](mailto:n.bouhana@ucl.ac.uk)

Co-PIs: **Paul Gill**, University College London

**John Morrison**, University of East London

**Lasse Lindekilde**, University of Aarhus (Denmark)

**Dalal Alrajeh**, Imperial College London

**Aim:** This 3-year project capitalizes on knowledge and methods accrued in criminology to investigate the comparatively neglected 'where' of radicalization.

**Countries examined:** Fieldwork in England, Denmark, & Northern Ireland; additional research in the U.S.

With some exceptions, research on homegrown radicalization has privileged investigation of individual-level attributes (e.g., socio-demographic and psychological characteristics; life experiences; grievances; social bonds; religious and political beliefs). Much less systematic attention has been paid to the immediate socio-physical environment in which radicalization takes place and the processes through which individuals interact with this environment. Yet decades of research in the neighboring domain of crime prevention shows that the development of criminal propensities (radicalization being one instantiation of this process) is the outcome of a particular kind of interaction between people with specific characteristics and propensities, and environments with a given set of socializing features.

This project proposes to capitalize on the crime prevention knowledge-base to investigate 1) the characteristics of radicalizing settings (places where individuals undergo all or part of the process of radicalization, both geographic and virtual); 2) the processes of self- and social selection through which individuals end up exposed to these radicalizing settings; and 3) the systemic processes which promote (or suppress) the emergence of radicalizing settings and, hence, a social ecology favorable (or unfavorable) to radicalization.

### **Planned Methodology:**

We propose to use a mixed-method comparative design, involving a) fieldwork in England, Denmark and Northern Ireland, including structured and semi-structured interviews with community leaders and individuals who have undergone radicalization, and comparative community surveys; b) the systematic collection of open-source data on known radicalizing settings in the United States and the United Kingdom; and c) the use of logic-based approaches recently applied to crime science, in order to formulate a robust general explanatory model from our context-specific data.

### **Anticipated Outcomes of Research:**

Our key deliverable will be a general model of the social ecology of radicalization, which can serve a purpose akin to the Social-Ecological Framework for Violence Prevention in use at the Centers for Disease Control (CDC), allowing for 1) the systematic organization of our knowledge-base of individual radicalization and its causes; 2) the coherent allocation of prevention tasks across public and private stakeholders; and 3) the systematic analysis of radicalization risk and subsequent design of counter-measures in diverse socio-geographical and cultural contexts.

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\* *DoD Program Officer:* Ben Knott, Air Force Office of Scientific Research, [benjamin.knott.2@us.af.mil](mailto:benjamin.knott.2@us.af.mil)  
*Anticipated period of performance:* Sept' 15–Sept' 18

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

We aim to deliver a cross-context understanding of the social ecological conditions under which homegrown radicalization can take place. Such an understanding is a prerequisite to the design of effective CVE community-level interventions. Furthermore, the project will deliver evidence-based knowledge of radicalization hotspots and selection processes in the United States, as well as a better appreciation of radicalization processes associated with the 'foreign fighter' phenomenon, with implications for the prevention of citizen engagement in foreign terrorist organizations and the effective management of returning fighters.

**Anticipated research products:**

- Open-source dataset of known radicalizing settings in the US and UK
- Research briefs for stakeholders
- Workshops for practitioners
- Public briefings (notably in surveyed communities)

## Pilot: Security Assessment Framework for E-Residency\*

**Eric Burger**, Georgetown University, [eric.burger@georgetown.edu](mailto:eric.burger@georgetown.edu)

**Clare Sullivan**, University of South Australia and Visiting Faculty at Georgetown University

**Aim:** Examine the key stages of Estonia's recently announced e-residency program to determine the need for, and feasibility of, developing a more comprehensive security assessment tool for e-residency programs and the next evolution of international digital identity initiatives, digital citizenship (or e-citizenship).

In late 2014, the Republic of Estonia became the first country in the world to open its digital borders to persons from anywhere in the world to apply to become e-residents of Estonia. E-residency is more than just a new way of doing business but could be a fundamental shift in global commerce. This new development may have lasting international significance with potential impacts on US national security.

The Estonian e-Residency initiative enables a person from anywhere in the world to be, in effect, a virtual resident. An Estonian e-Resident can now establish an Estonian company online, administer the company from anywhere in the world, conduct e-banking and make remote money transfers. Estonia plans to expand the program both in terms of services available to e-Residents particularly using cloud computing and geographically through the location of Data Embassies outside Estonia. Other countries such as Azerbaijan have also announced plans for a similar program using a mobile platform.

The primary objective of the pilot project is to conduct a preliminary cross-discipline assessment of security strengths and vulnerabilities of the present and planned features of Estonian e-Residency. The pilot project will examine the key stages of the Estonian e-residency program:

1. Identity authentication for registration as an e-resident
2. Integrity and security of identity verification for e-transactions, authenticity and security of e-signatures and security of communications including e-sending of documents, particularly in a mobile environment
3. Security of e-residency data and data access, including data in the planned State Cloud and Data Embassies

The strengths and vulnerabilities of these aspects will be assessed from both U.S. national security and international security perspectives.

This initial threat assessment will be used to determine the need for, and feasibility of, developing a more comprehensive security assessment framework which we call the Minerva E-ID Assessment Framework. The MEIA framework would be a set of tools and standards that enable analysts to comprehensively assess security threats and vulnerabilities, and more broadly to predict the US national security impacts of foreign countries' implementation of electronic, Internet-based identity systems. Such a framework would not only assess the Estonian e-residency program but also the application of MEIA to e-residency programs of other countries and regions; and to the next evolution of international digital identity initiatives, digital citizenship (also known as e-citizenship).

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\* *Government Program Officer:* Micheline Strand, Army Research Office  
*Government Point of Contact:* Lisa Troyer, Army Research Office, [lisa.l.troyer.ctr@mail.mil](mailto:lisa.l.troyer.ctr@mail.mil)  
*Anticipated period of performance:* Sept' 15–June' 16

## Dynamic Statistical Network Informatics\*

Principal Investigator: **Kathleen Carley**, Carnegie Mellon University, [kathleen.carley@cs.cmu.edu](mailto:kathleen.carley@cs.cmu.edu)

Co-PI: **Joel Levine**, Dartmouth College

[www.casos.cs.cmu.edu/projects/](http://www.casos.cs.cmu.edu/projects/)

**Aim:** Develop and test a novel, scalable and robust technology for estimating and analyzing socio-cognitive cultural maps and then using them to assess the lay-of-the-land, changes in power structures and resilience of various countries and socio-cultural groups.

**Regions of interest:** Syria and Iraq, Pacific Rim, and the global cyber community

Military leaders have a need to understand the lay of the land so as to effectively conduct shaping operations in a region of interest. This is often referred to as socio-cognitive terrain mapping. In order to shape operations, these leaders have a need to rapidly assess the overall communities' stance on an issue of interest, resilience, and so the impact of changes on that communities' stance on an issue of interest and/or its power structure, the impact of supporting one group versus another, and to evaluate various courses of action given the socio-cognitive terrain mapping. From a socio-cultural perspective understanding the lay of the land means attaining a structural understanding of: 1) who are the critical decision makers (individuals or groups); 2) what are the relations such as similarities, and potential alliances and conflicts among these decision makers; and 3) what is the basis for those relations, alliance and conflicts e.g., are they based in economic, status, education, religion, location. At its core, developing this socio-cultural understanding means collecting, reasoning about, visualizing and forecasting change in networks. However, these networks are not the traditional social networks in which the observed relations among a handful of actors constrain and enable activity. Rather, these are high-dimensional dynamic inferred networks relating actors at different levels of granularity (individuals and groups) to other actors and their activities, beliefs, and topics of concern. Methodologically, such high dimensional dynamic networks pose severe problems for the analyst. Challenges include: *accurate inference*—inferring multi-dimensional relations among actors given characteristics of the actors or their activity or association with specific topics despite data limitations; *uncertainty estimation* - assessing the certainty associated with these high dimensional relations given data biases and incompleteness; *interpretable visualizations*—visualizing high dimensional networks, uncertainty in high dimensional networks and change in these networks in a way that supports interpretation and operational intelligence;

NEW RESEARCH AWARDS

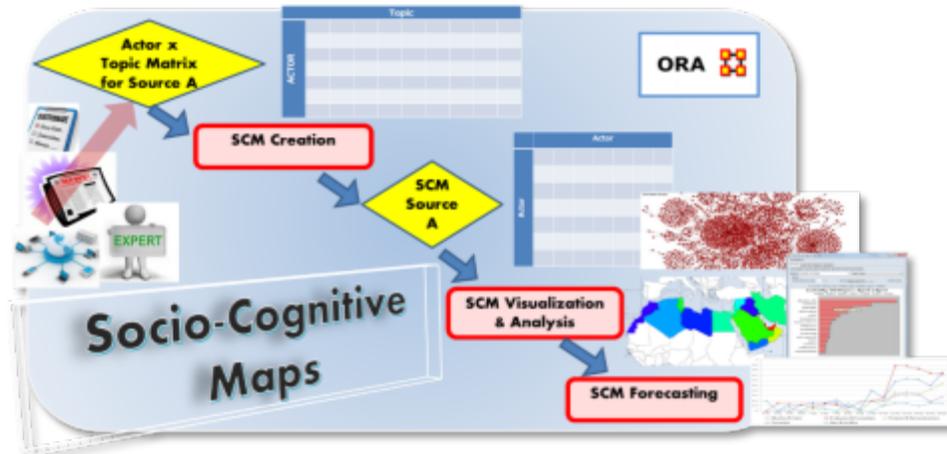


Figure 24. Socio-Cognitive Map Analytic System

\* *Government Program Officer:* Harold Hawkins, Office of Naval Research, [harold.hawkins@navy.mil](mailto:harold.hawkins@navy.mil)  
*Anticipated period of performance:* Sept'15–Sept'20 (with option)

*influence assessment* - determining the points of influence in the high dimensional network to support operational intelligence; *dynamics assessment*—assessing change in networks and the position of actors in networks taking into account weighted and valenced relations; and *workflow complexity*—reducing strain on analysts who would need to utilize a large number of complex methods many of which do not currently exist as re-usable algorithms on diverse data.

### **Planned Methodology:**

This research will provide a means for gaining this socio-cultural understanding and for easily identifying changes in the underlying socio-cultural context – the socio-cognitive cultural map (SCM). The SCM is the best-fit model of these underlying relations among actors in the region of interest based on a socio-cognitive understanding of the social and cultural similarities and differences among actors as expressed through their activities and attention to various issues. These actors might be individuals or groups such as country leaders, “the military,” ethnic or terror groups. SCMs can be built based on data derived from diverse sources such as open-source texts and questionnaires. From an actionable perspective, understanding the lay of the land, requires being able to use the information in the SCM to assess changes in the resilience of the community, its power structure, and its stance on an issue of interest as changes occur in the set of actors, the relations among them possibly due to fundamental changes in the basis for relations such as increasing the level of wealth or education. To be operationally usable SCMs need to be a) quick to develop, b) sensitive to cultural difference, c) interpretable, d) capture trends and changes, and e) usable for doing course of action analysis. The algorithms needed for generating, assessing, and visualizing SCMs need to be robust, scalable and reusable. To develop, assess and visualize SCM’s we utilize a combination of cognitive workflow analysis, language technology for text mining, high-dimensional network analytics, statistical network analytics, and visual network analytics. Data from news is extracted using COTS tools for text mining. Cognitive workflow analysis is used to track the process of SCM creation and assessment while it is being taught to students. Then this is operationalized using advance network methods, statistical procedures for high-dimensional data like LASSO, heuristic optimization procedures like simulated annealing will be used for finding the best fit models, advanced network visualization for demonstration, and what-if one-step simulation for forecasting. Modern software engineering methods are used to implement and test procedures for creating, enhancing, visualizing, and forecasting using SCMs and then embedding these in an overall system – see Figure 24 that will leverage the ORA network toolkit. We focus on: SCM creation, SCM enhancement, SCM analysis and visualization, and SCM forecasting. New algorithms will be implemented and tested, the overall workflow refined, and the generalizability of the methods assessed through the construction and assessment of SCMs for diverse contexts (resiliency, deterrence and cyber), regions of interest (Syria/Iraq, Pacific Rim, and Global) using diverse data sources (questionnaire, news, subject matter expert assessments, and sensor data). The result will be a set of predictive models to assess how specific countries will respond to specific issues of interest under various courses of action, and a general process that can be used in other contexts.

### **Anticipated Outcomes of Research:**

This research will provide new algorithms, techniques, procedures for creating, assessing and using SCM’s, guidance on how best to apply these algorithms, and a process for doing stability, resiliency and change assessment using these algorithms and the SCMs. In addition, this research will lead to a principled approach to laying out network images so that information on cohesion, fractionation, lines of agreement and disagreement are readily apparent to the observer.

### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

The algorithm, procedures and associated tools developed in this project for identifying and visualizing

SCMs, assessing resiliency and the impact of structural changes on resiliency will provide the DoD with a core operational capability to enhance predictive modeling, and support mission planning. The proposed technology enhancements, particularly those for visualizing, analyzing, and fusing information from media and interviews are of immediate value to rebuilding operations, joint HA/DR operations, MISOC, public-relations operations, irregular warfare operations, intelligence efforts, and IO operations.

**Sharable data resources to be generated** (details on page 171):

- ORA – SCM Analytics
- SCM Example Models for Training

**Other anticipated research products**

- Automated and optimized SCM procedure available in ORA
- Training modules on SCM creation and assessment

Table 2. Type of Data by Country

Countries	Topic	Questionnaire	News	Subject Matter Experts	Sensor Data
Syria/Iraq	Resiliency	Yes	Yes		
<b>Pacific Rim</b> N. Korea S. Korea US China	Deterrence		Yes	Yes	
<b>Global</b> 115 countries	Cyber Security		Yes		Yes

NEW RESEARCH AWARDS

## Understanding China's Efforts to Become a Global Defense Science, Technology, and Innovation Leader\*

Principal Investigator: **Tai Ming Cheung**, UC San Diego, [tcheung@ucsd.edu](mailto:tcheung@ucsd.edu)

**Aim:** Deepen and broaden our understanding of the nature, dynamics, and trajectory of China's accelerating rise as a highly capable defense science, technology, and innovation power.

**Countries examined:** China, Russia, Israel, and India

Building upon an existing Minerva project examining the relationship between security and technology in China (see pg. 25), this new project seeks to both deepen and broaden our understanding of the nature, dynamics, and trajectory of this progress through a careful assessment of the structures, processes, and drivers, especially within the Chinese national and defense science, technology, and innovation systems.

There are three key components of this project.

**1. China's Defense Research, Development, and Acquisition (RDA) System:** The first component examines how China's defense establishment goes about conceiving, developing, producing, and procuring weapons systems, using an analytical framework that incorporates the different stages of the RDA process along with concepts from the field of innovation studies such as industrial innovation and national innovation systems. The project looks at the complex ecosystem of organizations and rules that are responsible for the conceptualization, design, engineering, testing, production, acquisition, and operation of weapons systems. This framework will be applied to several case studies.

**2. Annual Review of China's Defense Industrial Base:** The second component provides a yearly review of the expansive Chinese defense industrial base, which offers a longitudinal perspective of the trends taking place in its grand transformation from imitator to innovator. Key areas of focus include the role of major actors (corporations, government and military agencies, research organizations), inputs (funding, technology transfers), processes (governance, decision-making, management of projects), and outputs (technologies). Research will also focus on assessing the strengths and weaknesses of the defense industrial base at a systems level. The main analytical approach is the use of case studies that combine detailed descriptions offering rich empirical evidence and the use of an innovation capabilities framework that identifies and sorts key drivers of change and innovation into hard (tangible input factors) and soft (intangible, process-related factors) innovation categories.

**3. Applying Lessons Learned from China to Understand How Other Countries Become Military Technological and Industrial Powers:** Based upon findings from the study of China's military technological development, the third component develops a generalizable framework that offers indicators and explanations as to why, how, and when other countries, especially those catching up, decide to develop indigenous or joint defense technological and industrial capabilities. Key factors include 1) top-level leadership support; 2) threat environment; 3) availability of high-quality scientific and technological talent; and 4) access to external technology and knowledge transfers. Case studies will be conducted on Russia, Israel, and India.

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\* *Government Program Officer:* Micheline Strand, Army Research Office

*Government Point of Contact:* Lisa Troyer, Army Research Office, [lisa.l.troyer.ctr@mail.mil](mailto:lisa.l.troyer.ctr@mail.mil)

*Anticipated period of performance:* July' 15–July' 18

## New Analytics for Measuring and Countering Social Influence and Persuasion of Extremist Groups\*

Principal Investigator: **Hasan Davulcu**, Arizona State University, [HasanDavulcu@asu.edu](mailto:HasanDavulcu@asu.edu)

**Luke Gerdes**, United States Military Academy at West Point

**Jonathan Githens-Mazer**, University of Exeter

**Baoxin Li, Paulo Shakarian, and Mark Woodward**, Arizona State University

**Aim:** Develop novel measurement and analytic methods for detecting Information Cascades (ICs) and automated approaches informed by social science to determine what types of information “goes viral” and under what circumstances.

**Regions examined:** Southeast Asia (Indonesia and Malaysia), West Africa (Nigeria), Western Europe (United Kingdom), Middle East (Iraq and Syria) – via fieldwork.

Online Information Cascades (ICs) in which tens and in some case hundreds of thousands of individuals participate to spread information and opinions across the globe are now common. ICs point to moments of heightened resonance among individuals and groups that often lead to collective behaviors. Substantively we will focus on the diffusion of violent and counter-violent ideologies in Muslim communities. Within each of these objectives, we will also explore relationships between online ICs and those in natural environments.

### Approach:

We have four primary research objectives:

1. Embed findings from social science research on influence and persuasion into formal models of ICs.
2. Ground models for several real socio-cultural groups using their online social media.
3. Devise methodologies to predict viral trends in Internet based communities
4. Devise methodologies to determine effective counter-messaging strategies.

### Anticipated Outcomes of Research:

This research will help us to identify core features and underlying mechanisms of ICs and to reverse engineer group-specific diffusion dynamics to design targeted counter-persuasion campaigns.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense:

Our design builds fundamental knowledge of social media tools that could be used to mitigate the influence of extremist groups and/or spread public affairs information about infrastructure-building projects and other development initiatives. We also propose to develop new means of data gathering and analysis that the intelligence community could employ to better understand the mindset and motivations of non-state adversaries.

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\* *Government Program Officer:* Harold Hawkins, Office of Naval Research, [harold.hawkins@navy.mil](mailto:harold.hawkins@navy.mil)  
*Anticipated period of performance:* Sept' 15–Sept' 18

## Spheres of Influence, Regional Orders: Assessing Approaches for Understanding China's Rise\*

Charles Glaser, George Washington University  
[cglaser@gwu.edu](mailto:cglaser@gwu.edu)

**Aim:** Understand the type of geopolitical architecture the United States should strive to establish in East Asia as China rises.

**Countries examined:** China, Japan, South Korea, Singapore (via fieldwork); other East Asian countries

China's rise is surfacing basic questions about the United States' ability to continue to achieve its goals in East Asia. The United States has begun to envision the future architecture for achieving its interests in East Asia. Some have called for the United States to preserve its sphere of influence in East Asia. Others have called for the United States to continue to promote a regional order defined by "a set of rules that all play by." Our project will analyze the concepts of spheres of influence and regional orders: What exactly is embodied and implied by these concepts? Are the two—spheres and orders—mutually compatible? What means are available to the United States for pursuing them and how likely is the United States to achieve them? Does the United States require a sphere of influence and/or a regional order to achieve its fundamental goals of peace, security, and prosperity?

### Planned Methodology:

The project will produce a set of nested studies. The first component addresses a spectrum of *conceptual issues* about spheres of influence and international orders, thereby laying the foundation for the other study components of our project. It will establish agreed upon definitions of these basic concepts and develops a series of theoretical arguments. The next three components of our project explore approaches that emphasize *military means*: power projection, focusing on the conditions under which major powers decide to develop power-projection capabilities; military alliances, focusing on the challenges a declining power faces when trying to preserve its alliances; and forward-deployed forces, focusing on their role in preserving the credibility of the alliance-leading state.

The next components of our project concentrate on *international institutions*. The first zeros in on fundamental features of institutional design, exploring how they determine how much influence a state can exert through an international institution. The second institutional component of our project compares the relative advantages of formal alliance and multilateral institutions for building a regional order in Northeast Asia. The final two components of our project address *economic and social dimensions* of states' potential means. The economic component identifies the mechanisms via which trade and foreign investment can provide a state with influence that reaches beyond the economic realm. The social component of our study will explore an under-appreciated means of influence that is available to some states—their diaspora—and will explore how China manages vast diaspora to acquire influence.

Our project will employ a variety of methodological approaches that match the substantive and empirical nature of the questions we are studying, including deductive analysis to advance IR theory; large-n statistical methods and qualitative methods; economic analysis of U.S. and foreign patterns of trade, finance, and immigration; fieldwork involving interviews in the U.S. and abroad; historical research using archival materials and other declassified documents.

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*Anticipated period of performance:* Sept' 15–Sept' 18

**Anticipated Outcomes of Research:**

Our project will provide a compressive assessment of spheres of influence and regional orders, including:

1. The goals that a state could use one or both of these approaches to achieve;
2. Their conceptual foundations;
3. The diverse tools that states may have available to implement these approaches, including military capabilities, alliances, trade and investment, international institutions, and diasporas;
4. Historical examples of how states have implemented these models of influence;
5. The role that spheres of influence and international orders currently play in U.S. policy toward East Asia;
6. The challenges that the United States may encounter in maintaining these types of influence as China rises; and
7. The policy implications for East Asia.

**Potential Implications for National Defense:**

At the broadest level, our project will generate an improved understanding of two distinct approaches to future U.S. presence and influence in East Asia—a sphere of influence and a regional order. Our project will help to clarify whether they are complementary or competing means available to the United States, the potential tradeoffs, and the political, institutional, and technical conditions under which these tradeoffs may arise. Our project will enrich understanding of how each of these potential tools of grand strategy actually operates in practice, and the costs and benefits they can provide.

NEW RESEARCH AWARDS

## Identity Claims: Expanding the Issue Correlates of War (ICOW) Dataset\*

Principal Investigator: **Paul Hensel**, University of North Texas

Co-PIs: **Sara McLaughlin Mitchell**, University of Iowa

**Krista E. Wiegand**, University of Tennessee

**Andrew P. Owsiak**, University of Georgia

Project Point of Contact: Peyton Wilson, University of North Texas, [Peyton.Wilson@unt.edu](mailto:Peyton.Wilson@unt.edu)  
<http://www.paulhensel.org/icow.html>

**Aim:** Build an original data set to allow analysis of the role of *identity claims*—explicit contention between the official representatives of two or more states over the status or treatment of a shared ethnic group, as seen in Crimea—in international conflict.

**Conflicts examined:** Conflicts over shared ethnic groups since World War II.

Recent academic studies have suggested that nation-states have come to support a norm of territorial integrity, making outright land grabs unacceptable and costly foreign policy tools. The Russian annexation of Crimea was the first successful case of coercive territorial annexation in several decades, and Russia's economy has struggled since then because of the costly economic sanctions imposed by Western states for violating this norm. Even if leaders are unlikely to pursue territorial annexation, though, they continue to make demands over the treatment of their co-ethnics abroad. Examples since World War II include Russian diplomatic or material support for ethnic Russians in Estonia, Transnistria, and Ukraine, Hungarian support for ethnic Hungarians in neighboring Slovakia and Romania, and Austrian support for ethnic Germans in the former South Tyrol. We seek to study these cases, which we term "identity claims" and define as explicit contention between the official representatives of two or more states over the status or treatment of a shared ethnic group.

We seek to collect an original data set of all identity claims since World War II, which we will then analyze to understand these claims. One important question to be investigated is the frequency of these identity claims: have they become more frequent as the territorial integrity norm has developed and new territorial claims have become less frequent? How closely linked are identity claims and territorial claims: how often do identity claims lead to new irredentist territorial claims, and how often are territorial claims followed by identity claims after the border itself is settled? We also seek to understand the domestic and international conditions – politically, socially, and economically – that make these claims most likely to begin, most likely to escalate to military action, and most likely to be managed or settled peacefully. Finally, we seek to determine whether identity claims are handled similarly to the territorial, river, and maritime claims that we have studied previously, or whether the question of treatment of ethnic groups within a state is fundamentally different from these other issues because it falls under the nature of domestic sovereignty. For example, while we expect many similarities in claim management, third party settlement techniques such as adjudication would seem less likely to be used, as international actors such as courts decide that the lack jurisdiction to take on a largely domestic political question.

This project represents the next stage in the *issue approach* to international relations, as developed by the Issue Correlates of War (ICOW) Project. The core idea of the issue approach is that contentious issues vary in their importance, or *salience*, and that leaders select different foreign policy tools depending on the salience of the issue at stake. Issue salience is conceptualized along two dimensions: *tangible salience* is based on tangible values related to security, survival, and wealth, while *intangible salience* is

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*Anticipated period of performance:* Sept' 15–Sept' 18

based on intangible values that derive from notions of culture/identity, equality/justice, independence, and status/prestige/ influence. Identity claims are typically high on intangible salience (as the treatment of one's kinsmen has great symbolic and cultural value), but low on tangible salience (as the state making the claim has little to be gained in material terms from helping its kinsmen abroad). Theoretically, we expect that high levels of intangible salience will increase the potential for both interstate militarized conflict and intrastate violence involving the ethnic groups in question.

**Planned Methodology:**

The main portion of this project, data collection, involves the use of historical, geographical, and political reference sources and news sources to identify and code details of all identity claims around the world since World War II. We will begin from the Ethnic Power Relations (EPR) and Transborder Ethnic Kin (TEK) data sets, which identify all politically relevant ethnic groups since World War II and delineate connections between such groups in multiple countries. These data sets have identified over 150 ethnic groups that are shared by two or more countries, accounting for well over 1200 potential identity claims (such as Russia vs. Estonia over Russians or Turkey vs. Iraq over Kurds).

We will study each of these potential claims using reference sources on ethnic groups (such as *Ethnic Groups Worldwide* and the *Ethnic Groups of the World* series), books and journal articles on each country or (where relevant) each ethnic group by historians, political scientists, and geographers, and news coverage from sources such as the *New York Times*, *Facts on File*, *Keesing's*, and Lexis-Nexis. These sources will be used to identify qualifying identity claims, where there is some suggestion that two governments may have disagreed explicitly about the status or treatment of a shared ethnic group. Each such claim will be investigated more closely to determine the nature of the claim and any actions that either side took to pursue its interests.

Finally, this information on claims will be coded and entered in a manner that is consistent with the ICOW project's existing datasets on territorial, river, and maritime claims. The PIs will then analyze this new data to help understand the origins, escalation, management, and ending of identity claims, as noted above.

**Anticipated Outcomes of Research:**

This project will produce a publicly available dataset of all identity claims since World War II, with additional information on details of the claims and on how the claimants managed their disagreement. We will use this data set to study the conditions under which identity claims are most likely to begin and most likely to escalate, as well as the techniques that have been most likely to manage or end such claims. We will also use this data set to study the impact of identity claims by outside actors on ethnic conflict and civil war within a country.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

This will provide the first comprehensive look at recent global patterns of identity claims: are they becoming more common as overt territorial claims decline, are they more or less dangerous than issues like territory, and under which conditions are they likely to emerge or escalate? The answers to such questions will help U.S. policymakers identify potential conflict fault lines before they escalate, and will offer advice on how such conflicts can be managed or resolved most effectively.

**Sharable data resources to be generated:**

The Issue Correlates of War (ICOW) Identity Claims Dataset (page 192): a downloadable data set with information on the occurrence and management of all identity claims since World War II.

NEW RESEARCH AWARDS

## Understanding American Muslim Converts in the Contexts of Security and Society\*

John Horgan, University of Massachusetts, Lowell, [John.Horgan@uml.edu](mailto:John.Horgan@uml.edu)  
Scott Flower, Global Centre for Research & Engagement (GCORE)

**Aim:** Understand why Muslim converts play a disproportionate role in Islamist terrorism.

**Country examined:** The United States

Muslim converts play a disproportionate role (statistically over-represented) in Islamist terrorism internationally. In fact, Muslim converts are seven times more likely to radicalise than people 'born Muslim' and converts in the West are increasingly engaged in 'homegrown' domestic extremism and attacks overseas as Foreign Fighters with implications for US national security. We investigate:

- How can we understand and predict what leads some converts to radicalise?
- Do the radicalization processes of Muslim converts differ from those born Muslim. If so, how?
- What roles do Muslim converts play as domestic 'homegrown' threats and as Foreign Fighters?
- With what types of strategic and tactical threat scenarios might converts be involved?

### Methodology:

A robust mixed methods approach, involving extensive ethnographic fieldwork in the US with non-radicalized and radicalized Muslim converts.

- Establish new large-*N* qualitative and quantitative convert datasets (using surveys and ethnographies);
- Apply a range of analytical approaches to assess the convert datasets (statistical, qualitative, SNA);
- Compare/contrast radicalized and non-radicalized converts and compare and contrast these findings with the radicalization processes of those who are 'born Muslims';
- Develop and test the Conversion-Radicalization Continuum (CRC), an interdisciplinary theoretical framework and rigorous scientific method for understanding factors that contribute to convert radicalization; and
- Use evidence-based scenario development to evaluate the range and nature of security challenges converts represent.

### Anticipated Outcomes of Research:

A major contribution to the study of Islamic conversion in America through scholarly publications; new empirical insights that enhance currently incomplete understandings of religious conversion, radicalization and terrorism and publish findings in peer-reviewed journals and books; provide a range of potential practitioner and policy-focused options for governments to use for the tasking of surveillance and in the development of intervention strategies to counter violent extremism among converts.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense:

We will deliver a number of assessment tools, indicators and scenarios to practitioners and policy makers which will assist with the development of evidence-based approaches to threat and risk assessment; we will directly inform US national security stakeholders about the research findings throughout the project through the provision of reports, briefings in person, conferences and workshops.

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\* *Government Program Officer:* Harold Hawkins, Office of Naval Research, [harold.hawkins@navy.mil](mailto:harold.hawkins@navy.mil)  
*Anticipated period of performance:* Sept' 15–Aug' 18

**Anticipated research products:**

- Practitioner-focused briefs of key lessons for the role of converts in radicalization, terrorism and foreign fighters and operational definitions.
- A range of potential policy options for governments to use for the development of intervention strategies to counter violent extremism among converts.
- Policy paper that examines the role played by Islamic revivalist movements in religious conversion to determine the extent to which such movements may be involved in the recruitment, facilitation and mobilization of converts for terrorism.
- Peer-reviewed academic journal articles on Muslim converts and convert radicalization in America; book presenting the research, published by a leading scholarly press.

## **Mobilizing Media: A Deep and Comparative Analysis of Magazines, Music, and Videos in the Context of Terrorism\***

**Tony Lemieux**, Georgia State University, [alemieux@gsu.edu](mailto:alemieux@gsu.edu)

Co-PIs: **Carol Winkler**, **Shawn Powers**, **Ben Miller**, Georgia State University

**Nelly Lahoud**, United State Military Academy, West Point

**Jonathan Pieslak**, City College of New York); **Akil Awan**, University of London

**Jarret Brachman** and **Humera Khan**, Consultants

<http://mobilizingmedia.gsu.edu> (not active yet)

**Aim:** To understand the media campaigns of prominent terrorist groups through theoretically-informed analyses of how terrorist groups use multi-sensory (i.e., visual, text, sound-based) appeals across media platforms that accounts for models of behavior change and influence.

Violent jihadist groups are increasingly deploying a sophisticated, multi-sensory strategic communications approach to subdue detractors and to recruit, educate, and inspire followers. Our analytical focus on magazines, music, and videos stems from their complementary functions and recirculation patterns as linked strategic communication campaigns across platforms. Three central perspectives guide the Mobilizing Media research program: Cultivation Theory, Multi-modal Processing, and the Information, Motivational, Behavior Skills (IMB) Model of Behavioral Change.

**Planned Methodology:** We will (i) Establish the corpus of media content and a multi-modal, media-based analytical approach; (ii) Conduct thematic analysis of music and video content to identify core thematic and persuasive elements; (iii) Conduct detailed text and context analyses of sources (English & Arabic) using natural language processing (NLP); (iv) Most importantly, the team will map the multi-modal themes, elements, and concepts from each medium onto extended IMB constructs, allowing for direct comparison across all media types.

**Anticipated Outcomes of Research:** The project will establish a systematically integrated analysis of communication elements and strategies that catalyze participation in, and support for, violent action. Our analysis will advance science in the study of terrorism, build theory, and highlight potential points of intervention and areas for future empirical research.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:** Understanding the strategic communication strategies of the ISIL and Al-Qaeda media campaigns is essential to national defense. This will be a foundation for assessing such media campaigns going forward.

**Sharable data resources to be generated:** (i) An extensive database of anashid, videos, and magazines; (ii) Media analysis, derived from magazine, video, and musical sources.

**Anticipated research products:** (i) Briefings for defense, intelligence, and law enforcement communities; (ii) Conference presentations, peer-reviewed publications and an edited book on *Mobilizing Media*; (iii) Expand focus beyond ISIL, AQAP, and AQ to groups such as Al Shabaab, Boko Haram, and emergent groups; (iv) Policy relevant research on how to effectively intervene and combat the influence of terrorist propaganda.

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*Anticipated period of performance:* Sept'15–Aug'20 (with option)

## The Effect of Shocks on Overlapping and Functionally Interacting Social and Political Networks: A Multimethod Approach\*

Zeev Maoz, University of California in Davis, [zmaoz@ucdavis.edu](mailto:zmaoz@ucdavis.edu)

Co-PIs: **George Barnett**, **Raissa D'Souza**, and **Brandon Kinne**, University of California, Davis  
**Camber Warren**, Naval Postgraduate School

**Aim:** Understand how interacting social and political networks re-organize following major shocks to one of them.

Social and political networks interact with each other on a constant basis. In some cases, this interaction involves spillover from one network to another (e.g., from alliances to trade in IR); in other cases units share ties across networks (some co-workers are friends); in still other cases there is a functional relationship between networks that do not share nodes (e.g., terrorist and counter-terrorist networks are functionally related). We examine how shocks—both natural disasters and man-made shocks—that originate in one network might spread to other networks, and how such interdependent networks re-organize following such shocks.

### Planned Methodology:

Our methodology combines four different elements:

- (1) *Mathematical modeling*: we develop mathematical models that explain and quantify forms of interdependence between or among networks and of the propagation of shocks across such networks;
- (2) *Agent-based modeling (ABMs)* using the insights of the math models we develop computer simulations of different network interdependencies and of the process of shocks propagation across such networks. These models enable us to generate propositions about the research questions above.
- (3) *Laboratory experiments*. We develop a series of experiments whereby subjects play a series of cooperative games iteratively, choosing each time both their playing partners and strategies in such games. We induce shocks in treatment groups that alter the parameters of the playing field. We examine variation in subjects' choice of partners and strategies by comparing these to control groups that are not shocked.
- (4) *Empirical analysis*. Analysis of the propositions deduced from the math models and ABMs on empirical data of social and political networks.

A key goal of the project is to develop a real-time computerized system tracking the propagation of shocks across networks. We plan to do so using event-data on national and international events, tracking both actual behavior of actors, and media coverage of such events.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense:

- Important insights about processes of shock propagation across networks will have important implication for design and planning of security networks.
- Infrastructure for modeling and testing cross-network interdependencies and for modeling and simulating process of shock propagation and network reorganization.

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*Anticipated period of performance*: Sept' 15–Aug' 18

- Real-time shock monitoring system contains important implications for national defense.

**Sharable data resources to be generated<sup>18</sup>**

- International Alliances
- International Trade
- International Conflict
- International Governmental Organizations
- Dyadic International Conflict
- Terrorism
- Media and Internet search
- International Conflict and cooperation events within and between countries

**Anticipated research products**

- At least two workshops/short conferences discussing research progress and results.
- A number of papers and possibly a book on the topic.
- Training of the next generation of network scholars, who have strong interdisciplinary work experience.
- A real-time shock-monitoring system.
- A large data repository on interacting social and political networks.

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<sup>18</sup> Some of these data exist; they are transformed to different formats allowing network analytic data applications (e.g., matrices, dyadic files, attribute files etc.) Some of the datasets will be collected and placed on the data repository.

## Trafficking/Terrorism Nexus in Eurasia \*

Principal Investigator: **Mariya Omelicheva**, University of Kansas, [omeliche@ku.edu](mailto:omeliche@ku.edu)

**Lawrence Markowitz**, Rowan University

**Stephen Egbert**, University of Kansas

**Aim:** Explore the nature of terrorism-criminal connections and identify the conditions under which terrorist-trafficking alliances are forged and change.

**Countries examined:** Armenia, Azerbaijan, Kazakhstan, Russia, Turkmenistan, and Uzbekistan; research for Georgia, Kyrgyzstan, and Tajikistan will also include fieldwork.

The links between terrorism and transnational organized crime are an emerging challenge to international peace and security. Drug trade, in particular, has provided funding for insurgency and terrorist attacks in various regions throughout the world. Many transnational criminal organizations and terrorist groups have also become involved in human trafficking. Despite the many points of intersection between trafficking activities and terrorism, there is still a tendency to treat these forms of transnational crime as discrete, and examine them separately or as part of the overlapping trafficking routes.

The Program conducts a robust set of analyses of the interface of drug trafficking, human trafficking and terrorism in the nine states of Eurasia that exemplify important aspects of the trafficking/terrorism nexus. Further, the Program assesses national and international capacities to respond to the trafficking/terrorism nexus and identify the obstacles that inhibit governments and international agencies from addressing the nexus.

### Planned Methodology:

The Program utilizes a mixed-method research design for collecting, analyzing, and visualizing data for three projects constituting the Program:

- (1) Mapping Terrorism and Trafficking
- (2) Modeling the Trafficking/Terrorism Nexus; and
- (3) Assessing National and International Responses.

**Projects 1 and 2** apply GIS-enabled tools and methods of spatial econometrics to map terrorist-criminal connections and assess the impact of geospatial and socio-political variables on trafficking and terrorism. **Project 3** involves rigorous case study analysis of nine hotspots in Eurasia to assess national capabilities to respond to the threats of trafficking and terrorism. It also encompasses a comprehensive inventory of responses to the trafficking/terrorism nexus by international agencies (United Nations Office on Drugs and Crime, International Organization for Migration, and European Union) and U.S. missions. Research on national and international responses will be performed via the content analysis of their formally announced programs and in-depth individual interviews with a wide range of experts in selected field sites.

### Anticipated Outcomes of Research:

The Program will produce broadly applicable models of the interface of drug trafficking, human trafficking and terrorism that will advance our knowledge of geospatial and socio-political conditions that generate states' vulnerabilities to these crimes. The Program will also develop a typology of terrorist-

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*Anticipated period of performance:* Sept' 15–Sept' 18

criminal connections, and explain how those connections promote violence.

**Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

By mapping the trafficking/terrorism nexus, this Program will identify areas of particular concern where U.S. military assets may be directed for its disruption. By assessing the national capacities to address the nexus, the Program will formulate recommendations for U.S.–national coordination of policy responses. By analyzing international responses, the Program will assess the capacity building support of international institutions to states facing the nexus. Overall, the findings will support the “whole-of-government” approach to transnational crime that enhances interagency cooperation and collaboration with partner nations.

**Sharable data resources to be generated:**

- A trafficking/terrorism website dedicated to the analysis and exploration of the convergence of terrorist and trafficking incidents in Eurasia and assessment of the Eurasian states’ vulnerabilities to these crimes. This will be an open source, online platform that will leverage GIS–compatible datasets, maps, visuals, analytical models, and GIS–enabled analytical tools to provide a resource for research and teaching of the terrorism/trafficking nexus in Eurasia.
- Publicly available GIS–compatible datasets of terrorist incidents, drug seizures, and human trafficking locations in Eurasia available for future research through the Program’s website.
- Datasets with information on various geospatial factors and integrated data on socio-political vulnerabilities examined in the study.

**Additional anticipated research products**

- Policy briefs addressing the spatial dimensions of drug trafficking, human trafficking, and terrorism;
- Academic publications: a book manuscript and several peer-reviewed articles;
- New teaching curriculum for two courses - *Eurasian Security* and *Weak States and Challenges to Security in Eurasia* – and a course module geared toward the military education curriculum;
- A Closing Conference on the Terrorism/Trafficking Nexus.

## The Social and Neurological Construction of Martyrdom\*

Robert Pape, University of Chicago, [rpape@uchicago.edu](mailto:rpape@uchicago.edu)

Jean Decety, University of Chicago

<http://cpost.uchicago.edu/>

**Aim:** Develop the first comprehensive social and neurological understanding of how extremist organizations propagate their message and which audiences are the most susceptible.

How do violent extremist organization (VEOs) such as the Islamic State of Iraq and Syria (ISIS) construct cultures of martyrdom that mobilize support for their activities, even to the point of normalizing the use of suicide attacks? Our research will improve the understanding of how VEOs gain and leverage support from their base populations and the construction of messaging methodologies.

### Planned Methodology:

This study looks at how VEOs mobilize support through targeted messaging and how these appeals interact with their audiences' beliefs and psychological traits. There are three main tasks for our approach.

- In **Task 1**, Dr. Pape and his research team will systematically analyze and compare the strategies VEOs use to construct cultures of martyrdom supporting their goals and objectives; the source material for this includes over 100 martyr videos.
- In **Task 2**, Dr. Decety and his team will use functional magnetic resonance imaging (fMRI) of individuals while they view martyr videos to investigate the pathways by which martyrdom appeals evoke sympathy and to identify characteristics that moderate the messages' persuasive effects on audience beliefs.
- **Task 3** structures the collaboration between Drs. Pape and Decety throughout the project, including regular meetings, integrated publication of results, and joint drafting of a final report.

The optional two-year extension includes **Task 4**, which expands the social investigation to more VEOs, while **Task 5** extends the neurological investigation to audiences that are proximate to conflict areas, such as Turkey. **Task 5** would involve fieldwork. **Task 6** disseminates findings to leading scholars and policy makers in a conference.

### Anticipated Outcomes of Research:

- Provide a detailed analysis of VEO communication strategies by region and campaign;
- Produce experimentally tested indicators of populations susceptible to VEO messaging and audience reactions;
- Contribute to the capacity to produce strategies for counter-efforts; and
- Mentorship of undergraduates, graduate students, and post-doctoral fellows.

### Potential Impact on DoD Capabilities and Broader Implications for National Defense:

The DoD will gain a significant new understanding of how VEOs generate targeted messages across regions and groups, how and why some individuals respond affirmatively to VEO efforts, and the identification of specific cultural nodes that are employed by VEOs to recruit and bolster their ranks.

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*Anticipated period of performance:* Sept' 15–Sept' 20 (with option)

**Sharable data resources to be generated**

- **Task 1: *Uncovering the Social Bases of Cultures of Martyrdom*** will produce eight comparative case analyses of contemporary cultures of martyrdom, a database of formatted and translated martyr videos with attack information and associated context, and selected videos formatted for fMRIs.
- **Task 2: *Uncovering the Neurological Bases of Cultures of Martyrdom*** will produce fMRI brain scans with accompanying neurological data and analyses.
- **Task 3: *Integration of Findings and Publication of Results*** will produce a synthesis of qualitative and quantitative analyses from Task 1 and Task 2, with explanatory data.

**Any other anticipated research products?**

- Book and article publications in peer-reviewed journals and academic presses.
- Training of post-docs, graduate students, and undergraduates.
- International conference for leading scholars and policy makers (in optional Task 6)

## **Ambiguous and Information Warfare in a Russian and Chinese Age\***

Principal Investigator: **Patrick Porter**, University of Exeter, [patrick.porter4@gmail.com](mailto:patrick.porter4@gmail.com)

Co-PIs: **Igor Sutyagin**, **Edward Schwarck**, and **Raffaello Pantucci**

Royal United Services Institute for Defence and Security Studies

**Aim:** Develop an intellectual framework to define the nature of the threat from Russian and Chinese ambiguous warfare and through which the threat may be managed and countered.

**Countries examined:** China, Russia, and interviews in Ukraine, Vietnam, Republic of Korea, and Japan.

Ambiguous warfare has become a central feature of Russia's military operations against its East European neighbors and NATO—as well as for China in its attempts to undermine the credibility of U.S. extended deterrence in East Asia and subvert certain international legal principles. Information warfare is one of the many tools deployed in such conflicts, though its opaque nature lends it to playing an important role. Both China and Russia have employed ambiguous and information warfare at a tactical level to disrupt or confuse Western military and political decision-making, but also at the strategic level to foster media narratives and public opinions in directions detrimental to Western interests. However, Western governments and militaries currently lack a clear and current intellectual framework to define the nature of the threat from Russian and Chinese ambiguous warfare, a problem which hampers their ability to respond effectively.

### **Approach:**

The research method of the proposed project will center on the study of historical case studies, field research and scenario workshops. Historical case studies will be analyzed against current activity with a view to forming a clearer picture of how ambiguous warfare has evolved and what its operating methodologies are—in particular as they are deployed by China and Russia. The findings of this research will be discussed and presented in workshops aimed at developing methods to more sharply define, counter, dissuade or deter ambiguous and information warfare. Project researchers will use a combination of desk-based research, in-person and remote interviews, and workshops with scenario discussions.

### **Anticipated outcome of the research:**

The project will provide a baseline definition of the origins, principles and methods of ambiguous warfare as employed by Russia and China. The secondary outcome will be to identify vulnerabilities within the ability of Western liberal democracies to counter ambiguous warfare by authoritarian states such as Russia and China, and discuss how the threat can be countered, dissuaded or deterred.

### **Impact on DoD activities or broader implications for national defense:**

In Eastern Europe, the United States has struggled to respond to Russia's use of ambiguous warfare, particularly in the information realm. In the Asia-Pacific, while the U.S. rebalance has resulted in a significant increase in regional military assets, China has demonstrated a superior ability to control the pace of escalation in crisis situations, disrupt the decision-making of its adversaries, and shape the narrative surrounding its rise as a great power. As Russian and Chinese ambiguous warfare includes operational methods that do not feature within the conventional warfare doctrines of the U.S. and NATO, both entities have struggled to articulate a clear and effective response. It is necessary to establish a clear intellectual framework through which the threat can be managed and countered.

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\* *Government Program Officer:* Martin Kruger, Office of Naval Research, [martin.kruger1@navy.mil](mailto:martin.kruger1@navy.mil)  
*Anticipated period of performance:* Sept' 15–Sept' 18

## **A Computational Model of Resources and Resiliency: Deploying the Elements of National Power in a Complex Ecological Security Environment\***

Tony Rivera, Duke University, [WAR10@duke.edu](mailto:WAR10@duke.edu)

**Aim:** Build a modeling and simulation platform of the elements of national power that is rooted in resource and resiliency theory from environmental science and informed by international relations theory (IR), cognitive neuroscience, and Department of Defense (DOD) doctrine

There are two interrelated problem sets. The first is that theory is divided by discipline and the failure to integrate theoretical approaches produces fractured knowledge for application. What does environmental, political, and cognitive neuroscience say about the deployment of resources and 1) how complex adaptive systems theory can help bridge this divide and 2) how this can inform DOD doctrine? The second is that modeling DOD doctrine on resources of national power, known as DIME<sup>19</sup>/PMESII, presents methodological issues given the interdependencies between these sets of elements and the range of factors that affect them. By conceptualizing DIME as resources and PMESII<sup>20</sup> as a strategic ecosystem, we hope to uncover key mechanisms related to processes such as fungibility, replenishment, and others, that will empower scholars, practitioners, analysts, and decision makers to better utilize these doctrines and thereby better inform national security.

### **Planned Methodology**

Our approach for this study entails modeling the Iranian-Saudi cold war, as a proof of concept. We have chosen the Iranian-Saudi cold war because of 1) the implications it has for (in)stability in a region that is pivotal to international security, 2) its contribution to the rise and continued growth of Da'esh (ISIL, ISIS), and 3) because of the impact these factors have on U.S. national interests and security. We propose to model these actors in terms of their “elements of national power” as “resources” in order to understand their dynamic mechanisms in relation to each other, in a particular strategic landscape, and over time.

### **Anticipated Outcomes of Research:**

This modeling platform will enable scholars, analysts, practitioners, and decision makers to better understand non-trivial issues such as: the way in which fungible natural resources can be used to bypass economic sanctions using diplomatic, informational, or other forms of power, i.e., the fungibility of resources across domains; the time it takes to recover from shocks, internal or external; and the time it takes to bring resources to bear in changing contexts. This research will also empower profiling of key decision-making processes that account for cultural differences, risk acceptance/aversion, rationality, and emotion among other factors impacting decisions to allocate resources. Finally, this effort will consider the impact of decisions to deploy resources within specific types of socio-political ecosystems and the impact the particular niche has on decision-making, the resources deployed, and subsequent decisions by other actors.

### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

Regional combatant commanders, strategists, analysts, and scholars of international security have long worked with the idea of the elements of national power using DIME and have conceptualized the

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\* *Government Program Officer:* Micheline Strand, Army Research Office

*Government Point of Contact:* Lisa Troyer, Army Research Office, [lisa.l.troyer.ctr@mail.mil](mailto:lisa.l.troyer.ctr@mail.mil)

*Anticipated period of performance:* Sept' 15–Aug' 18

<sup>19</sup> DIME: diplomacy-information-military-economic interactions

<sup>20</sup> PMESSI: political, military, economic, social, infrastructure, and information systems

operational environment using PMESII. This effort, using robust ecological, cognitive, and IR theory and computational power, will deliver a product that will integrate these paradigms into a working model, with replicability to other regions and problem sets. Further, we will enable data input for model accuracy and from both open sources and non-open sources to make the model useful in various contexts. The model will also be very useful for developing, communicating, and implementing inter-agency solutions. This will enable strategists to have significant real-time data fed, modeling ability of their area of responsibility with second and third order effects measurement capability.

**Anticipated research products:**

- *Conferences:* We expect to participate in conferences where we will present our theoretical contributions, our model, and our findings. These conference papers will be of publishable quality, prepared with intent for publication.
- *Workshops:* We plan to propose and run a workshop for a large political science organization, likely the International Studies Association. The workshop will teach the research program motivating the project, demonstrate the model functionality, and potentially train interested users on its application. This will be coordinated with the International Security Studies Section.
- *Publications:* We expect to publish a number of articles. Some of these will be technical and some related to the case studies. Participation in conferences will incentivize this effort. Further, while this project is not primarily about methodological innovation, there are enough significant contributions here for publication. Lastly, there is at least one book project here regarding the Iranian-Saudi Cold War, its origins, its current context, its consequences, and the challenges and opportunities presented by it to U.S. policy makers.
- *The Model:* The model itself will be a fully operational instrument for investigating potential for conflict, direct or by proxy, by running baseline forecasts, what-if experiments, sensitivity analyses, and other tests. The data used for the model will render it an abstract representation of the Iranian-Saudi Cold War, but the model will also retain a capacity for generalizability. The model will be such that, with the acquisition and instantiation of new data, it could be easily generalized to alternative context-spaces of interest. This capacity rests on a methodological approach that emphasizes a standardized, theoretically informed model framework that acts as a receptacle for case-specific data.
- *The Theory:* The theoretical apparatus developed from the literature and honed with case-study process-tracing work will be complete and validated. Participation in conferences and the production of published documentation will make the developed theoretical apparatus available for further academic study.
- *Documentation of Model Results:* Results from experimentation with the model will be documented with description and analysis.
- *Documentation of Model Construction:* There will be an ongoing effort to document protocols, procedures, data, and implementation throughout the model construction process, for purposes of verification, transparency, and subsequent training of potential users. New and existing visualizations will be developed and deployed to capture the multiple dimensions along which model construction is conducted. Raw datasets, subject-matter expert testimony, actual model creation scripts, and other relevant materials will be made available for interested users.

## **Pilot: Intl University Research Ventures: Implications for US Economic Competitiveness and National Security\***

Principal Investigator: **Zachary Taylor**, Georgia Institute of Technology, [mzak@gatech.edu](mailto:mzak@gatech.edu)

**Jan Youtie** and **Juan Rogers**, Georgia Institute of Technology

**Philip Shapira**, Georgia Institute of Technology and Manchester Business School

**Aim:** To study the quantity, quality, and implications of joint research ventures between American universities and foreign universities/research institutes.

**Countries examined:** TBD (candidates include China, Russia, Qatar, Singapore)

We intend to gather data on the recent expansion of research-oriented (not education-oriented) foreign campuses and offices. Who is participating? What kinds of knowledge are being transferred? What is the direction and balance of knowledge flows? Who is exploiting the knowledge and for what purposes? What are the policy implications? What are the repercussions for US national security and economic competitiveness, as well as for regional innovation clusters? We are especially interested in joint research ventures between US universities and those in countries considered to be economic or military competitors. We will also scan globally to identify activities in developing economies. We will investigate the research communities that are established around the US international university research centers, including possible third-party linkages with countries that may present potential security threats.

**Planned Methodology:** Web-scraping, interviews, several on-site case studies.

### **Anticipated Outcomes of Research:**

The results are expected to inform political and economic theories about technology transfer, innovation, economic competitiveness, and democratization/civil society.

### **Potential Impact on DoD Capabilities and Broader Implications for National Defense:**

The data can be used to track participants, outputs, activities, and linkages over time, thus laying the baseline for future impact studies and theory testing. The results will also aid US policymakers to better identify and understand the sources of national competitive advantage in science and technology and the mechanisms of technology transfer. This research is especially important for the DoD because it is often the primary funder for the American research universities that participate in these international ventures.

### **Anticipated research products:**

- Descriptive list of existing and recent international university research ventures, and their basic characteristics (e.g., participants, funders, fields of study).
- Papers, articles, and a workshop on university R&D internationalization

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\* *Government Program Officer:* Micheline Strand, Army Research Office

*Government Point of Contact:* Lisa Troyer, Army Research Office, [lisa.l.troyer.ctr@mail.mil](mailto:lisa.l.troyer.ctr@mail.mil)

*Anticipated period of performance:* Aug'15–Aug'16

## Research for Defense Education Faculty

In Fiscal Year 2015, the Minerva program staff initiated a new program: Research for Defense Education Faculty, or R-DEF, providing research support for teaching faculty at participating Professional Military Education (PME) institutions and defense academies. Program goals include

- Connect social science insights and methods to current and future defense leadership to inform tomorrow's key security decisions.
- Invest in those educating our future military and national security leaders.
- Incentivize new policy-relevant, social science research in our PMEs.
- Connect PMEs with DoD policy makers to the benefit of both.

This section lists with short descriptions all ongoing or soon-to-start Minerva R-DEF projects selected in FY 2015, sorted by researchers' home institutions.

<b>Air Force Command &amp; Staff College</b>	<b>153</b>
Conquering the Islamic Republic with Airpower: The Rif and Syrian Rebellions, 1925–27	
Identity and Stability in the Tanzanian People's Defense Force	
<b>Air War College</b>	<b>154</b>
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Judging Corruption: Systematic Abuse of Authority for Individual Gain	
<b>U.S. Military Academy at West Point</b>	<b>160</b>
The Cyber Side of Social and Political Mobilization	
Teaching Undergraduates Social Policy Modeling and Inquiry	
Identifying Vulnerabilities Using Network Analytic Methods in Rapidly Growing African Cities	
How Invitations for Intervention Influence Political Violence	
Social Unrest, Political Violence and Natural Resource Exploitation in North Africa and the Sahara	
Understanding the Effects of USG Terror Designations	
A New Cold War? Russian Public Opinion as a Key Determinant	
American National Security, 7th Edition	

## Air Force Command & Staff College

### Conquering the Islamic Republic with Airpower: The Rif and Syrian Rebellions, 1925-27

**William Dean**, Dept of Comparative Military Studies, [william.dean.1@us.af.mil](mailto:william.dean.1@us.af.mil)

**Major Ed Ouellette**, Dept of National and International Security Studies, [edward.ouellette.2@us.af.mil](mailto:edward.ouellette.2@us.af.mil)

Selected Fall 2014

An analytical narrative that focuses on the operational character of the Rif Rebellion, a forgotten conflict with great relevance to today's strategic, social, and military problems haunting relations between the West and the Islamic world. This study aims to examine French military operations in Morocco and Syria through three analytical lenses: military effectiveness, the principles of war, and the face of battle. One major contribution of this study will be to evaluate how this campaign affected the French armed forces in the years both before World War II and in its aftermath. The authors argue that the Rif Rebellion had significant long-term effects on subsequent force structure and military operations; hence the substantial importance and broad applicability of this book for a scholarly audience.

**R-DEF awards supports:** Research travel to archives in France.

### Identity and Stability in the Tanzanian People's Defense Force

**Charles Thomas**, Department of Comparative Military Studies, [charles.thomas.40@us.af.mil](mailto:charles.thomas.40@us.af.mil)

Selected Spring 2015

This project proposes to identify the mechanisms by which the Tanzanian state formed and promulgated a unified nationalist identity within the Tanzanian armed forces and the efficacy and evolution of these efforts. To achieve this goal, the researcher will undertake 90 days of data collection within Tanzania. Roughly half of this time will be used for archival research in the Tanzanian National Archives and Tanzanian Military Archives. The remainder will be used to interview a wide spectrum of serving and retired TPDF personnel for their personal experiences of these mechanisms. The gathered data will then be analyzed with an eye towards the civil-military relations theories of Morris Janowitz, which argue towards the key to professionalism being the couching of militaries within the social and cultural context of the state they serve. The proposed final product will be an academic volume that will offer both analysis of the successful Tanzanian model and policy prescriptions for aiding in the construction of professional militaries in the developing world. Given the increasing involvement of the Department of Defense with the development, education, and training of our African partners' militaries, this study will offer key insights into what has made a relatively poor and extremely diverse country a model of military and social stability.

**R-DEF awards supports:** Research travel to Dar es Salaam and incidental costs related to the trip.

## Air War College

### Electoral Competition, Criminal Violence, and CMR in Democratic Mexico

**Gabe Aguilera**, Department of International Studies, [Gabriel.Aguilera@us.af.mil](mailto:Gabriel.Aguilera@us.af.mil)

Selected Fall 2014

The goal of this research project is to study the evolution, prospects, and policy implications of contemporary civil-military relations in Democratic Mexico. This research will target the political science, Latin American studies, and policy communities. If successful, my articles and book will grace reading lists at PME institutions and will serve as invaluable sources for practitioners involved in US-Latin American relations.

**R-DEF awards supports:** Research travel to Mexico; conference travel to present results.

### Rising Revisionist? China's Evolving Relations with the Middle East

**Dawn Murphy**, Department of International Security Studies, [dawn.murphy@us.af.mil](mailto:dawn.murphy@us.af.mil)

Selected Spring 2015

This project analyzes China's behavior towards the Middle East and Sub-Saharan Africa both regionally and multilaterally (e.g. economic relations, foreign aid, military relations, diplomatic relations, and cultural relations) and through detailed case studies of the Forum on China-Africa Cooperation (FOCAC), the China-Arab States Cooperation Forum (CASCF), the China-Middle East Issues Special Envoy, and the China-Africa Issues Special Envoy.<sup>5</sup>

**R-DEF awards supports:** Interviews in China, Egypt, Saudi Arabia, the United Arab Emirates

### Investigating the Political Determinants of the Mobile and Internet Revolution in Africa

**Naunihal Singh**, [naunihal.singh@us.af.mil](mailto:naunihal.singh@us.af.mil)

Selected Spring 2015

This project investigates the role played by political factors in either facilitating or hampering the spread of information and communication technologies across sub-Saharan Africa. This topic is of relevance to Minerva because mobile phones and the internet have had a deep impact on society and politics worldwide, and it is therefore important to better understand the dynamics of this technological revolution. Africa is of particular interest because it is the fastest growing market for mobile telephony in the world, despite its relative poverty.

The work I am proposing fills an important gap in the literature on this topic. There has been very little research into the political correlates of access to information technologies, nor of the politics surrounding decisions by governments to end domestic telecom monopolies and allow foreign competition in such a vital sector. The project develops several alternative explanations for varying levels of technology penetration and tests them using both quantitative and qualitative methods.

**R-DEF awards supports:** Research travel to Ghana, Malawi.

## War Stories: Narrating American Strategy at Home and Abroad since 1945

Jackie Whitt, Department of Strategy, [jacqueline.whitt@us.af.mil](mailto:jacqueline.whitt@us.af.mil)

Selected Spring 2015

This research looks at the process of narrating US strategy, with a particular emphasis in the post-1945 era, when narratives about the Cold War, the New World Order, and the Global War on Terror dominate the discussion. Myriad other narratives exist as well—globalization, decolonization, democratization, social justice, austerity—but these are largely subsumed under the dominant narratives that explain the global order. The questions I am asking are these: How do American politicians, service members, and citizens tell the nation’s war stories? How do their narratives converge and compete? How are narratives of war and strategy contested in public spaces? How do these narratives shape policy and strategy, and how are the narratives, in turn, shaped by events on the ground? How do narratives about war shape American identity and America’s role in the world? How do allies, partners, adversaries, and enemies abroad understand America’s strategic narratives, and how might the US narrate its strategic choices more effectively for a global audience?

**R-DEF awards supports:** Travel for archival research, supplies, outreach travel (academic conference)

## Marine Corps University

### Complex Dependence: Mapping the Character of Modern War

Ben Jensen, Command & Staff College, [benjamin.m.jensen@usmc.mil](mailto:benjamin.m.jensen@usmc.mil)

With support from graduate students at American University, School of International Service

Selected Fall 2014

As countries and political actors increase their connectivity along a series of global economic and information networks, they expand the number of coercive pathways open to potential belligerents. Rather than produce a stable, integrated world free from conflict, states leverage these connections to coerce adversaries short of war. This faculty-student research team will develop new data and historical case studies on crisis behavior between interdependent rivals. This data can help inform defense planning and strategy through identifying coercive approaches in a networked world. The project will result in a manuscript on complex dependence written for both military and national security professionals as well as academics in security and strategic studies.

**R-DEF award supports:** Research assistants for data coding (expanding the International Crisis Behavior dataset); conference travel; copy editing.

## National Defense University College of International Security Affairs

### The U.S.-Mexico Bilateral Defense Relationship 1988–2014: Continuity and Change

Craig Deare, [dearec@ndu.edu](mailto:dearec@ndu.edu)

Selected Fall 2014

My research intends to examine the evolution of the U.S.-Mexican bilateral defense relationship to better understand how and why this specific relationship has improved, in fits and starts, over the past 25 years. The American and Mexican militaries have evolved in distinct fashions over the past 100 years, and today have very different responsibilities, mission sets, orientations, and capabilities. In addition, a number of structural realities present on each side of the border, including a bilateral lack of trust, pose challenges for improved interaction and greater collaboration between the armed forces of each country. The combination of circumstances has created an “incompatible interface” in terms of U.S.-Mexican military interaction.

This research intends to extend scholarship on the general theme, but should break entirely new ground in the specific area of the U.S.-Mexico bilateral defense relationship, where not a great deal of work has been done

**R-DEF award supports:** Research travel, supplies

### The Politics of Police Reform: Society against the State in Post-Soviet Countries

Erica Marat, [erica.marat.civ@gc.ndu.edu](mailto:erica.marat.civ@gc.ndu.edu)

Selected Spring 2015

Following the ouster of the Viktor Yanukovich regime in February 2014 and the subsequent presidential and parliamentary elections, one of the most urgent priorities for the new Ukrainian government is the reinvention of the country’s Soviet-inherited, militarized and politicized police. This research explores how civil society organizations and individual activists influence various stages of police reform in post-Soviet states such as Ukraine. I argue that bottom-up reform efforts are essential in transforming the police from a punitive institution into a service-oriented entity. Bottom-up efforts may forestall further politicization of the police and ensure that foreign assistance is spent responsively (Carothers 2006, Moncado 2009). Instead of the state using the police as a mechanism to dominate society, police functions should reflect a detailed state-society consensus on when it is appropriate to use violence to maintain social order (Bayley 2008). Bottom-up democratic police reform is a lengthy process of deliberation and negotiation between the state and the public on the role of the police in the post-authoritarian age.

**R-DEF award supports:** Research travel (ten days in Kyiv to interview civil society actors, donors, and government officials involved in the reform); copy editing

## National War College

### Arctic Security

**David Auerswald**, Department of National Security Strategy, [AuerswaldD@ndu.edu](mailto:AuerswaldD@ndu.edu)  
Selected Spring 2015

In this project I will conduct a geopolitical assessment of the Arctic, recommend changes to U.S. priorities for the region based on that assessment, and publish my findings in a book and at least two articles. The project has three main components:

- (1) Analysis of existing Arctic strategies of the so-called Arctic 8 (i.e. Canada, Denmark via Greenland, Finland, Iceland, Norway, Russia, Sweden and the United States)
- (2) In-country assessments of each nation's choices: I will generate multifaceted country assessments focusing on the intent/direction of each Arctic strategy and the security, economic, political and cultural reasons for that strategy taking its existing form. I aim to produce country studies that draw on lessons from a variety of social science disciplines in the model of the Minerva program.
- (3) Disseminate results, to and with the help of OSD Policy staff and other government officials.

**R-DEF award supports:** Research travel to six of the non-U.S. Arctic countries to meet with and interview government officials from the defense, foreign and interior ministries, leaders of foreign NGOs and think-tanks, and representatives of indigenous peoples.

### Strategic Thinking Aptitude and Learner Autonomy Levels among Senior Military Leaders

**Colonel Ling Yung**, [ling.yung@ndu.edu](mailto:ling.yung@ndu.edu)  
Selected Fall 2014

Past research on strategic thinking development has been largely limited to specific aspects of the process. This proposed research extends the understanding of the relationships among the various constructs related to strategic thinking learning and development.

The central research question is to determine the degree of relationship between strategic thinking and learner autonomy levels as measured by the Strategic Thinking Questionnaire (STQ) (Pisapia, et al, 2011) and Learner Autonomy Profile—Short Form (LAP-SF) (Confessore and Park, 2004).

This study will focus on the profession of arms and examines the extent of the relationship between the strategic thinking levels of senior military officers, in the U.S. Department of Defense, and their learner autonomy levels. Specifically, this research investigates the extent of the relationship between the STQ results of newly promoted general and flag officers and their LAP-SF scores. Additionally, this work will determine the extent of the relationship(s) between the constructs of Strategic Thinking (Systems Thinking, Reframing, and Reflection) and Learner Autonomy (Desire, Resourcefulness, Initiative, and Persistence.)

**R-DEF awards supports:** Software purchases; travel

## U.S. Air Force Academy

### European Missile Defense after Ukraine

**Damon Coletta**, Political Science, [damon.coletta@usafa.edu](mailto:damon.coletta@usafa.edu)

Selected Fall 2014

In March 2013, the Obama administration cancellation of Phase IV European missile defense directed against intercontinental ballistic missiles was received as a dramatic gesture, altering hard-won policy commitments of certain NATO Allies in order to break the ice of a stalemated U.S.-Russian relationship. The following election year, after crisis in Ukraine, critics seized upon European missile defense diplomacy as a premature giveaway, and an error in NATO's deterrence posture, baring the Alliance's jugular for an ambitious Russian leadership interested primarily in manipulating the balance of power between East and West. Ongoing faculty research reconsiders European missile defense in light of three related literatures: the future of NATO; risks of extended deterrence; and the technology of arms control.

Because this project aims toward an optimistic interpretation of prospects for Russia-NATO cooperation on European missile defense, probably more than conventional wisdom would allow, it will be important to test these ideas in relevant workshops. Constructive criticism from experts- an informal version of the Delphi method from public policy-is the best medicine for improving judgments inherent in the social scientific approach adopted here. In order to ground policy recommendations in a realistic appraisal of diplomatic conditions and strengthen underlying theory as to how technology might be engineered, across several cases, to deepen international cooperation, the researcher requested funds to support presentation of this project as part of a panel of papers on "NATO after Ukraine," led by our discussant and leading NATO scholar, Stanley Sloan. The panel will occur within the framework of the International Studies Association annual meeting, which will bring together for several days scholars and policy analysts from the United States and Europe on deterrence, arms control, and the series of crises currently complicating American foreign policy.

**R-DEF awards supports:** Conference travel to present research findings

### The International Criminal Court in Relation to Africa

**Captain Kristin Eberle**, Political Science, [Kristin.Eberle@usafa.edu](mailto:Kristin.Eberle@usafa.edu)

**Captain Alexander Pedersen**, Political Science

**Fran Pilch**, Political Science

Selected Fall 2014

Researchers requested funds from the Minerva Initiative to attend the 7th Annual Association for the Study of the Middle East and Africa (ASMEA) Conference in Washington, DC. In particular, Dr. Fran Pilch chaired a panel on the topic of the International Criminal Court (ICC) in relation to Africa, Capt Eberle served as panel discussant, and all researchers presented papers.

Minerva R-DEF funds allowed the panel members to not only present findings for their research to experts in African and Middle Eastern studies and policy issues but also facilitated beneficial networking opportunities, directly resulting in active collaboration with professors at other schools around the globe. One of the collaborations in particular that came out of the conference is on the use of simulations in the classroom, based off Dr. Dylan Craig's (American University) research paper, presentation, and subsequent conversations regarding his original design for his parallel Politics of Sub-Saharan Africa

class. Attendance of a variety of panels and the ability to hear from keynote speakers, which included the current Iraqi Ambassador to the United States, additionally enhanced the travelers' regional knowledge which will be shared in USAFA classrooms, ultimately improving the education of the next generation of Air Force leaders. Furthermore, Capt Eberle and Capt Pedersen are taking the findings from their paper on the Trust Fund for Victims and using them as a springboard for a future paper on "Leveraging Full-Spectrum Programming to Break Cyclic Violence and Promote Regional Stability", which will include primary source research and field interviews pending funding availability.

**R-DEF awards supports:** Conference travel to present research findings

### **Judging Corruption: Systematic Abuse of Authority for Individual Gain**

**David Sacko**, Political Science, [David.Sacko@usafa.edu](mailto:David.Sacko@usafa.edu)

Selected Spring 2015

This project assesses the causes of institutional corruption using quantitative and qualitative methods and proposes policy solutions to both the general and judicial abuse of authority for personal gain in Ukraine.

The first phase will refine the separate preliminary theories that explain societal and judicial corruption and conduct a multivariate analysis on separate indicators of both overall political corruption and judicial corruption, using (at this point) civil society, democracy, economic development, population pressure, war, civil war, inequality, physical integrity, and foreign economic penetration as the primary explanatory variables on a pooled time series data set of at least 150 countries from 1998-2014. The preliminary results strongly indicate that civil society systematically decreases the likelihood of both overall corruption and judicial corruption, that most malignant form of corruption, even after accounting for covariates that the literature cites, liberal regime type, economic development, and foreign economic penetration.

Using inference garnered from the quantitative analysis, the second phase will go into the field to conduct a qualitative analysis of corruption in Ukraine and Georgia, using the a comparative similar systems methodology employing a rich description and analysis of the factors that led to the remediation of corruption in one case (Georgia) and a policy prescription for another state where corruption still dogs the political system (Ukraine). Through the use of multimodal methodology, this project will produce the determinants of general and judicial corruption and propose a policy to reduce corruption in Ukraine.

**R-DEF awards supports:** Course buyout to extend semester sabbatical to full year; research travel to Central Europe; conference travel

## U.S. Military Academy at West Point

### The Cyber Side of Social and Political Mobilization, [Aaron.Brantly@usma.edu](mailto:Aaron.Brantly@usma.edu)

Aaron Brantly, Cyber Institute, [Aaron.Brantly@usma.edu](mailto:Aaron.Brantly@usma.edu)

Selected Fall 2014

This research will leverage big data analysis from open source content sources including blogs, Twitter, Facebook, Sina-Weibo, YouTube, forums, and news sites to develop a rigorous metric for analyzing and assessing the extent and ramifications for large scale social and political movements on policy and regime change in developing democracies and authoritarian regimes. Through an understanding of the cyber side of social and political movements, policy makers will have a more accurate and timely grasp of events happening in real-time.

**R-DEF awards supports:** Student research assistance (data coding); research travel; computing support

### Teaching Undergraduates Social Policy Modeling and Inquiry

Kate Coronges, Network Science Center/ Behavioral Science & Leadership, [kcoronges@gmail.com](mailto:kcoronges@gmail.com)

Chris Arney, Network Science Center/ Behavioral Science & Leadership, [david.arney@usma.edu](mailto:david.arney@usma.edu)

Selected Fall 2014

The USMA team proposes:

- 1) to develop and hold the first undergraduate contest in Social Policy Modeling (we intend to call this “the Minerva Challenge”), which will facilitate exposure and education of students, and
- 2) to build collaboration among faculty around Minerva-related teaching, research and problem solving strategies.

The hope is that the contest will encourage both students and faculty members to build a more integrated educational culture at their schools and increase social science policy awareness, learning and problem solving on their campuses. This first contest would be a prototype that if successful would lead to international outreach across the departments of social and behavioral sciences.

The contest will involve teams of 3 students working for up to 4 days to produce a policy paper focused on an issue identified in the current Chairman of the Joint Chief of Staff’s challenge list. USMA will recruit 8–15 teams from the academies, USMA and possibly USNA and USAFA, and nearby schools. Each team will produce a 15–20 page policy paper that a faculty team will judge and provide feedback on. Books will be awarded for outstanding work. A follow-up, one-day student conference will help consolidate the learning experiences provided by the four day competition.

**R-DEF awards supports:** Travel support to student context participants, books

### Identifying Vulnerabilities Using Network Analytic Methods in Rapidly Growing African Cities

Amy Krakowka, Network Science Center / Geography & Environmental Engineering,

[amy.krakowka@usma.edu](mailto:amy.krakowka@usma.edu)

Chris Arney, Network Science Center/ Behavioral Science & Leadership, [david.arney@usma.edu](mailto:david.arney@usma.edu)

Selected Spring 2015

Our team will develop models and theory that contribute to understanding, navigating and utilizing unfamiliar and challenging social and physical terrains in urban and peri-urban areas. Peri-urban areas are the “urban-fringe” areas, such as the slum development on the outskirts of metropolitan areas. The Sub-Saharan region continues to rapidly urbanize as a result of rural exodus and rapid population growth. We will use Uganda—specifically the capital city of Kampala and the surrounding peri-urban environment— as the test case for our research.

Our models will combine Infrastructure/Resource/Logistics networks with our vulnerability framework which determines who is vulnerable, where, and why. This methodology builds a comprehensive vulnerability assessment by defining the study area, hypothesizing who is vulnerable to what, developing a causal model of vulnerability, and finding indicators that can operationalize the model. In-country interviews are at the core of this methodology. They will consist of discussions with representatives from international organizations, leading academic institutions and government representatives at the local and national levels. We use this expert evidence to populate our model with localized variables that can best assess vulnerability at a localized scale. This framework then allows a comparative analysis of environmental vulnerability in other regions of Africa that exhibit similar socio-environmental conditions.

**R-DEF awards supports:** Research travel of researchers and cadets to Uganda to collect data and conduct interviews; research assistant salary, and travel to conferences for outreach of project insights.

### How Invitations for Intervention Influence Political Violence

**Daniel Milton**, Combating Terrorism Center, [daniel.milton@usma.edu](mailto:daniel.milton@usma.edu)

Selected Fall 2014

Many scholars have investigated the effects of military intervention on political violence, particularly in the case of terrorism and civil war. However, each of these studies relies on data that only notes when an actual intervention has taken place. Using data that only records actual military interventions omits a very important variable: instances in which an invitation for intervention was made, but acted upon. In this case of terrorism, a lack of intervention by outside states even when such an invitation was made may result in future willingness to engage in terrorism. In the case of civil wars, not including invitations for intervention may shield importance distinctions on how states make the decision to intervene, as well as how the civil conflict ends.

We gather data on invitations for military intervention from 1980–2013 to assess how non-intervention affects the likelihood of transnational terrorism, the decision to intervene the termination of civil wars.

- Under what conditions do states choose not to intervene, even when another state asks them to intervene?
- Does choosing not to militarily intervene when another state asks for help result in an increased likelihood of experiencing transnational terrorism?
- Does choosing not to militarily intervene when another state asks for help increase the duration of a civil war?

**R-DEF awards supports:** Data coding, summer salary, and travel to disseminate results

## Social Unrest, Political Violence and Natural Resource Exploitation in North Africa and the Sahara

**Geoff Porter**, Combating Terrorism Center, [geoff.porter@usma.edu](mailto:geoff.porter@usma.edu)

Selected Fall 2014

Extractive industries are increasing in North Africa and the Sahara in order to meet increased global commodities demand. The increase in natural resource exploitation brings with it the prospect for increased economic development, but also increased social unrest and political violence, two phenomenon with which natural resource exploitation has historically been linked. Local communities generally disproportionately bear the costs of extractive industry activity and rarely share equitably in the benefits. In some instances natural resource conflicts can lead to political instability. In others, violent non-state actors harness natural resources to sustain their campaigns. However, extractive industries in North Africa and the Sahara have a distinct typology. This project explores how the industry's typology influences social unrest and political violence in the region. In a region that is increasingly important to US national defense interests, will increased extractives industry activity exacerbate tensions and strain fault lines? Or will North African and Saharan countries upon which the US relies for counter-terrorism initiatives in the region avoid the resource curse?

**R-DEF awards supports:** Research travel to conduct interviews with stakeholders

## Understanding the Effects of USG Terror Designations

**Bryan Price**, Combating Terrorism Center, [bryan.price@usma.edu](mailto:bryan.price@usma.edu)

Selected Fall 2014

The central question in this research is whether or not the use of the Foreign Terrorist Organization (FTO) designations list (created before 9/11) and Executive Order 13224 (signed shortly after 9/11) have been effective CT tools in the post-9/11 era. Both provide mechanisms to identify and disrupt the finances of groups and individuals that support terrorism. This proposal endeavors to gather open-source data on more than 2000 groups and individuals designated as FTOs and Specially Designated Global Terrorists (SDGTs) to determine the efficacy of these tools. After collecting the data, quantitative analysis will be utilized to determine whether or not these tools have been effective in their stated purpose of undermining terrorist organizations that threaten the United States.

**R-DEF award supports:** Research assistance for data coding, summer salary

## A New Cold War? Russian Public Opinion as a Key Determinant

**Thomas Sherlock**, Department of Social Sciences, [Thomas.Sherlock@usma.edu](mailto:Thomas.Sherlock@usma.edu)

Selected Fall 2014

The crisis in southeastern Ukraine, an important threat to regional stability, has underlined the inability of western analysts to identify which political factors will determine Kremlin actions and whether the current conflict will spread beyond Ukraine, metastasizing into a new Cold War.

Recent surveys suggest that most Russians strongly oppose open escalation, and preliminary research indicates that public opinion serves as a powerful constraint on the militarization of Russian foreign policy. This fact has likely restrained the Kremlin, forcing it to engage in proxy warfare and consistent

denials of providing military support for the insurgents -- more likely aimed at the Russian domestic audience than for foreign consumption as assumed. If the hypothesis is correct and if the Kremlin eventually decides to openly escalate, rather than continue with proxy warfare, that decision would likely divide Russian society more deeply than at any other time during Putin's rule.

The purpose of this project is to collect empirical evidence that 1) identifies dominant preferences in Russian public opinion on Russia's future conduct in the crisis in Ukraine; and 2) demonstrates the influence of these preferences on the formulation of Russian foreign policy regarding the conflict in Ukraine.

**R-DEF award supports:** Research travel to Russia; survey of population

### **American National Security, 7th Edition**

**Rachel Sondheimer**, Department of Social Sciences, [rachel.sondheimer@usma.edu](mailto:rachel.sondheimer@usma.edu)

**COL Suzanne Nielsen**, Department of Social Sciences, [Suzanne.Nielsen@usma.edu](mailto:Suzanne.Nielsen@usma.edu)

Selected Spring 2015

The researchers request funds to complete a new edition of *American National Security (ANS)*, a top textbook on national security published by Johns Hopkins University Press and used to educate undergraduate and graduate international relations studies nationwide. The new edition will incorporate policies and developments from the years following the election of President Barack Obama that have significant implications for the broader trajectory of U.S. national security strategy and policy. In 2007 and 2008, as the last volume was being written, it was particularly important to explain the impact of the terrorist attacks of September 11, 2001 on the structure and policies of the U.S. government. In 2015, with the end of the U.S. war in Iraq and a significant reduction of the U.S. role in Afghanistan, the new edition will assess with greater perspective the various responses of the United States to the heightened sense of vulnerability provoked by these attacks. Care will be taken to ground important descriptions and explanations in the appropriate academic literatures including American politics, comparative politics, international relations, economics, history, and sociology.

ANS is a textbook and thus does not, perhaps, consist of in-depth cutting edge research that characterize most other Minerva proposals. However, the breadth of its coverage of national security topics and its reach into national security undergraduate and graduate programs certifies that it will help to shape the future thinkers and leaders in national security affairs. This type of textbook is needed to educate young and emerging scholars and to frame debates for years to come. The exercise of generating the updated edition of this core text also has tremendous professional development value for the instructors of our future military leaders.

**R-DEF awards supports:** costs for copy editing and other necessary materials

## Minerva-Generated Resources for Academics and Policymakers- ADD URLS

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## International Crisis Behavior (ICB) Dataset, Version 11

Kyle Beardsley, Duke University, [kyle.beardsley@duke.edu](mailto:kyle.beardsley@duke.edu)

<http://sites.duke.edu/icbdata/> [under development]

**Production Date:** Publicly available 10/31/2015

The ICB data currently contain 455 crises from 1918 to 2007, and the new version will add 17 crises to take the data to 2013. See “

*Data Expansion: International Crisis Behavior Update, 2008-2013*” on page 123 for more details of the work.

A state experiences an ICB crisis when there is a threat to a basic value by another state, there is a finite time for action, and there is a heightened perception of armed hostilities. One characteristic that distinguishes the ICB crises from other data on international conflict is that escalation to armed violence is not a necessary condition for inclusion as a case, but the potential for escalation is a necessary condition. So, whereas the Uppsala Conflict Data Program<sup>21</sup> data requires a specific threshold of violence (25 annual battle-related fatalities), the ICB data include many cases of interest at a lower threshold of violence or that had the potential to escalate to violence but did not. Moreover, whereas the Militarized Interstate Dispute (MID)<sup>22</sup> data includes many cases of militarization that never posed much of a threat to the actors, the ICB data only includes those cases in which the leadership of at least one of the sides perceived a crisis.

There are two levels of the data. The first is at the actor level, in which each observation codes the crisis trigger, response, management and termination behavior, as well as the background characteristics of each of the actors that perceived an international crisis. The second is at the system, or crisis, level, in which each observation codes the aggregate behavior of the crisis actors and other involved actors during the entire crisis.

We have followed the procedures established by Brecher and Wilkenfeld (1997) in coding the ICB data. This includes assigning each potential case to two coders who use all available information to assign values to each of the variables in the actor-level and system-level components. The coders operate independently and only compare codes after they have assigned values for each of the variables. They then attempt to resolve any differences, with feedback from the project leaders as needed. This procedure reduces coder error and ensures consistency with the decisions made in the coding of the existing crises in the dataset.

**Related materials:**

Dozens of papers and books have used earlier versions of the data. The new version is in the final stages of completion, and analysis will commence shortly after it is complete.

**Resource utilization:**

Our update ties into the efforts of **Benjamin Jensen**’s team to code crises prior to 1918, as well as to the efforts of **Erik Gartzke**’s team to investigate cross-domain deterrence within ICB crises.

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<sup>21</sup> Learn more at <http://www.pcr.uu.se/research/UCDP/>.

<sup>22</sup> Part of the Correlates of War Project. Learn more at <http://cow.dss.ucdavis.edu/data-sets/MIDs>.

## Data Generated via Deterrence with Proxies Research

Principal Investigator: **Eli Berman**, UC San Diego, [elib@ucsd.edu](mailto:elib@ucsd.edu)  
Government Program Officer: Harold Hawkins, Office of Naval Research

The data and tools described below have been and will be generated through the Minerva project “*Deterrence with Proxies*” described on page 8.

### Gaza Incidents Data

**Resource Point of Contact:** Eli Berman, UC San Diego, [elib@ucsd.edu](mailto:elib@ucsd.edu)

**Production Date:** Data will be ready for release by the end of 2016. Early access by the government may be possible in consultation with research team.

Empirical studies of deterrence are generally frustrated by a lack of data, since most threats are successfully deterred. An exception is the ongoing conflict between Israel and terrorists in Gaza, which generates daily data for analysis. In this case Hamas, which has controlled the Gaza Strip since expelling Palestinian Authority forces in 2007, acts as a somewhat unusual proxy. Since 2007, thousands of rocket and mortar attacks have emanated from Gaza into Israel, perpetrated by both Hamas and other Islamist organizations that Hamas alternately suppresses and enables. Mortar attacks are typically indiscriminate, but roughly target civilians in rural Israeli communities bordering Gaza. Rocket attacks are more precise and deadlier. Israel Defense Force (IDF) responses have included both economic and military measures, ranging from modulating the flow of supplies and goods into Gaza, to targeted assassinations, active air strikes, and even very large-scale interventions—including ground incursions in late December 2008 and in the summer of 2014.

The Gaza Incidents Data Set (GIDS) will provide a wealth of information to study this case. This data set will contain data covering all of this cross-border activity, including mortar attacks, rockets, targeted assassinations and resulting injuries and fatalities, by location in Gaza, from United Nations Situation Reports, which we are digitally coding daily from October 2006 through January 2015. For many of the air strikes, including those that were clearly targeted assassinations, the intended targets are identified, including whether they are members of the proxy, Hamas, or of one of the Islamist organizations that Israel has effectively charged Hamas with suppressing. Situation reports are being coded both manually and digitally parsed by a program for cross-validation and error check. Coded items include type of attack, casualties, fatalities, location and perpetrator—when available.

We are also augmenting GIDS with data on intermediate levels of sanction/punishment, as measured by the flow of goods allowed into Gaza from Israel on a weekly basis, as well as the flow of people across the Rafah crossing into Egypt, as a proxy for the flow of goods across that border. This information comes from the United Nations Office for the Coordination of Humanitarian Affairs (OCHA).

GIDS will also include data tracking public opinion in both Gaza (from the Palestinian Survey Research Center) and Israel to measure audience costs, the political value—positive or negative—in suffering or committing violence.

Whereas part of the information available in GIDS is available from other data sets, to the best of our knowledge, GIDS will provide the most thorough and comprehensive source of data on incidents in The Gaza Strip from January 2007 until January 2015.

**Resource utilization:**

These data will be valuable to researchers studying incomplete deterrence and scholars of Middle East conflicts and terrorism.

**Mining Activity in India from Satellite Images**

**Resource Point of Contact:** olivervandeneynde@gmail.com

**Production Date:** At the time of publication of the first paper at the latest the data will be made public as replication data on the ESOC website (<http://esoc.princeton.edu>). Early access can be possible on consultation with the research team.

**Resource description:**

This resource provides information on mines in India for 8 minerals (coal – 358 mines; bauxite – 224 mines; chromite – 28; copper – 12 mines; gold – 5 mines; iron ore – 433 mines; lead and zinc – 2 mines; and manganese ore – 260 mines). For each of the non-coal mines, we have information on the lease area. Based on satellite imagery (and depending on image availability), we also have information at different points in time (between 2005 and 2013) on the observable active area, the abandoned area, the total area, an indicator for whether the mine is active, an indicator of whether there are visible responsible mining practices, an indicator for whether there are terraces, the number of terraces, an indicator of truck activity, and an indicator for visible machine activity.

Correct coding of images was verified on a sample basis. For each of the mines we also have precise coordinates.

To our knowledge, we are the first team of economists and political scientists to use satellite images to measure the extent of mining activity. In contexts like India's, where administrative data is likely to mask illegal mining activity, this data is particularly useful.

**Resource utilization:**

This data was collected on purpose for our project, so this is the first use of this resource. It should be useful for research on economic development in conflict zones.

## Multi-Source Assessment for State Stability

**Kathleen M. Carley**, Carnegie Mellon University, [kathleen.carley@cs.cmu.edu](mailto:kathleen.carley@cs.cmu.edu)  
Government Program Officer: Harold Hawkins, Office of Naval Research

The data and tools described below have been and will be generated through the Minerva project “*Multi-Source Assessment of State Stability*” described on page 18. All are available within the ORA software tool at <http://www.casos.cs.cmu.edu/projects/ora/software.php>.

### ORA – Twitter Analysis Metrics

**Production Date:** June 2015

**Resource URL:** <http://www.casos.cs.cmu.edu/projects/ora/software.php>.

These are new network-based metrics for assessment trust and reach using Twitter data. Traditional twitter tools focus on finding the most frequent tweeter, most common hashtag, and just doing counts. This applies high-dimensional network metrics to assess the network of tweets and to compare changes in these networks over time. Visualization on maps is possible.

#### **Resource utilization:**

Used at multiple universities. Tested at Ft. Bragg.

### Country level meta-networks for Arab Spring (Twitter-based)

**Production Date:** Anticipated October 2015

Country level meta-networks for Arab Spring based on twitter. This is a dataset comprised of a set of meta-networks in XML extracted from twitter. One per month per country. Senders are de-identified. No linkage to original tweet IDs or verbatim Tweet content. Verification through triangulation of coding approaches, and SME assessment.

### Country level meta-networks for Arab Spring (news-based)

**Production Date:** Anticipated October 2015

Country level meta-networks for Arab Spring based on news. This is a dataset comprised of a set of meta-networks in XML extracted from newsdata. One per month per country. Verification through triangulation of coding approaches, and SME assessment.

### List of Twitter Handles for News Sources

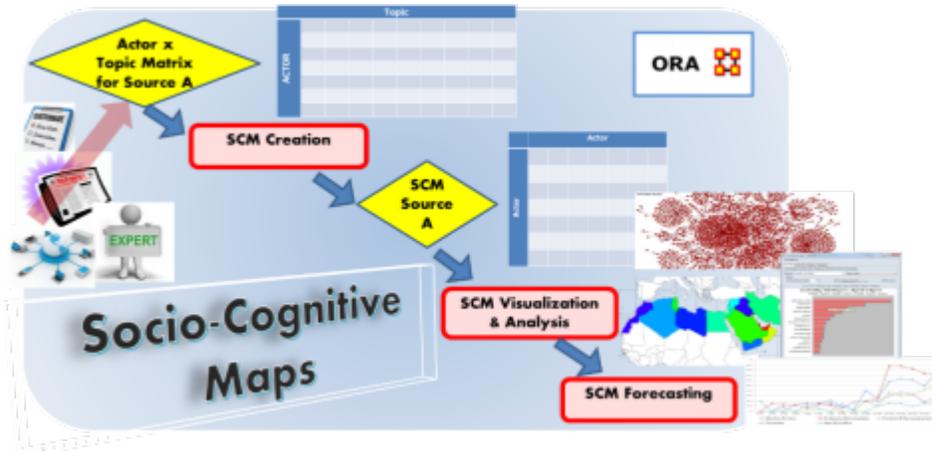
**Production Date:** Anticipated October 2015

This is a list of the twitter handles for news agencies and reporters as discovered in Twitter. It is expected be incomplete as the number of reporters change and agencies also change their handles. It will also be integrated into ORA for automatic segmentation of news tweets from other sources.

## Dynamical Statistical Network Informatics

Kathleen M. Carley, Carnegie Mellon University, [kathleen.carley@cs.cmu.edu](mailto:kathleen.carley@cs.cmu.edu)

The data and tools described below have been and will be generated through the Minerva project “*Dynamic Statistical Network Informatics*” described on page 130. This research will provide a means for gaining this socio-cultural understanding and for easily identifying changes in the underlying socio-cultural context – the **socio-cognitive cultural map (SCM)**.



### ORA – SCM Analytics

**Resource URL:** <http://www.casos.cs.cmu.edu/projects/ora/software.php>

**Production Date:** Anticipated December 2016

This will be a new set of analytic capabilities that will take an actor by topic network and generate the SCM (socio-cognitive cultural map), visualize it, and support reasoning about resilience and power structures given the SCM.

### SCM Example Models for Training

**Production Date:** Anticipated August 2016

This will be a set of input data for the SCM process (actor x topic matrices) and the associated resultant SCM. They will be associated with a set of powerpoint slides for training users in the creation and analysis of SCMs.

## **Resources for Complex Emergencies and Political Stability in Asia**

Principal Investigator: **Joshua Busby**, University of Texas at Austin

[www.strausscenter.org/cepsa/](http://www.strausscenter.org/cepsa/)

Several tools and datasets will be generated through the Minerva project “

*Complex Emergencies and Political Stability in Asia (CEPSA)*” described on page 15. Most build on resources generated by the sister project “*Climate Change and African Political Stability*”. The Asia component of the Armed Conflict Location and Event Dataset (ACLED) is described below; for further details for the CEPSA Disaster Vulnerability Model, CEPSA Disaster and Climate Aid Data, and CEPSA Mapping Tools, see descriptions of the related Resources for Climate Change and African Political Stability on page 174.

### **Armed Conflict Location and Event Dataset: ACLED-Asia**

**Resource Point of Contact:** Clionadh Raleigh, c.raleigh@sussex.ac.uk

**Resource URL:** [www.strausscenter.org/acled/](http://www.strausscenter.org/acled/)

**Production Date:** ACLED Asia covers real-time information on political violence, riots, and protests. 2015 data were first released in May 2015, and new data updates are released monthly.

ACLED Asia is designed for disaggregated conflict analysis and crisis mapping. This dataset codes the dates and locations of all reported political violence events in over 60 developing countries in Africa and Asia. Political violence includes events that occur within civil wars and periods of instability, public protest and regime breakdown. The project covers all countries in South and Southeast Asia in real-time, starting in 2015 with back data from 2010 coming in the near future.

Every event is coded using the same rules on who, what, where, and when, to maximize comparability and validity. Additional information, such as event ID numbers, precision scores for location and time, notes to give the context of the event, fatality numbers if reported, codes to distinguish between the types of actors, and additional spatial information are also provided in each row of information. ACLED data are released in both excel and csv forms.

ACLED data are collected each week after individual coders have scrutinized the information from reports; they are then aggregated and revised by the first coding reviewer, investigated and cross-checked by the second reviewer and then event notes and details are inspected by the third and final reviewer. The process is designed to assure (1) validity through intra- and inter-coder checks; (2) accuracy to correct mistakes in coding; and (3) relevance by determining whether each compiled event constitutes an act of political violence.

#### **Related materials:**

- Clionadh Raleigh and Sarah Kaiser-Cross, “Armed Conflict Location and Event Data Project Codebook, Asia Version,” *ACLED Codebook*, March 2014.
- Clionadh Raleigh and Jonthan Gonzalez-Smith, “Real-Time Analysis of Asian Political Violence, Conflict Trends No. 1,” *ACLED Conflict Trends Report*, March 2015.
- Clionadh Raleigh, Sarah Kaiser-Cross, and Hillary Tanoff, “Real-Time Analysis of Asian Political Violence,” Conflict Trends No. 2,” *ACLED Conflict Trends Report*, May 2015.

Additional publications will be shared at [www.strausscenter.org/cepsa/publications.html](http://www.strausscenter.org/cepsa/publications.html).

## Resources for Climate Change and African Political Stability

Robert Chesney, University of Texas at Austin

CCAPS Senior Program Manager: Ashley Moran, [amoran@austin.utexas.edu](mailto:amoran@austin.utexas.edu)  
[www.strausscenter.org/ccaps](http://www.strausscenter.org/ccaps)

The data and tools described below have been generated through the Minerva project “*Climate Change and African Political Stability*” described on page 21.

### Armed Conflict Location and Event Dataset (ACLED)

**Resource URL:** [www.strausscenter.org/ccaps/data](http://www.strausscenter.org/ccaps/data)

**Resource Point of Contact:** Clionadh Raleigh, [c.raleigh@sussex.ac.uk](mailto:c.raleigh@sussex.ac.uk)

**Production Date:** Version 5.0 released in 2015. Data updates released weekly.

CCAPS researchers at the University of Sussex and Trinity College Dublin developed the Armed Conflict Location and Event Dataset (ACLED) that tracks the actions of opposition groups, governments, and militias across Africa, specifying the exact location and date of battle events, transfers of military control, headquarter establishment, civilian violence, and rioting. ACLED includes data from 1997–2015, with real-time conflict data updated weekly. All data are date-specific and geo-referenced to the town level. ACLED's disaggregation of civil war and transnational violent events allows analysis of the local factors that drive instability in Africa. ACLED provides the tools for analysts to explore which regimes are most dangerous in Africa, who are the most active conflict groups on the continent, where civilians are most at risk, what types of violence are most prevalent, and where violent social upheaval, such as rioting, is increasing.

In addition to collecting real-time data on conflicts continent-wide, ACLED also produces monthly conflict trend reports that highlight escalating and ongoing conflicts, violent group formation, and patterns of violence within conflict-affected states.

#### Related materials:

- Clionadh Raleigh, Caitriona Dowd, and James Moody. “Real-Time Analysis of African Political Violence,” *ACLED Conflict Trends Report* (released monthly). No. 40, August 2015
- Clionadh Raleigh, Andrew Linke, and John O’Loughlin, “Extreme Temperatures and Violence,” *Nature Climate Change* 4, 76–77 (2014).
- Clionadh Raleigh and Caitriona Dowd, “Governance and Conflict in the Sahel’s ‘Ungoverned Space’,” *Stability: International Journal of Security and Development* 2, 2 (2013).
- Caitriona Dowd, “Tracking Islamist Militia and Rebel Groups,” *CCAPS Research Brief No. 8* (Austin: Robert S. Strauss Center for International Security and Law, 2013).

See all ACLED publications at [www.strausscenter.org/ccaps/armed-conflict-publications.html](http://www.strausscenter.org/ccaps/armed-conflict-publications.html).

#### Known utilization:

This dataset is widely used by U.S. government and military agencies, academic researchers, and international organizations. It is used for a range of purposes, informing humanitarian and development work in conflict-affected contexts, diplomatic policy, and academic research on the dynamics of conflict.

The dataset has been downloaded by organizations in 77 countries, including:<sup>23</sup>

- U.S. government agencies, including the Centers for Disease Control and Prevention, Combined Joint Task Force-Horn of Africa, Congressional Research Service, Defense Advanced Research Projects Agency, Defense Intelligence Agency, National Geospatial-Intelligence Agency, National Ground Intelligence Center, Office of Foreign Disaster Assistance, U.S. Africa Command, U.S. Agency for International Development, U.S. Army Africa, U.S. Army Corps of Engineers, U.S. Army Intelligence Directorate, U.S. Army Research Laboratory, U.S. Central Command, U.S. Department of Defense, U.S. Department of State, U.S. European Command, and U.S. Special Operations Command;
- Multilateral or foreign government agencies, including the African Development Bank, African Union Commission, International Committee of the Red Cross, International Criminal Court, German Federal Office for Migration and Refugees, Japanese Ministry of Defense, Mo Ibrahim Foundation, Netherlands Centre for Safety and Development, Niger Basin Authority, Norway Statistics Office, Potsdam Institute for Climate Impact Research, UK Department for International Development, UNDP, UNHCR, UNICEF, UNOCHA, UN Office in West Africa, World Bank, World Food Programme, and World Meteorological Organization;
- Nongovernmental or research agencies, including Chatham House, Direct Relief International, Freedom House, Fund for Peace, Institute for Defense Analyses, Institute for Security Studies, International Food Policy Research Institute, Overseas Development Institute, RAND Corporation, and Rift Valley Institute; and
- Universities, including Columbia, Cornell, Georgetown, Harvard, London School of Economics, MIT, NYU, National Intelligence University, Naval War College, Nigerian Defence Academy, Oxford, Princeton, University of Cape Town, University of Chicago, University of Geneva, University of Liberia, University of Nairobi, UN University for Peace, U.S. Naval Academy, West Point, and Yale University.

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<sup>23</sup> Note that this includes only downloads through the [www.strausscenter.org/ccaps](http://www.strausscenter.org/ccaps) website and does not include organizations that downloaded the data from the [www.acleddata.org](http://www.acleddata.org) site.

## Social Conflict Analysis Database (SCAD)

**Resource URL:** [www.strausscenter.org/ccaps/data](http://www.strausscenter.org/ccaps/data)

**Resource Points of Contact:** Idean Salehyan ([idean@unt.edu](mailto:idean@unt.edu)), Cullen Hendrix ([Cullen.Hendrix@du.edu](mailto:Cullen.Hendrix@du.edu))

**Production Date:** *The Social Conflict Analysis Database* (Version 3.1), released in 2014, is the successor to the *Social Conflict in Africa Database*. This version of the data extends coverage to 2013 and includes Africa, Mexico, Central America, and the Caribbean. An updated version planned for 2015 release includes 2014 data for select countries in the Middle East as well.

CCAPS researchers at the University of Denver, the University of Texas at Dallas, and the University of North Texas developed the Social Conflict Analysis Database (SCAD), which includes information on over 10,300 social conflict events from 1990 to 2013. While previous data sources have focused on large-scale conflicts like civil and international wars, SCAD catalogues the myriad ways conflict manifests as political and social disorder. SCAD includes protests, riots, strikes, inter-communal conflict, government violence against civilians, and other forms of social conflict not systematically tracked in other conflict datasets.

Each event record contains information on the location, timing, and magnitude of social conflict events, as well as the actors, targets, issues of contention, and government response.

Event ID	Country	Location	Start Date	End Date	Event Type	Actor	Target	Deaths	Issue
8510008	Egypt	Cairo	Oct 12, 1990	Oct 12, 1990	Anti-Government Violence	Muslim fundamentalists	Government	0	Unidentified/Specified
8510009	Egypt	Cairo	Jan 29, 1991	Jan 29, 1991	Spontaneous Demonstration	Egyptian journalists	Government	0	Foreign Affairs/Relations
8510010	Egypt	Cairo	Feb 25, 1991	Feb 26, 1991	Spontaneous Demonstration	Egyptian university students	Government	1	Environmental Degradation, Foreign Affairs/Relations
8510011	Egypt	Cairo	Mar 30, 1991	Mar 30, 1991	Spontaneous Demonstration	traps	Iraqi government, Arab League	0	Foreign Affairs/Relations
8510012	Egypt	Cairo	Oct 27, 1991	Oct 27, 1991	Anti-Government Violence	Muslim fundamentalists	Government	0	Foreign Affairs/Relations
8510014	Egypt	Cairo	Nov 01, 1991	Nov 01, 1991	Organized Demonstration	Muslim fundamentalists	Government	0	Foreign Affairs/Relations
8510017	Egypt	Cairo	Jun 28, 1992	Jun 28, 1992	Extra-Government Violence	Al-Jihad	Secularist writer	1	Religious Discrimination/Issues
8510025	Egypt	Cairo	Feb 26, 1994	Mar 04, 1994	Organized Demonstration	University students, Opposition Parties	Government	0	Foreign Affairs/Relations
8510026	Egypt	Cairo	May 17, 1994	Jul 25, 1994	United Strikes	Lawyers' Syndicate	Government	0	Human Rights/Democracy
8510028	Egypt	Cairo	Oct 18, 1994	Oct 18, 1994	Spontaneous Demonstration	Writers/intellectuals, Islamic radicals,	Government	0	Domestic War/Violence/Terrorism

While other data sources contain rich information about *armed* conflict in Africa, the goal of the SCAD project is to provide researchers, journalists, NGOs, and the policy community more detail about other forms of *social* conflict

### Related materials:

- Cullen S. Hendrix and Stephan Haggard, “Global Food Prices, Regime Type, and Urban Unrest in the Developing World,” *Journal of Peace Research* 52, 2 (2015): 143–157.
- Cullen S. Hendrix and Idean Salehyan, “No News Is Good News: Mark and Recapture for Event Data When Reporting Probabilities Are Less Than One,” *International Interactions: Empirical and Theoretical Research in International Relations* 41, 2 (2015): 392–406.
- Idean Salehyan, “Best Practices in the Collection of Conflict Data,” *Journal of Peace Research* 52, 1 (2015): 105–109.
- Idean Salehyan, “Climate Change and Conflict: Making Sense of Disparate Findings,” *Political Geography* 43 (2014): 1–5.
- Idean Salehyan and Christopher Linebarger, “Elections and Social Conflict in Africa,” *Studies in Comparative and International Development* 50, 1 (2015): 23–49.

See all SCAD publications at [www.strausscenter.org/ccaps/social-conflict-publications.html](http://www.strausscenter.org/ccaps/social-conflict-publications.html).

**Resource utilization:**

This dataset is widely used by U.S. government and military agencies, academic researchers, and international organizations. The dataset has been downloaded by organizations in 104 countries, including:

The dataset has been downloaded by organizations in 93 countries, including:

- U.S. government agencies, including the Centers for Disease Control and Prevention, Defense Intelligence Agency, National Geospatial-Intelligence Agency, Office of Transition Initiatives, U.S. Africa Command, U.S. Agency for International Development, U.S. Army Cold Regions Research and Engineering Lab, U.S. Army Corps of Engineers, U.S. Army Engineer Research and Development Center, U.S. Army Research Laboratory, U.S. Central Command, U.S. Department of Defense, U.S. Department of State, U.S. Institute of Peace, U.S. Special Operations Command Africa, and U.S. Special Operations Command Headquarters;
- Multilateral or foreign government agencies, including the Defense Research and Development Canada, European Commission Joint Research Centre, German Development Agency, German Federal Office for Migration and Refugees, German Institute of Global and Area Studies, International Committee of the Red Cross and World Bank, International Criminal Court, Japanese Ministry of Defense, Kenya Medical Research Institute, Liberia Platform for Dialogue and Peace, Mo Ibrahim Foundation, Netherlands Centre for Safety and Development, Niger Basin Authority, Nigeria Foreign Service, Nigeria Ministry of Environment, Norway Statistics Office, Potsdam Institute for Climate Impact Research, UNDP, UNEP, UNHCR, UNICEF, UNOCHA, UN Office for West Africa, UN Operations in Cote d'Ivoire, UN Population Fund, World Bank, and World Food Program;
- Nongovernmental or research agencies, including Chatham House, Conservation International, Development Alternatives Inc., Direct Relief International, Economic Research South Africa, Energy and Resources Institute, Fund for Peace, Institute for Defense Analyses, Institute for Disease Modeling, Institute for Economics and Peace, Institute for Peace and Development, Institute for Security Studies, International Food Policy Research Institute, Mercy Corps, Norwegian Council for Africa, Pacific Disaster Center, Peace Research Institute Oslo, RAND Corporation, Small Arms Survey, Uganda Justice and Reconciliation Project, and World Vision; and
- Universities, including Addis Ababa University, Chinese Academy of Sciences, Columbia, Cornell, Duke, Emory, Fletcher School, Georgetown, Harvard, Johns Hopkins, King's College London, London School of Economics, MIT, National Defense University, Naval Postgraduate School, Northwestern, Notre Dame, Oxford, Princeton, SciencesPo, Stanford, Stockholm University, University of Bern, University of Cape Town, University of Chicago, University of Nairobi, University of Zurich, Uppsala University, U.S. Naval Academy, West Point, and Yale University.

**CCAPS Mapping Tool, Conflict Dashboard, Aid Dashboard, and Climate Dashboard**

**Resource URL:** [www.strausscenter.org/ccaps/mappingtool](http://www.strausscenter.org/ccaps/mappingtool)

**Resource Point of Contact:** Ashley Moran, [amoran@austin.utexas.edu](mailto:amoran@austin.utexas.edu)

**Production Date:** January 2012-September 2013, updated weekly with ACLED conflict data and periodically with other datasets as they are revised.

In addition to its award-winning mapping platform, CCAPS has created several online dashboards that focus on specific topics including climate, conflict, and aid. Each is described with corresponding screenshots below.



The **CCAPS mapping tool** enables researchers and policymakers to visualize data on climate change vulnerability, conflict, governance, and aid, and to analyze how these issues intersect in Africa. The mapping tool, built in partnership with Development Gateway, allows users to select and layer any combination of CCAPS data onto one map to assess how myriad climate change impacts and responses intersect. By integrating the various lines of CCAPS research, as well as other existing datasets, the CCAPS

mapping tool aims to provide the most comprehensive view yet of climate change and security in Africa. In July 2013, the **CCAPS mapping platform received Esri’s prestigious Special Achievements in GIS Award for its work mapping security risks related to climate change.**



The **CCAPS climate dashboard** displays the CCAPS Climate Security Vulnerability Model for analysis of where and when climate-related events disrupt Africa’s security and development. The dashboard shows how the four sources of vulnerability used in the CCAPS model—physical exposure to climate-related hazards, population density, household and community resilience, and governance and political violence—contribute to local areas’ overall vulnerability to climate security concerns.

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The **CCAPS Conflict Dashboard** brings together mapping, trends analysis, and raw data to help users visualize emerging and historical conflict trends in Africa. It allows users to analyze conflict by actor, event type, issue, intensity, and a range of other conflict dynamics. The tool utilizes two CCAPS-supported conflict datasets: the *Social Conflict Analysis Database (SCAD)* and the *Armed Conflict Location and Event Dataset (ACLE)*.



The **CCAPS Aid Dashboard** includes geocoded aid data from CCAPS and several partner institutions. CCAPS and Development Gateway built the dashboard to combine trends analysis with the most comprehensive collection of geocoded data on aid projects in Africa. The aid dashboard includes three aid datasets: (1) CCAPS’ Malawi Geocoded and Climate Aid Dataset, which includes all types of aid for the 30 donors in Malawi’s Aid Management Platform, (2) World Bank Aid Projects Continent-Wide, which

includes all World Bank aid projects in all sectors from 1990-2011, and (3) African Development Bank Aid Projects Continent-Wide, which includes all African Development Bank projects in all sectors approved in 2009–2010. The Aid Dashboard also includes key contextual indicators courtesy of AfriPop (population density), Harvest Choice (poverty headcount ratio), and the World Bank (GDP per capita).

**Resource utilization:**

The CCAPS mapping tool and dashboards are used widely by U.S. government and military agencies, African national ministries, nongovernmental organizations, and international organizations, being used for example by analysts in the U.S. Africa Command, Combined Joint Task Force-Horn of Africa, U.S. State Department, USAID, and UNEP’s Division of Early Warning and Assessment, to name a few diverse organizations. The mapping platform has been accessed from 152 countries.

**Related materials:** (Full list at [www.strausscenter.org/ccaps/publications.html](http://www.strausscenter.org/ccaps/publications.html))

- Ashley Moran and Dominique Thuot, “Bridging the Policy Gap: Mapping Climate Change and Security for Impact in Africa,” *CCAPS Research Brief No. 20* (Austin: Robert S. Strauss Center for International Security and Law, 2013).
- *User Guide to the CCAPS Mapping Tool* (Austin: Robert S. Strauss Center for International Security and Law, 2013).
- *User Guide to the CCAPS Conflict Dashboard* (Austin: Robert S. Strauss Center for International Security and Law, 2013).
- *User Guide to the CCAPS Aid Dashboard* (Austin: Robert S. Strauss Center for International Security and Law, 2013).

## Subnational African Education and Infrastructure Access Data

**Resource URL:** [www.strausscenter.org/ccaps/data](http://www.strausscenter.org/ccaps/data)

**Resource Point of Contact:** Josh Busby ([busbyj@austin.utexas.edu](mailto:busbyj@austin.utexas.edu))

**Production Date:** August 2013

This dataset provides data on literacy rates, primary and secondary school attendance rates, access to improved water and sanitation, household access to electricity, and household ownership of radio and television. Unlike other datasets, notably the World Bank's World Development Indicators, this dataset provides data at the subnational level, specifically the first administrative district level. Furthermore, the data is comparable both within and across countries. This subnational level of data allows for assessment of education and household characteristics at a more relevant level for allocation of resources and targeting development interventions. The dataset includes data for 38 countries, covering 471 of Africa's 699 first level administrative districts.

This data was calculated using raw survey data from three sources: the Demographic and Health Surveys supported by the U.S. Agency for International Development; Multiple Indicator Cluster Survey supported by UNICEF; the General Household Surveys conducted by Statistics South Africa. The datasets used are freely available for download from the websites of these agencies.

### Related materials:

Todd Smith, Joshua Busby, and Anustubh Aghnihotri, *Codebook for Subnational African Education and Infrastructure Access Data* (Austin: Robert S. Strauss Center for International Security and Law, 2013), [www.strausscenter.org/images/Subnational\\_African\\_Data\\_Codebook\\_August\\_2013.pdf](http://www.strausscenter.org/images/Subnational_African_Data_Codebook_August_2013.pdf).

### Resource utilization:

This dataset is widely used by U.S. government and military agencies, academic researchers, and international organizations. It is used for a range of purposes, informing academic research on the dynamics of conflict, diplomatic policy, and humanitarian and development work in conflict-affected contexts. For example, the dataset has been downloaded by organizations in 38 countries, including:

- USG agencies, such as the U.S. Army, U.S. Army Corps of Engineers, U.S. Air Force, and the U.S. Naval Academy.
- International organizations, such as the Office for the Coordination of Humanitarian Affairs, Peace Research Institute Oslo, United Nations Environment Programme, United Nations High Commissioner for Refugees, and the World-Wide Human Geography Data Working Group.
- Research and nongovernmental agencies, such as AidData, the Urban Institute, and the World Bank.
- Universities, such as Columbia University, Cornell University, Georgetown University, Harvard College, London School of Economics, MIT, Pennsylvania State University, Princeton University, Tufts University, University of Pennsylvania, University of Zimbabwe, and Yale University.

## Malawi Geocoded and Climate Aid Dataset

**Resource URL:** [www.strausscenter.org/ccaps/data](http://www.strausscenter.org/ccaps/data)

**Resource Points of Contact:** Catherine Weaver ([cweaver@austin.utexas.edu](mailto:cweaver@austin.utexas.edu))

**Production Date:** August 2012

In partnership with AidData and the Government of Malawi, CCAPS published a first-of-its-kind geocoded and climate-coded aid dataset. The dataset includes all types of aid from 30 donors in Malawi's Aid Management Platform, geocoded and climate-coded to provide a more complete picture of how adaptation fits into development efforts within the country.

The dataset includes 754 codable projects, from 1996–2011 that include over 2,900 activities, 2,500 locations, and approximately \$5.95 billion of committed aid. The dataset also allows researchers to assess if adaptation aid is targeting areas of greatest climate security risks.

ADAPTATION AID

Search

Enter Word  Search Advanced Search Download the Full Dataset

Text Search for 'forest'

Project Name	Sector	Donor	Recipient	Location	Year Agreement Signed	Year of Planned Completion	Cumulative Commitment (USD)	Climate Relevance
Forestry Management for Sustainable Livelihoods	Environment, Lands and Natural Resources	European Union (EU)	Malawi	Mua Lilelo Forest Reserve	2004	2011	\$11,044,977.61	Capacity Development
Forestry Management for Sustainable Livelihoods	Environment, Lands and Natural Resources	European Union (EU)	Malawi	Nalosa Forest Reserve	2004	2011	\$11,044,977.61	Capacity Development
Mountain Biodiversity Increase Livelihood Security (MOBILISE)	Integrated Rural Development	US Agency for International Development	Malawi	Mulanje Forest Reserve	2010	2012	\$3,000,000.00	Capacity Development
Rural Feeder Roads	Roads, Public Works and Transport	European Union (EU)	Malawi	Chimelo Forest Reserve	2007		\$20,554,964.59	Capacity Development
Forestry Management for Sustainable Livelihoods	Environment, Lands and Natural Resources	European Union (EU)	Malawi	Nchali Forest Reserve	2004	2011	\$11,044,977.61	Capacity Development
Forestry Management for Sustainable Livelihoods	Environment, Lands and Natural Resources	European Union (EU)	Malawi	Dzunge Forest Reserve	2004	2011	\$11,044,977.61	Capacity Development

Data has been compiled to expand this dataset to include food security coding for seven donors in Malawi, as well as climate aid coding for all World Bank projects continent-wide in Africa. This expanded dataset is planned for release in the fall of 2015.

### Resource utilization:

This dataset is widely used by USG agencies, academic researchers, and international organizations as a resource on how adaptation fits into development efforts within Malawi. The dataset has been downloaded by organizations in 57 countries. The data and aid mapping work of the CCAPS team has been used for external and/or internal operations by Adaptation Watch, AidData, International Institute for Environment and Development, Heinrich-Bohl Foundation, Overseas Development Institute, Oxfam International, The World Bank, The World Resources Institute, USAID Climate Change Unit.

**Related materials:** (Full list at [www.strausscenter.org/ccaps/adaptation-aid-publications.html](http://www.strausscenter.org/ccaps/adaptation-aid-publications.html).)

- Catherine Weaver, Stephen Davenport, Justin Baker, Michael Findley, Christian Peratsakis, and Josh Powell, “Malawi’s Open Aid Map,” Policy research report for the Open Aid Partnership (Washington: World Bank, 2014).
- Justin Baker, Sarah McDuff, and Catherine Weaver, “Tracking Climate Aid in Africa: The Case of Malawi,” *CCAPS Research Brief No. 18* (Austin: Robert S. Strauss Center for International Security and Law, 2013).
- Abigail Ofstedahl, Elena Rodriguez, and Justin Baker, “Tracking Aid for Food Security: Methodology and Pilot Case Study in Malawi,” *CCAPS Research Brief No. 17* (Austin: Robert S. Strauss Center for International Security and Law, 2013).

## Relational Database Analysis System for Chinese S&T

PI: **Tai Ming Cheung**, University of California - San Diego, [tcheung@ucsd.edu](mailto:tcheung@ucsd.edu)

Point of Contact: **David Meyer**, University of California - San Diego, [dmeyer@math.ucsd.edu](mailto:dmeyer@math.ucsd.edu)  
<http://igcc.ucsd.edu/sitc/>

**Production Date:** The database is expected to be publicly available in the near future. Early access to the data by the U.S. government may be possible.

A key component of the Minerva project entitled, “*The Evolving Relationship between Technology and National Security in China: Innovation, Defense Transformation, and China’s Place in the Global Technology Order*” (described on page 25) has been the development of a **Relational Database Analysis System**. The principal aim of the database system is to support graph-theoretic social network analysis to characterize the positions of individuals, organizations, projects, and technologies within networks, as well as provide general characterizations of the nature of these networks. This is the only database of its kind focused exclusively on Chinese science and technology programs, personnel, and organizations.

Data collection sources and methods include the use of an extensive array of publicly accessible Chinese language materials, Chinese language journals, Chinese corporate databases, and other external databases with relevant data as well as field research that includes interviews with officials, scientists, researchers, and business executives. Data includes biographical information of personnel (**Figure 26**), programmatic information on science and technology projects, and corporate and organizational information (**Figure 27**). This data can be further analyzed using a graphical interface that can demonstrate relationships between personnel and corporations and organizations (**Figure 25**). Data is entered by IGCC staff, individually sourced, and carefully reviewed for accuracy and consistency.



**Figure 25: Illustrative Example of Relational Network Analysis of Individuals: Relational Network of Xu Dazhe, Director of the State Administration for Science, Technology, and Industry for National Defense**

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Future China-Minerva Database

-WHERE WE LEARN ABOUT CHINA-

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### 中国航空工业集团公司(Aviation Industry Corporation of China)

**Established:** 2008

**Sector:** Aerospace & defence

**English Summary:** AVIC Industry Corporation of China (AVIC) is one of the China's top ten military industrial enterprises. It was founded in November of 2008 through the re-organizing and consolidation of China Aviation Industry Corporation Limited (CAIC), China Aviation Industry Group Corporation (AVIC), AVIC's parent company, capable of providing whole-chain services to customers in many fields: from research and development to operation, and from manufacturing to finance. Its business units cover defence, transport aircraft, engines, helicopters, avionics and systems, general aviation, aviation research, flight test, trade and logistics, asset management, financial services, engineering planning and construction, and automobiles.

**Chinese Summary:** 中国航空工业集团公司(简称“中航工业”)是中国十大军工企业之一,是由中航工业的国有特大型企业和国家授权投资机构,于2008年11月6日由原中国航空工业第一、第二集团公司重组联合而成。集团公司设有航空装备、运输机、直升机、无人机、机载设备与系统、通用飞机、航空研究、飞行试验、贸易物流、资产管理、工程规划建设、汽车等产业板块。

Region	Category	SZSS Code	HK Stook Market Code	Listing Date	Legal Representative	SZSS Security Type	HK Security Type	Est_Date	Source
State-owned Holding Company	Domestic				殷雪琪				百道百科-中国飞机制造业研究
<b>Category</b>									

<b>Names</b>									
Type	Name	From	To	From	To				
English Name	Aviation Industry Corporation of China	2008	Present	中航工业 - 集团简介					
Abbreviation	AVIC	2008	Present	中航工业 - 集团简介					
Chinese Name	中国航空工业集团公司	2008	Present	中航工业 - 集团简介					
Abbreviation	中航工业	2008	Present	中航工业 - 集团简介					

<b>Location</b>									
Country	Province	City	Township	Village	District	Street Number	Zip Code	From	To
China	北京	Beijing	Chaoyang	Jiangqiao Road	No.128	100022	2008	Present	中国航空工业集团网址

Figure 26. Illustrative Example of Biographical Data Entry of Individuals: Partial Profile on Wan Gang, Minister of Science and Technology of the People's Republic of China

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### 万钢(Wan Gang)

**Male** 汉族

**Born:** 1952-08 Age: 63

**Birth province:** 上海 Hometown: Shanghai

**Chinese Academy of Science and Technology for Development** 院长 2007 to Present

**Ministry of Science and Technology** 部长 2007 to Present

**China Zhi Gong Party** 党委书记/书记/主席 2007 to Present

**China Zhi Gong Party** 委员/成员 2006 to Present

**State Council S&T and Education Group** 委员/成员 Present

<b>Names</b>									
Chinese Name	English Name	万刚	Wan Gang	funding					

<b>Employment</b>									
Organization/Corporation	Position	From	To	More Info					
<a href="#">China Zhi Gong Party</a>	党委书记/书记/主席	2007	Present						
<a href="#">Chinese Academy of Science and Technology for Development</a>	院长	2007	Present						
<a href="#">Ministry of Science and Technology</a>	部长	2007	Present						
<a href="#">China Zhi Gong Party</a>	委员/成员	2006	Present						
<a href="#">State Council S&amp;T and Education Group</a>	委员/成员	2008	2013						
<a href="#">Chinese Peoples Political Consultative Conference</a>	常委/书记/副书记/副主席	2006	2011						
<a href="#">Shanghai Association for Science and Technology</a>	理事长	2003	2008						
<a href="#">Chinese Peoples Political Consultative Conference</a>	常委/书记/副书记/副主席	2006	2007						
<a href="#">China Zhi Gong Party</a>	院长	2004	2007						
<a href="#">Tonaji University</a>	副院长	2003	2004						
<a href="#">Tonaji University</a>	主任	2001	2004						
<a href="#">Tonaji University</a>	院长	2001	2004						
<a href="#">Tonaji University</a>	秘书	2001	2004						
<a href="#">State Council of the PRC</a>	其它	2000	2000						
	工程师	1991	1996						
<a href="#">Tonaji University</a>	其它	1981	1985						
<a href="#">Northeast Forestry University</a>	其它	1978	1979						
<a href="#">Sandaie Communes in Yanli County, Jilin Province</a>	其它	1969	1975						

Note: ★ denotes military service or related organizations.

Figure 27. Illustrative Example of Data Entry for Corporations: Partial Profile of Aviation Industry Corporation of China

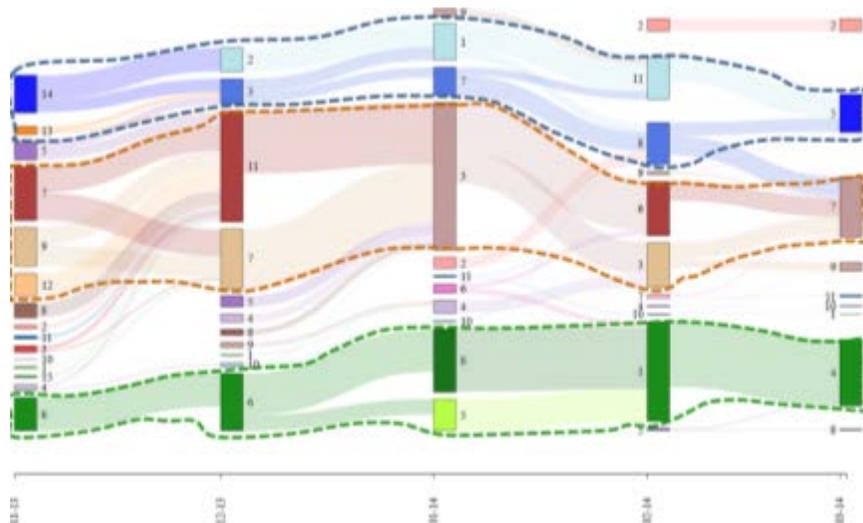
## LookingGlass: A Visual Intelligence Platform for Tracking Online Social Movements

**Resource Point of Contact:** Hasan Davulcu, Arizona State University, [hdavulcu@asu.edu](mailto:hdavulcu@asu.edu)

**Production Date:** August 1, 2016

The LookingGlass tool was generated through the Minerva project “*Finding Allies for the War of Words: Mapping the Diffusion and Influence of Counter-Radical Muslim Discourse*” described on page 117. It will be used in the new Minerva effort “*New Analytics for Measuring and Countering Social Influence and Persuasion of Extremist Groups*” on page 134.

LookingGlass is a social movements tracker tool which is able to detect radical hot-spots of social networks, their narratives and activities, and socio-cultural, economic, and political drivers. LookingGlass is bootstrapped by highly trained area experts with social science and subject matter expertise as well as local cultural knowledge. A video demo of LookingGlass is published online at YouTube link.<sup>24</sup>



**Figure 28. Social media community dynamics in the UK between November 2014 and March 2015.** The five month Sankey diagram for the UK reveals three basic types of online communities: the blue moderate Muslim communities, the red right-wing British communities, and the green radical and some extremist-minded Muslim communities.

Longitudinal analysis of social media messages (such as those that can be observed on Twitter, message boards, blogs, or in chat rooms) with LookingGlass reveals (1) latent online communities, (2) flows between communities and social movements (SMs), (3) growth and shrinkage drivers (i.e., events and narratives) of SMs, and (4) influential promoters of SMs. For example, the Sankey diagram<sup>25</sup> shown in **Figure 28** reveals the polarized community dynamics observed in the UK between November 2014 and March 2015 (depicted on x-axis). Sankey diagram visualization is used in LookingGlass to depict flows of individuals from one set of communities in to another set, as different types of movements evolve month-to-month. The numbered boxes (depicted on y-axis) correspond to different highly-networked communities at monthly snapshots. The sizes of boxes correspond to sizes of different communities at each monthly snapshot, and the color of the boxes corresponds to different types of groups. The

<sup>24</sup> Visit <http://www.youtube.com/watch?v=m1eHXwQwYKY>.

<sup>25</sup> Defined at <https://developers.google.com/chart/interactive/docs/gallery/sankey>.

connections between boxes show the sizes of monthly flows between groups, and their evolutionary patterns such as emergence, splits and mergers, growths or shrinkage and extinction.

We have been using LookingGlass to track social movements in the UK. The five month Sankey diagram for the UK reveals three basic types of online communities: the blue moderate Muslim communities, the red right-wing British groups, and the green radical and some extremist-minded Muslim groups. Inspecting popular news, images and videos within these groups and communities reveals significant events, narratives and their effects.

One of the most interesting dynamics identified through LookingGlass is the symbiotic relationship in the UK between far-right groups (such as the English Defence League and the British National Party), and extremist-minded Muslim groups (such as the proscribed and renamed Al Muhajiroun, most recently called Need4Khilafah, The Shariah Project and the Islamic Dawah Association).

For example, following the release of the damning Rotherham report on 26 August 2014, which revealed more than 1,400 children in Rotherham were abused over a period of 16 years by "mainly Asian men", LookingGlass showed that online followers of the EDL, the far-right political parties, and pseudo-militia group Britain First begun to merge and they began staging protests, leading to arrests last September, 2014. In the eyes of the EDL and its supporters, this was associated with the unchecked Islamification of Britain. In the wake of this incident, LookingGlass pointed to us tweets of interest with "hate speech" in the red right-wing communities demanding to "put everyone who was not white British into Nazi-style death camps".

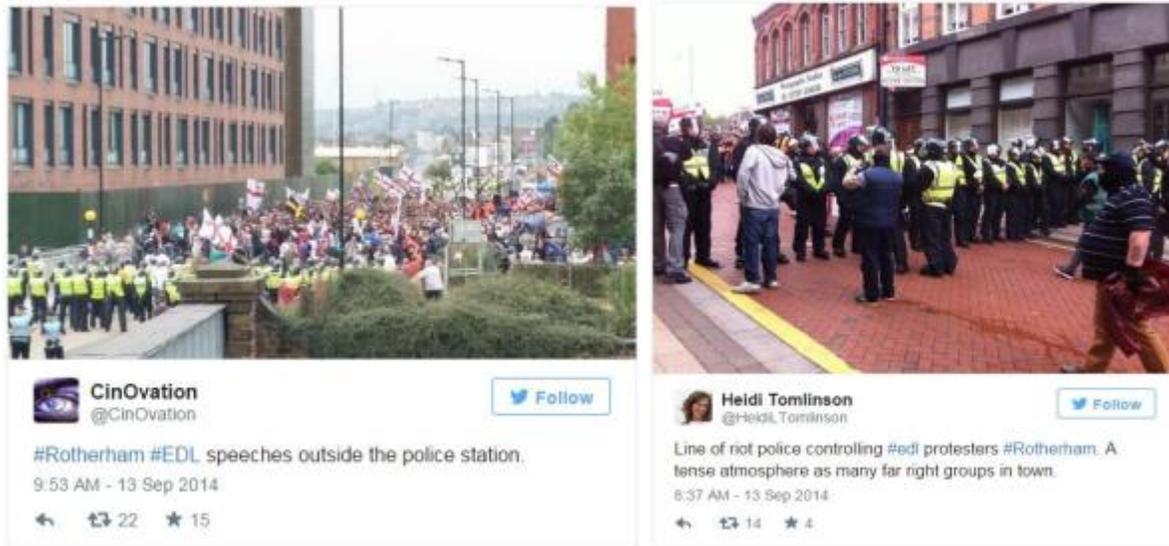


Figure 29. The EDL protest in Rotherham in September, 2014.

**Related materials:**

Davulcu, H. & Woodward, M., 2015, "LookingGlass: A Visual Intelligence Platform for Tracking Online Social Movements." In: Gerdes, L.M. (editor) *Illuminating Dark Networks: The Study of Clandestine Groups and Organizations (Structural Analysis in the Social Sciences)*, Cambridge: Cambridge University Press, pp. 84–103.

## Resources for Indigenous Land Rights Project

Jerome Dobson, University of Kansas

<http://prmapping.res.ku.edu>

The data and tools described below have been and will be generated through the Minerva project “*Centroamérica Indígena: Land Rights and Stability in Indigenous Societies of Central American*” described on page 31.

### *C.A. Indigena Website*

Our website is essentially a clearinghouse for data related to our research activities. On the website users will find a variety of information related to our project including details about our team members at the University of Kansas and at our partner schools in Central America. In addition, we list affiliated governmental and non-governmental organizations throughout Central America with whom we are working closely; we link to these organizations’ websites when possible.

In terms of data, the website offers three sections of interest including the Honduran Muskitia and Darién case studies, and applied research. The first two sections allow the user to access and download, in PDF format, historical participatory maps on indigenous land use gathered by Dr. Herlihy and his team during field work in the 1990s. An additional feature of the Muskitia section is the use of “transparent digital maps” that allow the user to view these historical maps overlaid, in ArcGIS Online, on satellite and aerial imagery; and excellent tool for comparing historical land use with current land cover change.

The third section “Applied Research,” details our current activities. In addition to our regional study and the two regional case studies (Honduran Moskitia and Darién of Panamá), the CA Indígena research team is collaborating with local grassroots and government organizations in several specific projects which benefit their communities while furthering our mutual understanding of indigenous geographies. In this section you can follow the progress of our work in Katainasta, Honduras; Sacatepéquez, Guatemala and

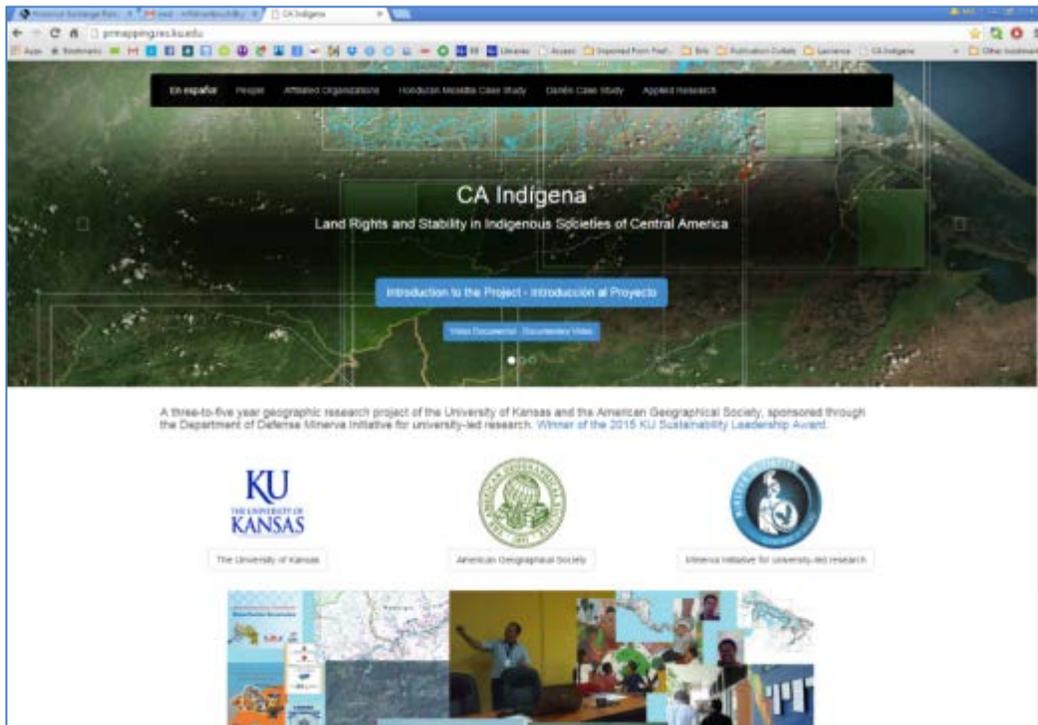


Figure 30. The C.A. Indigena Website serves as a clearinghouse for data.

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the Alto Chirripó of Costa Rica. For an inside look at the PRM process in Katinasta, see our short documentary piece at <https://www.youtube.com/watch?v=nklypg6uoXA>.

**Resource utilization:**

Since going live in March 2015, the website has had over 800 visits from 23 countries ranging from the Americas, to Europe and Asia.

**C.A. Indigena Territorial Jurisdictions Database**

**Resource URL:** <http://prmapping.res.ku.edu/appliedResearch.html>

**Production Date:** The production of this large-scale (fine) cartographic data is ongoing. As we receive or generate new data, it will be updated on our project website under the ‘applied research tab.’

The construction of our **Central American Regional (Municipal) database** represents only the broader scale our project, but we also work on the ground with indigenous communities, government agencies, NGOs, and universities in Honduras, Guatemala, and Costa Rica to map indigenous territorial jurisdictions at 1:50,000 scale or larger. These case studies give us a grassroots perspective to understand the indigenous territorial jurisdictions across Central America. They add depth to our Central American GIS which will display all indigenous territorial jurisdictions in the region while serving as a tool to query and visualize areas of stability or instability related to indigenous land tenure.

To better understand the stability/instability of indigenous societies, and Central America in general, we are both seeking out information on existing indigenous territorial jurisdictions and actively assisting governmental and indigenous organizations in the creation and mapping of new territories. One of our objectives is to compile a shapefile of all indigenous lands and their “territorial jurisdictions” in the region. We are in the process of digitizing the indigenous territories of Panama, and Nicaragua, and we are participating actively in the creation of new indigenous territories in the Honduran Moskitia. *For more information on this work please see our **Katinasta** section on our webpage.*

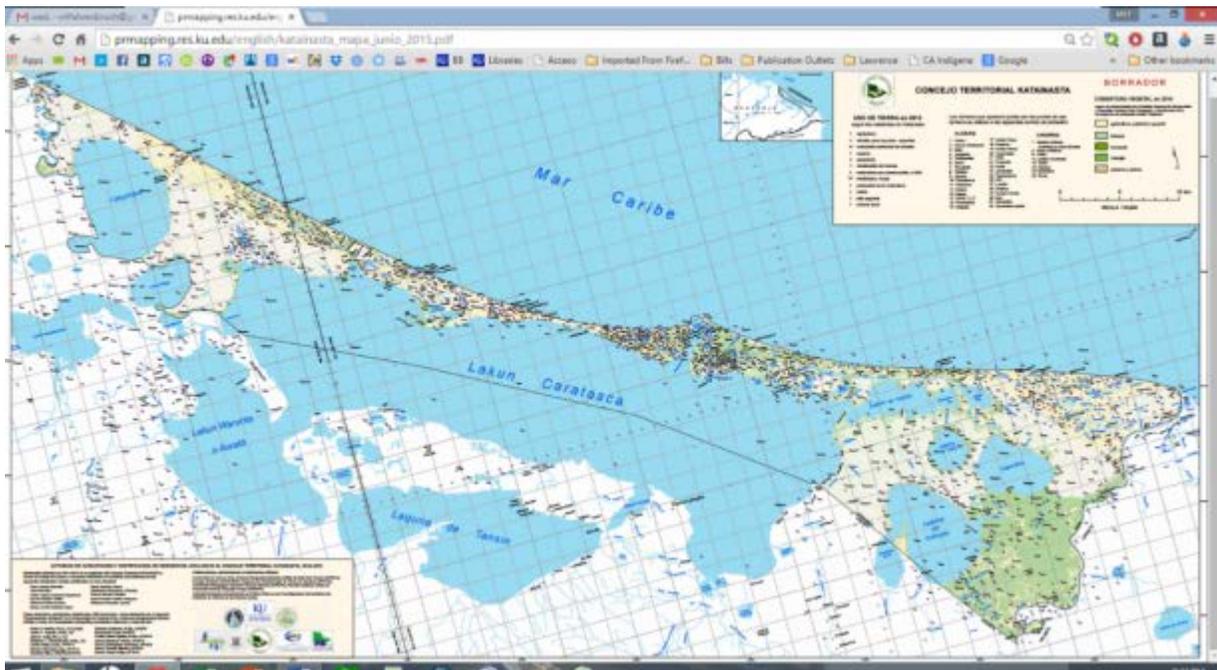


Figure 31. Example of Participatory Resource use Mapping in Katinasta, Honduras.

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As new territorial jurisdictions for indigenous populations are currently being formed throughout the region, our database will to be not only the most complete GIS dataset of indigenous territories in Central America, but the most detailed. In our study areas in Honduras, Guatemala, and Nicaragua, we will not only have the official boundaries but also up-to-date resource use information (see **Error! Reference source not found.** for an example of our participatory resource use mapping in Katinasta, Honduras.).

**Related materials:**

Herlihy, Peter H. et al. (CA Indígena)

2015. **Concejo Territorial KATAINASTA. Uso de Tierra en 2015 y Cobertura Vegetal en 2014.** Actividad de Capacitación y Certificación de Geógrafos Locales en el Concejo Territorial Katinasta, 2014–2015. Mapa digital ya publicado en color, escala 1:55,000. Tegucigalpa, MASTA; see <http://www.prmapping.res.ku.edu/english/Katinasta.html>.

**Resource utilization:**

Every map we create is for the purpose of supporting the indigenous groups in their struggle for autonomy and self-determination and for the management and protection of their natural resources. Our Katinasta map has already been used by indigenous leaders in an effect to formulate resource management plans necessary for effective governance, and we fully expect that our future work will also be used in this way.

**Central America Regional (Municipal) Database**

**Resource URL:** <http://prmapping.res.ku.edu/appliedResearch.html>

**Production Date:** This product is still in the development phase.

**Resource description:** The *municipio* (county-level administrative unit) is our basic unit of scale and analysis, of which our GIS has integrated the approximately 1500 municipios in Central America into one spatial coverage into which we are populating mainly census variables related to the stability of indigenous land in the region.

We are building a comprehensive, regional GIS of all Central American countries and their respective indigenous territorial jurisdictions. No such database exists, and it is very complicated to integrate spatial data from numerous sources into one seamless GIS. We must negotiate various coordinate systems, projections, and scales. We have to make local, regional, and international boundaries conform, and in some cases, we have to modify or create our own spatial coverage where the data don't exist or were rendered incorrectly.

We have begun to populate our spatial coverage with the latest census information available from each country, particularly those data contributing to the geo-political stability or instability in indigenous areas. Once again, this is complicated because we have to analyze all the current censuses in Central America, which vary greatly both in year published and content. The most recent census in Honduras, for example, was published in 2001 while Panama is up to date as of 2010. Perhaps a more difficult task is identifying variables of stability or instability in indigenous areas (such as percentage of houses in a municipio with access to the power grid or whether the indigenous group has legal tenure over its territory). Variables are not uniform across censuses in Central America, so in some instances we must identify equivalents from country to country, and integrate the entries into one column in our GIS database.

DATA & TOOLS

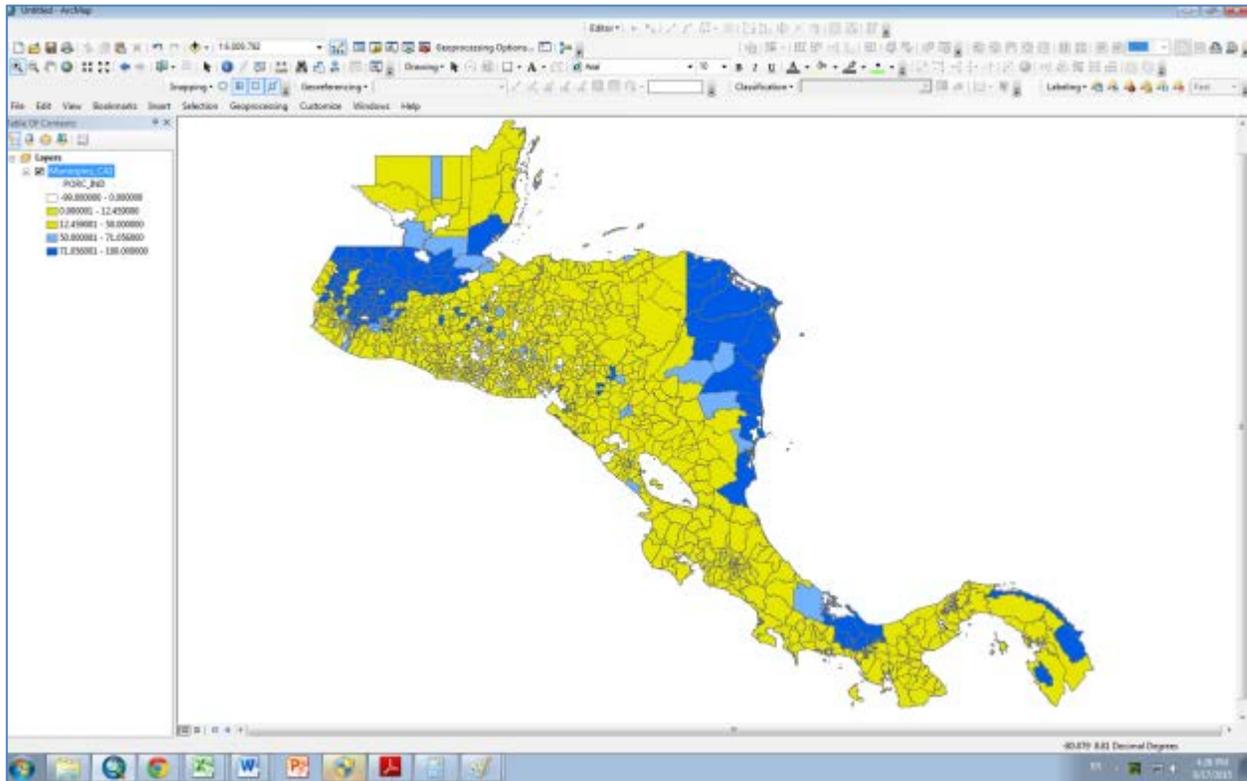


Figure 32. ArcMap display showing municipality shapefile and indigenous variable.

In conjunction with our fieldwork in Honduras, Guatemala, and Costa Rica, a major part of our research activity is the creation of a municipio level database (roughly equivalent to county level in the US) for all of Central America. Using what we learn about stability/instability of indigenous communities from our fieldwork, we are working carefully to select variables from national level census' that reflect the lived geographies of people on the ground. As of now, we have identified and completed, or nearly completed, the entry seven variables including:

- 1) Population
- 2) Number of houses
- 3) Persons per household
- 4) Percentage of indigenous people by self-identification (Shown in screenshot below)
- 5) Percentage of literacy
- 6) Percentage of households on an electricity grid
- 7) Access to potable water

In addition to these variables, we are amassing data on home ownership status, inter-municipal migration, and arable land. All entries are listed based on the name of the municipality and the municipality code assigned at the national level. All data is based on national census reports and is verified at the time of entry. As far as we know, no other database exists at this level to try to understand the stability of indigenous societies.

### Resource utilization

At this point the database is on our secured server and not accessible to the public, however, as highlighted above, all our results are published and available on the project website.

## Resources for Homeownership & Societal Stability in Central Eurasia

The data described below have been and will be generated through the Minerva project “*Homeownership and Societal Stability: Assessing Causal Effects in Central Eurasia*” described on page 43.

### Focus groups on housing and politics in four Eurasian countries

**Resource POC:** Theodore P. Gerber, University of Wisconsin-Madison, tgerber@ssc.wisc.edu

**Production Date:** Eighteen transcripts of the focus are ready for release and available upon request.

The investigators organized and implemented eighteen focus groups on housing issues, political and social attitudes, views of the United States, and other related matters in Azerbaijan, Kyrgyzstan, Russia, and Ukraine from May–August 2014. The parameters of the groups were as follows:

Country	Dates	Group Locations and Composition
Russia	August 2014	Moscow: university educated; less educated Kazan: ethnic Tatar; ethnic Russian
Ukraine	May 2014	Lviv: ages 18–30; ages 31–49 Kiev: Russian speakers; Ukrainian speakers
Azerbaijan	April-June 2014	Baku: male; female Sabirabad: male; female
Kyrgyzstan	June 2014	Bishkek: university educated; less educated Osh: ethnic Kyrgyz; ethnic Uzbek Village (near Osh): male; female

The transcripts of the groups in Russia and Ukraine are in Russian (including the three Ukrainian groups that were originally conducted in Ukrainian), those from Azerbaijan and Kyrgyzstan were translated into English. The data provide original qualitative insight into how 18–49 year olds in these four countries perceive their housing situations, their main concerns regarding housing and the overall situations in their countries, gender and ethnic relations in the countries, views of government institutions and policies, perceptions of the United States and Russia, and other country-specific topics such as assessments of the “Maidan” uprising in Ukraine, the situation of IDPs in Azerbaijan, squatter movements in Kyrgyzstan, and “foreign agent” labeling of NGOs in Russia.

Additional focus groups of a similar nature will be conducted in fall 2015 and spring 2017. The transcripts of those will be added.

#### Related materials:

Theodore P. Gerber and Jane Zavisca. “What 18 Focus Groups in the Former Soviet Union Taught Us about America’s Image Problems.” *The Wilson Quarterly*. Summer 2015.<sup>26</sup> This article has been republished by *Newsweek* magazine, *The Kyiv Post*, and *Russia Today*, and it was excerpted in *Johnson’s Russia List*.

<sup>26</sup> See <http://wilsonquarterly.com/quarterly/summer-2015-an-age-of-connectivity/what-18-focus-groups-in-former-ussr-taught-us-about-americas-pr-problems/>.

**Comparative Housing Experiences and Social Stability (CHESS) Survey**

**Resource POC:** Theodore P. Gerber, University of Wisconsin-Madison, tgerber@ssc.wisc.edu

**Resource URL:** N/A. We will deposit the data in a public data archive when appropriate.

**Production Date:** We will deposit the initial raw data file, technical reports, and codebook one year after completion of the study. Government officials may access the data in advance.

The investigators carried out large-sample surveys in Azerbaijan, Kyrgyzstan, Russia, and Ukraine in February–May 2015. Each survey included a nationally representative sample of 2000 residents ages 18–49 plus an oversample of 400, whose composition differed across the countries. The timing and parameters of the surveys were as follows:

Country	General sample composition	General sample N	Oversample (400)	Response rate	Date started	Date completed
Russia	Urban and rural	2001	4 Muslim regions	34%	1/27/2015	5/31/2015
Ukraine	Urban and rural	2000	Mortgagers	32%	2/27/2015	3/30/2015
Azerbaijan	Urban only	2010	IDPs	67%	2/9/2015	3/18/2015
Kyrgyzstan	Urban and rural	2000	regions with recent ethnic violence	67%	3/4/2015	5/3/2015

In each country, samples were drawn using modern methods adopted to the particular country’s circumstances. The questionnaires were developed in close consultations with our local research partners, pretested, and professionally translated into the appropriate languages. In addition to obtaining standard demographic and socio-economic information, the surveys include a wide array of questions measuring different aspects of each respondent’s housing situation, their (possible) political and social grievances, their levels of civic participation and social capital (both neighborhood-based and general), their views on issues such as the merits of democratic institutions, civic freedoms, and market vs. state-controlled economy, and their attitudes toward pressing political issues of the day such as the war in Ukraine, the foreign policy of the United States, and recent country-specific political controversies. Many questions are standardized across all four countries or subsets of them, while others are country-specific. The survey is unique due both to the countries and the topics it covers.

**Related materials:**

Preliminary results were briefed via the SMA network, and power point slides from the briefing are available from the authors. Policy memos and articles are currently under preparation.

## Duke Minerva Data and Tools

PI: Gary Gereffi, Duke University

Resource Point of Contact: **Danny ‘Dayne’ Hamrick**, [danny.hamrick@duke.edu](mailto:danny.hamrick@duke.edu)  
<http://sites.duke.edu/minerva>

The Duke Minerva website allows visitors to access resources generated through the MINERVA project “A Global Value Chain Analysis of Food Security and Food Staples for Major Energy-Exporting Nations in the Middle East and North Africa” described on page 47. The site provides:

- Links to publications
- Access to our map products, and
- Download the data we have compiled to make these products and carry out our research.

### Database contents:

For every country in the Middle East and North Africa, compiled data includes:

- Social context: Socioeconomic factors, demographics, agriculture, ports, trading, infrastructure and more
- Country consumption, production and trade data for rice, corn, wheat, crude, petroleum products, and natural gas.
- Dynamic links to geospatial data in a geographic information system (GIS) to allow for mapping and visualization.

See <http://sites.duke.edu/minerva/database/> for additional details on data compilation and map creation.

### Resource utilization:

Full access to our database has requested by and given to the Office of Geographic Sciences in the National Geospatial-Intelligence Agency.

## The Issue Correlates of War (ICOW) Identity Claims Dataset

**Resource Point of Contact:** Paul R. Hensel, phensel@unt.edu

**Resource URL:** <http://www.paulhensel.org/icow.html>

**Production Date:** Estimated August 2017; early access for government use may be possible.

The Minerva project “*Identity Claims: Expanding the Issue Correlates of War (ICOW) Dataset*,” described on page 137, represents the next stage in the issue approach to international relations, as developed by the Issue Correlates of War (ICOW) Project also managed by Dr. Hensel.

With previous extramural funding from the National Science Foundation and USAID, the ICOW Project has collected data on 837 dyadic claims to *territory* (between two countries), 244 dyadic claims to *maritime areas*, and 159 dyadic claims over *cross-border rivers*. ICOW has also identified over 3,000 instances when countries used peaceful or conflictual foreign policy tools to try to settle these issue conflicts. The project has produced more than two dozen publications by ICOW scholars and has been used in over 150 studies by other scholars.

Consistent with existing ICOW data sets, an *identity claim* is defined as a situation where official government representatives make explicit claims or demands regarding the treatment or status of their ethnic kinsmen in at least one other state. This data resource will include information about every identity claim (explicit disagreement between two nation-state governments over a shared ethnic group) since World War II. This information will include the dates when the claim began and (if relevant) ended, details about what demands were involved in the claim (ranging from equal rights for the group to autonomy, independence, or unification with the state making the demand), and details of the salience/importance of the claim to both states (such as the size and status of the group). It will also include information about the management of the claim, including each time that the states negotiated bilaterally, threatened or used military force over the claim, or turned to third party mediators or conflict managers for assistance.

### Related materials:

The current ICOW data sets (territorial, river, and maritime claims) are described in the following article, which also suggested identity claims as a potential future project:

Paul R. Hensel, Sara McLaughlin Mitchell, Thomas E. Sowers II, and Clayton L. Thyne (2008). “Bones of Contention: Comparing Territorial, Maritime, and River Issues.” *Journal of Conflict Resolution* 52,1 (February): 117–143.

### Resource utilization

Previous ICOW data sets have been used by dozens of scholars to study international conflict and conflict management, with some focusing on the specific topics covered by the data sets (territorial, river, or maritime claims) and others using these cases to study other phenomena (such as diversionary theory as a cause of conflict, the impact of river claims on civil war, or the effectiveness of international mediation and other conflict management strategies). We expect the same to be true for the new data set once it is released.

## The WomanStats Database

[www.womanstats.org](http://www.womanstats.org)

**Resource Point of Contact:** Valerie Hudson, [info@womanstats.org](mailto:info@womanstats.org)

**Production Date:** All of our existing data is currently online. Newly collected data is uploaded daily, and users can view the latest information entered into the database on our homepage.

### Resource description:

The WomanStats database provides raw qualitative and quantitative data on over 350 variables related to the physical security status of women across 176 countries. Unlike most research databases, we include information on cultural practices and their prevalence as well as their legal status in the community.

We also scale phenomena and produce ordinal scales that allow for cross national comparisons. We provide maps to accompany all of our univariate and multivariate scales. Our work is transparent as we provide the coding rubric for each scale and a download feature that allows a researcher to export data on a particular country and variable combination into Microsoft Excel. The WomanStats Database also has a RSS Feed feature that will allow users to receive constant updates on the specific variable, country, or country and variable combination of their choice. Registration for access to the database is free and convenient.



### Resource utilization:

The WomanStats Database has been used by many academic institutions and non-governmental organizations across the world. Scholars such as Alison Brysk, Brooke Ackerly, Victor Asal, and Kristian Skrede Gleditsch have cited our data in their work.

Our research findings have been vetted by the United Nations, the Office of Net Assessment at the Department of Defense, and Committees of the United States Congress. The WomanStats Database has been mentioned in several media outlets such as *The New York Times*, *60 Minutes*, and *The Economist*.

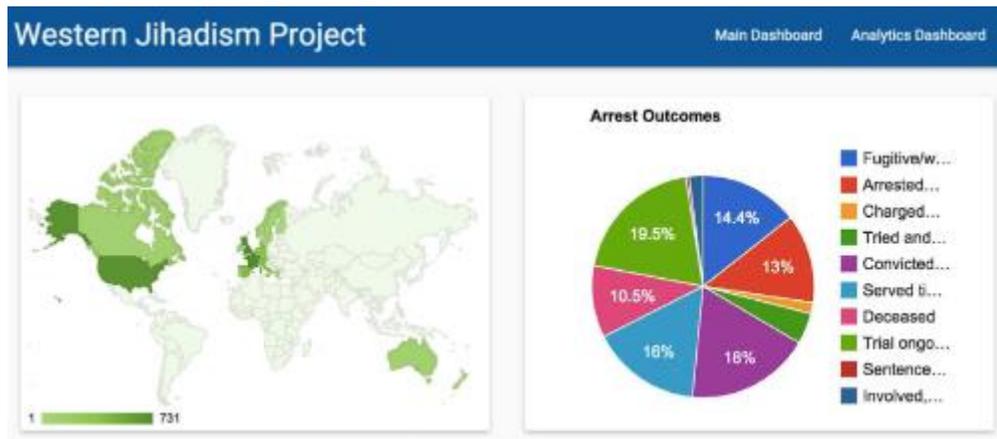
DATA & TOOLS

## Western Jihadism Data Collection: Tracking 20 Years of Al Qaeda-Inspired Terrorist Offenders and Incidents\*

Jytte Klausen, Brandeis University, [klausen@brandeis.edu](mailto:klausen@brandeis.edu)  
 Database implementation by Arya Boudaie and Sofiya Semenova  
<http://www.jytteklausen.com/>

**Production Date:** December 2015.

The Western Jihadism Project is a comprehensive database designed for the study of AI Qaeda-inspired terrorist offenders from Western states. The data collection tracks the evolution of AI Qaeda's recruitment strategy and its organizations in Western states-North America, the Antipodes, and Europe-from the early 1990s until today.



**Figure 33.** Analytics Dashboard of the database contains graphs and charts that the user can use to quickly get a snapshot of the data.

Data collection started in 2006 using an Excel spreadsheet format. The methodology is a variant of “cliometrics”, the statistical analysis of historical data mined from archival sources. All the data derives from archival research on publicly available documents such as court records, private and government reports, and media sources (16 languages). Every data point in the spreadsheet is coded manually. As the data bank grew and A/V files and other file formats were added to the data collection, it became necessary to convert the data collection to a relational database format.

Number of total recorded data points: 219,168	Number of terrorist organizations: 273
Encyclopedia file size: 2MB	Number of terrorist incidents (foiled and actualized)-includes non-violent conspiracies: 727
Number of unique individuals: 4,455	Number of person-to-person and person-to-terrorist organization links: ~20,000
Hamas-related individuals: 62	Total size of files archived on server: 96MiB
Hezbollah-related individuals: 148	
Number of foreign fighters: 1,821	
Foreign Fighters up to 2012: 1,037	
Foreign Fighters 2013 to present: 784	

**Figure 34.** Numerical description of the WJP database

\* *Government Program Officer:* Micheline Strand, Army Research Office  
*Government Point of Contact:* Lisa Troyer, Army Research Office, [lisa.l.troyer.ctr@mail.mil](mailto:lisa.l.troyer.ctr@mail.mil)  
*Anticipated period of performance:* March’15–March’16

Django administration Welcome, arya. View site / Change password / Log out

Home > Database > People

Select Person to change Recover Deleted People Add Person

Search:  Filter

Action:  Go 0 of 100 selected

Legacy id	ID Number	Full name	Country	Affiliation	Year born	Ethno national origin	
<input type="checkbox"/>	US99	99	Muntasser, Emadeddin Z.	USA United States	Jhadist	1965	Libyan
<input type="checkbox"/>	US98	98	Walker, Mark Robert	USA United States	Jhadist	1985	White-European
<input type="checkbox"/>	US97	97	Maldonado, Daniel	USA United States	Jhadist	1979	Latino-American
<input type="checkbox"/>	US96	96	Torres, Hiram	USA United States	Jhadist	1979	Latino-American
<input type="checkbox"/>	US95	95	Lindh, John Phillip Walker	USA United States	Jhadist	1981	White-European
<input type="checkbox"/>	US94	94	Youssef, Mohamed Hesham	USA United States	Jhadist	(None)	Egyptian
<input type="checkbox"/>	US93	93	Jayyousi, Kifah Wael	USA United States	Jhadist	1962	Jordanian
<input type="checkbox"/>	US92	92	Hassoun, Adham Amin	USA United States	Jhadist	1962	Palestinian
<input type="checkbox"/>	US91	91	Padilla, Jose	USA United States	Jhadist	1970	Latino-American
<input type="checkbox"/>	US90	90	Hassain, Mohammed Mesharref	USA United States	Jhadist	1955	Bengali
<input type="checkbox"/>	US9	9	Sattar, Ahmed Abdel	USA United States	Jhadist	1960	Egyptian
<input type="checkbox"/>	US89	89	Aref, Yassin M.	USA United States	Jhadist	1971	Kurdish
<input type="checkbox"/>	US88	88	al Dahab, Khalid Abu	USA United States	Jhadist	1963	Egyptian
<input type="checkbox"/>	US87	87	Taheri-azar, Mohammed Reza	USA United States	Jhadist	1984	Iranian
<input type="checkbox"/>	US86	86	Phanor, Stanley Grant	USA United States	Jhadist	1975	Afro-Caribbean

By country: All, AUT Austria, AUS Australia, BEL Belgium, CAN Canada, DNK Denmark, FIN Finland, FRA France, DEU Germany, GRC Greece, INT International, IRL Ireland, ITA Italy, LUX Luxembourg, NLD Netherlands, NZL New Zealand, NOR Norway, PRT Portugal, ESP Spain, SWE Sweden, CHE Switzerland, GBR United Kingdom, USA United States, (None)

Figure 35. Database view

**Relational Database:**

A relational database is an efficient means of storing a large dataset and uniting a database comprised of qualitative and quantitative data. Complicated searches can be carried out quickly, and the format eliminates the need to store redundant data characteristic of traditional spreadsheet formats.

The database view (Figure 35) lets the user search through and view all the available data. One of the features of the Django web framework is the built in administration tool, which allows for direct editing of models stored in the database. Third party libraries extend the function of the admin tool to allow for user tracking, auditing, revision history, and other functionality as needed.

The relational database model allows the data to be accessed and manipulated through a web framework, as opposed to multiple distributed excel files. The specific implementation we have chosen is Django, a web framework written in Python designed to be robust and secure. This web implementation allows for the data to be secured on Brandeis servers and only allowed for whitelisted users, while still being able to be managed in one place and edited by multiple people. This also allows the project to be built upon many already built and reliable open source web plugins, including those for revision history, analytics, data export, and more.

DATA & TOOLS

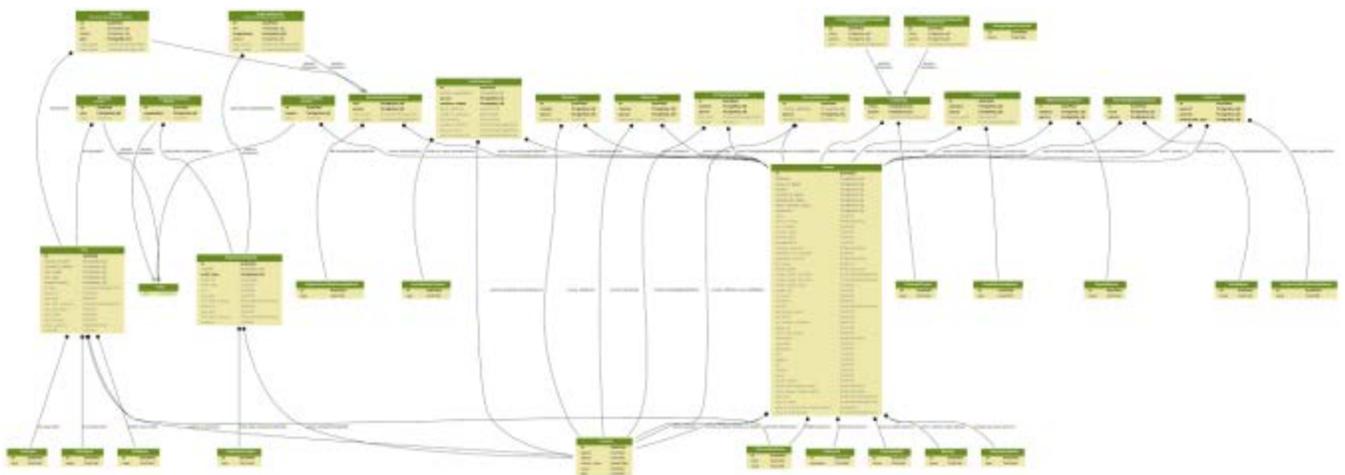


Figure 36. Map of database logic

Figure 37. Network Sociograms From Data Collection



Publications:

- Eliane Tschaen Barbieri and Jytte Klausen, Al Qaeda's London Branch: Patterns of Domestic and Transnational Network Integration, *Studies in Conflict & Terrorism*, Vol. 35, Iss. 6, 2012. (DOI:10.1080/1057610X.2012.675551)
- Jytte Klausen, "They're Coming. Measuring the Threat from Returning Jihadists." *Foreign Affairs*, October 1, 2014. (<http://www.foreignaffairs.com/articles/142129/jytte-klausen/theyre-coming>)
- Jytte Klausen, "Tweeting the Jihad: Social Media Networks of Western Foreign Fighters in Syria and Iraq." *Studies in Conflict & Terrorism*. January 2015. (<http://www.tandfonline.com/doi/pdf/10.1080/1057610X.2014.974948>).
- Jytte Klausen, Tyler Morrill, and Rosanne Libretti, "The Terrorist Age-Crime Curve: An Analysis of American Islamist Terrorist Offenders and Age-Specific Propensity for Participation in Violent and Non-Violent Incidents." Forthcoming in "Terror, Trauma, Memory: Special Issue Dedicated to the 20th Anniversary of the Oklahoma City Bombing," *Social Science Quarterly*. December 2015.

DATA & TOOLS

## Labels and Measures for Popular Hashtags from Nigerian Twitter Users, 2014

Principal Investigator: Michael Macy, Cornell University

The data described below were generated through the Minerva project “*Tracking Critical-Mass Outbreaks in Social Contagions*” described on page 80.

### Hand-labeled Popular Hashtags from Nigerian Twitter Users in 2014

**Resource Point of Contact:** Vladimir Barash, vlad.barash@graphika.com

**Production Date:** Data ready for release Fall of 2015; early access by government possible

This dataset includes forty-two Twitter Hashtags used by Nigerian Twitter users in 2014. A Hashtag is a string that describes the topic of a Tweet, or post to the Twitter microblogging service. The Hashtags in this dataset were used by at least 1000 users in 2014.

For each Hashtag, the dataset includes some basic descriptive statistics: time of initial tweet, total tweets that included the Hashtags in our data frame, total users that used the Hashtag in our data frame, a brief note about the topic the Hashtag refers to. The dataset also includes four codes for each Hashtag: whether it is initially related to an event that is being covered by mainstream news media; whether the Hashtag refers to a social or commercial campaign (e.g. social justice or viral marketing); whether the topic of the Hashtag has a social or political aspect (social movements, demonstrations, calls for systemic change); and whether sharing the Hashtag is risky, from the perspective of the coder. For the purposes of this dataset, risk is defined as material (risk to life or livelihood), emotional (risk of harassment or stalking), or social (risk of losing face or social capital). The dataset also includes comments explaining the particular choice of codes for each Hashtag. The Hashtags were coded by one user, and we intend to add additional codes in the future.

#### **Related materials:**

“Correlations with Complex Contagion Theory in Nigerian Hashtags”: submitted to Special Issue of SNAM on Diffusion of Information and Influence in Social Networks, August 2015.

## Aggregated contagion-related measures for popular Hashtags from Nigerian Twitter users in 2014

**Resource Point of Contact:** Vladimir Barash, vlad.barash@graphika.com

**Production Date:** Data ready for release Fall of 2015; early access by government possible

This dataset includes forty-two Twitter Hashtags used by Nigerian Twitter users in 2014. A Hashtag is a string that describes the topic of a Tweet, or post to the Twitter microblogging service. The Hashtags in this dataset were used by at least 1000 users in 2014. All statistics for these Hashtags are computed over the first 21 days of "significant usage." Significant usage is defined to be the first twenty-four hour period in which at least ten tweets in the dataset include the tag and at least three individuals use the tag.

For each Hashtag we include: total tweets that included the Hashtags in our data frame, total users that used the Hashtag in our data frame, and a number of measures that contribute information about how likely the Hashtag is to be a part of a social movement spreading internally within the network of Nigerian Twitter users versus part of a movement or news item best explained by phenomena outside of either Twitter or the geographic user set. Specifically, we track the fraction of users who started using the Hashtag after 0, 1, and 2 of their friends had done so; a measure of the density of the network among the initial users of the Hashtag; and the average daily percent users who began using the Hashtag before any of their users had.

This resource comes with a README file that includes detailed descriptions of all measures recorded for each Hashtag.

### **Related materials:**

Correlations with Complex Contagion Theory in Nigerian Hashtags: submitted to Special Issue of SNAM on Diffusion of Information and Influence in Social Networks, August 2015

## Databases for Quantifying Structural Transformation in China

David A. Meyer, UC San Diego, dmeyer@math.ucsd.edu

The following data sets are associated with the project “*Quantifying Structural Transformation in China*” described on page 85.

### Partially Ranked Lists of Chinese Communist Party Central Committee Members: 1<sup>st</sup> through 18<sup>th</sup> National Party Congresses

**Production Date:** These data have been submitted for inclusion in the Harvard Minerva Dataverse.

#### Resource description:

This is a partially ranked dataset on members and alternates of the Politburo Standing Committee, Politburo, and Central Committee for the 1<sup>st</sup> through 18<sup>th</sup> Congresses of the Chinese Communist Party (CCP). Our primary sources include documents provided by *People’s Daily Online* and Wolfgang Bartke’s *Biographical Dictionary and Analysis of China’s Party Leadership 1922–1988*.

*People’s Daily Online*, a state-owned media outlet, publishes news as well as a number of documents detailing party history and the composition of top political bodies in the CCP. We refer to a subset of these documents to create our partially ranked dataset of leaders. We provide the links, PDF files, and Pinyin transliteration of titles corresponding to each *People’s Daily Online* document used to construct the partially ranked lists.

In these partial rankings, ties reflect lack of information. Thus for recent Central Committees, the members of the Politburo who are not in the Politburo Standing Committee are all listed with the same rank since their true ranks are not released by the Chinese Communist Party. For Central Committee alternates, who have been listed in ballot order in recent years, with members with equal numbers of votes listed in “stroke order”, we have assigned different ranks only when the ordering is *not* by “stroke order”.

This seems to be the most complete listing available outside China.

#### Related materials:

David A. Meyer, Megha Ram, Greg Shaw and Laura Wilke, “Circulation of the élite in the Chinese Communist Party”, UCSD preprint (2014).



## Resources for Measuring and Modeling State Fragility

Principal Investigator: **Jonathan Moyer**, [jmoyer@du.edu](mailto:jmoyer@du.edu)

**Barry Hughes, Erica Chenoweth, Cullen Hendrix, Oliver Kaplan, and Timothy Sisk**

University of Denver's Josef Korbel School of International Studies

Government Program Officer: Marvin Kruger, Office of Naval Research

The data and tools described below have been and will be generated through the Minerva project "*Taking Development (Im)Balance Seriously: Using New Approaches to Measure and Model State Fragility*" described on page 88.

### Major Episodes of Contention (MEC) dataset

**Resource Point of Contact:** Erica Chenoweth, [Erica.Chenoweth@du.edu](mailto:Erica.Chenoweth@du.edu)

**Production Date:** August 2016

The MEC data project identifies the onsets and outcomes of contentious episodes, as well as additional variables for each episode, globally from 1946–2014. The episodes are classified according to size, reformist vs. maximalist goals, and level of observed coordination. This allows for more differentiation between like and unlike episodes, which we classify into two categories: reformist campaigns and maximalist campaigns. Reformist campaigns are those in which we observe evidence of multiple contentious events with more than 1,000 observed participants occurring in a coordinated (e.g. non-spontaneous fashion) toward a reformist goal. A maximalist campaign has the identical criteria, but the goal is either for the overthrow of the incumbent government, territorial secession, or independence from a colonial power or foreign occupier. For both types of episodes, events must last longer than one week and have more than 1,000 observed participants.

A campaign is defined as a series of observable, continuous, purposive mass tactics or events in pursuit of a political objective. Tactics used are overt, continuous, coordinated, and sustained—meaning the contentious episode consists of multiple linked events per week for at least one week—and last anywhere from weeks to years, distinguishing it from one-off events or riots. Campaigns are also purposive, meaning that participants are consciously acting with a specific objective in mind, such as expelling a foreign occupier or overthrowing a domestic regime. Campaigns have discernable leadership and often have names, distinguishing them from random riots or spontaneous mass acts. Campaigns usually have distinguishable beginning and end points, as well as discernable events throughout the campaign.

When a campaign relies primarily on nonviolent methods—which do not physically harm or threaten to harm the opponent—as opposed to violent or armed tactics, which do physically harm or threaten to harm the opponent—we characterize the campaign as nonviolent. Campaigns where some violence occurred but it was judged to be incidental to the larger nonviolent contention, we coded that campaign as having a radical flank. Campaigns where a significant amount of violence occurred are characterized as “violent.” A dichotomous variable is included in the dataset to indicate whether a violent campaign was occurring independently from but simultaneously to a nonviolent campaign. This provides a way to assess the effects of

simultaneously occurring violent campaigns on the outcomes of nonviolent campaigns.

We also differentiate between the extremity of the contentious episode's goals. Campaigns are coded as "reformist" when their goals can be achieved through policy changes short of the total removal of the incumbent leadership or territorial independence. Maximalist goals are those that explicitly call for the removal of the incumbent government, territorial independence, or the expulsion of a foreign occupation. We code this as maximalist because they cannot be achieved without fundamentally re-ordering the system.

The data differ from existing databases on protest in mobilization in several important ways. First, the unit of analysis is the episode (campaign) rather than the event (protest). This is akin to identifying and analyzing wars rather than individual battles. Second, the data depart from prior campaign-level databases through different source materials and more reliable validation procedures. For instance, the *Nonviolent and Violent Campaigns and Outcomes* database--the other database with globally-available data of this kind--relies on a consensus collection and verification method. For the MEC data, the sampling strategy is based on open-source news reports and information gathering rather than identifying a consensus sample.

Case selection followed a three-step process. First, researchers identified a candidate case in Banks (2013). Bank's dataset includes variables that identify events of contention, including riots, strikes, revolutions, government crises, and nonviolent collective action, with a country year serving as the unit of observation. If any nonviolent collective action was identified in Banks (2013) for a country year, the case became a candidate for inclusion in the MEC database.

Second, to ascertain whether the candidate case surpassed the threshold for inclusion in MEC, researchers turned to Regan (2012) and Hendrix and Salehyan (2012) to evaluate every contentious event within the year indicated by Banks to identify key inclusion variables, including that the episodes lasted for more than a week, had more than 1,000 participants, and had maximalist goals.

Third, after confirming a case inclusion with each of the databases, researchers used Factiva to collect news stories within the identified campaign date range for two reasons: (1) to verify inclusion in MEC; and (2) to gather data needed to code additional variables. The Factiva search relied on Agence France Press and Associated Press news wires and involves consistent search parameters.

There were rare instances where the Banks data would identify a contentious country year that was not observed in Regan (2012) and Hendrix and Salehyan (2012). In such cases, researchers would move directly to a Factiva search, entering the entire year range for Bank's observation (e.g. 01/01/2007 – 12/31/2007).

Finally, researchers performed verification checks on country years where neither Banks nor Regan identified any relevant cases. We did this by performing basic Factiva searches with the aforementioned key words. This process identified some candidate campaigns, which were then

investigated through the Factiva process. This not only revealed at least several important overlooked cases, but also served to verify the reliability of the Banks (2013), Regan (2012), and Hendrix & Salehyan (2012) data sets.

**Related materials:**

Maximalist campaigns analyzed as the dependent variable in the following publication: Erica Chenoweth and Jay Ulfelder, 2015. “Can structural conditions explain the onset of nonviolent uprisings?” *Journal of Conflict Resolution* (forthcoming); proofs available [online](#).

**Resource utilization**

The Political Instability Task Force<sup>27</sup> is jointly funding the data collection. However, other than the paper above (which only includes the maximalist data), the data are not yet publicly released. They will be available when all of the reformist and maximalist campaigns are complete.

**References**

- Banks, Arthur. 2013. *Cross-national time series data, 1955-2012*. Unpublished data set.
- Hendrix, Cullen and Idean Salehyan. 2012. *Social Conflict in Africa Database*. <http://www.scaddata.org/>. (Also described on page 176 in this compilation.)
- Regan, Patrick. 2012. *Protest and State Response Data*. Unpublished data set.

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<sup>27</sup> See [https://en.wikipedia.org/wiki/Political\\_Instability\\_Task\\_Force](https://en.wikipedia.org/wiki/Political_Instability_Task_Force), accessed August 26, 2015.

### DataGator Data Aggregator

**Resource Point of Contact:** Jonathan D. Moyer – [jmoyer@du.edu](mailto:jmoyer@du.edu)

**Resource URL:** <http://data-gator.com/>

**Production Date:** Beta version available March 2016. Users initially restricted to .edu and .gov/.mil email addresses.

The DataGator is a web-based data manipulation/aggregation tool that allows users to upload data and create/export new series for quantitative analysis drawn from other historical data from academic research and international organizations. The tool allows for the interaction and integration of heterogeneously structured data (across spatial and temporal dimensions) through a universal concordance table (including various units of analysis). A beta version of the tool will be available for public use in March 2016. It is currently being used for data management and transformation for this funded research.

DataGator incorporates both custom-made and third-party technologies. The backend services of DataGator are built upon django, redis, and several Amazon AWS services including RDS and S3. The front-end UI is an AJAX (AJAJ) web application based on bootstrap, jquery, and mathjax. In addition to the capability to perform data transformations directly on the web, the program also uses a desktop tool to import data in various file types including: .xls, .xlsx, .csv, .txt and .mdb. Users can also export data in .xlsx or .json format.

### International Futures tool

**Resource URL:** <http://ifs.du.edu>

**Production Date:** Currently available for open source use. Extended representation of state fragility driven by developmental imbalances available in 2017.

International Futures (IFs) is a tool for thinking about long-term country-specific, regional, national, and global futures. IFs integrates forecasts across different sub-models, including: population, economy, agriculture, education, energy, sociopolitical, international political, environment, technology, infrastructure, and health. These sub-models are dynamically connected, so IFs simulates how changes in one system lead to changes across all other systems. Download the open source tool for free: [pardee.du.edu](http://pardee.du.edu).

IFs leverages historical data (over 3,000 historical series), identifies and measures trends, and models dynamic relationships to forecast hundreds of variables for 186 countries for every year from 2010 to 2100. IFs is used to help understand dynamics within and across global systems, thereby allowing users to think systematically about potential futures as well as development goals and targets. There are three main avenues for analysis in IFs: historical data analysis (cross-sectional and longitudinal), Current Path analysis (where systems seem to be developing), and alternative scenario development (exploring if-then statements about the future). It should be understood that no software can predict the future.

#### **Related materials:**

Hughes, Barry B., Devin Joshi, Jonathan D. Moyer, Timothy Sisk, and Jose Solorzano. *Improving Global Governance*. Vol. 5. Patterns of Potential Human Progress. Pardee Center for International Futures, University of Denver: Paradigm Publishers and Oxford University Press, 2014.

## Terrorist Alliance Database

**Philip Potter**, University of Michigan, pbkp@umich.edu

**Erica Chenoweth**, University of Denver; **Michael Horowitz**, University of Pennsylvania

Government Program Officer: Marvin Kruger, Office of Naval Research

The data and tools described below have been and will be generated through the Minerva project “*Terrorist Alliances: Causes, Dynamics, and Consequences*” described on page 91.

Recent scholarship challenges the image of the individual terrorist as a “lone wolf,” suggesting few terrorists truly exist in isolation. The same is true of terrorist groups. Examples from around the world suggest that alliances between terrorist groups represent the rule much more than the exception. Such alliances can enhance the capabilities of the linked groups. When and how do terrorist groups ally with one another, states, and other non-state actors?

Unfortunately, answering that question is difficult because there is no comprehensive, time series data on terrorist alliances, and little systematic academic work addressing their causes and consequences. But understanding these alliances is vitally important for those interested in US security and counter-terrorism strategy. Intelligence organizations around the world already attempt, at the micro-level, to map networks of terrorists within groups like Al Qaeda. We believe that a clearer understanding of the relationship between organizations will also yield significant benefits for those interested in reducing the capacity of these groups to inflict harm.

### Methodology:

We began our dataset construction by generating a list of all terrorist groups known to exist from 1945-present. We are now in the process of identifying and coding the attributes of the relationships among these organizations including 1) the onset of collaboration; 2) the type of collaboration (material, training, ideological/inspirational, or intelligence); and 3) the termination of collaboration. We will then merge that into data on the activities of terrorist groups to understand the consequences of terrorist alliances for group behavior.

We have adopted a three-tiered data-collection strategy. First, we turn to content analysis of publically available media and scholarly sources to document the validity of these alliances described by prior research and identify alliances missed by prior data collection efforts. Relying primarily on encyclopedia, open source news reports, and declassified intelligence documents, we will also gather all available information on the genesis and decline of these relationships so that we can add the time series element to the data, which is entirely absent from existing studies but is crucial for any work that hopes to make causal inferences. Second, because linkages between many groups are difficult to identify and track over time, we will poll terrorism experts and generate a reliability score for each alliance relationship we identify. Third, we will conduct interviews with experts who have particular expertise in certain groups and regions.

In a parallel process, we are using the same sources to develop brief case studies of each collaborative relationship. These case studies will both include what is known about the nature of the alliance and document the evidence that we have uncovered. The result will be a degree of transparency that is unusual in social science datasets. Qualitative analysis will further establish the motivations behind terrorist alliances, the processes that give rise to them, and the direction of the causal arrows in terms of the relationship between alliance and capability.

**Anticipated Research Products:**

1. A data set, which we will make publicly available.
2. An interactive website containing the dataset, animations of relationship formation over time, a resource bibliography, and profiles on each terrorist group alliance.
3. Additional refereed articles explaining the rise and decline of terrorist group alliances based on our analysis of the data and case studies. These articles will include:
  - A paper on the founding of terrorist alliances, based on our new dataset.
  - A methodological paper on the design of the study of terrorist alliances.
  - A paper on factors that influence the end of terrorist alliances. This paper should be of particular interest to the Department of Defense since it will explore strategies that states have used to disrupt relationships between groups and the success and failures of those various strategies
  - An additional paper on the consequences of terrorist alliances. This paper will build on existing work by the co-principle investigators and study how these alliances lead to the diffusion of terrorist attacks and impact the lethality of terrorist groups.
  - A book bringing together the papers described above and including in-depth case studies and network maps of the terrorist alliance universe.

## Maritime Piracy Event and Location Datasets

**Brandon C. Prins**, University of Tennessee, bprins@utk.edu  
and **Ursula Daxecker**, University of Amsterdam

*Government Program Officer: Martin Kruger, Office of Naval Research*  
<http://brandonprins.weebly.com/minervaresearch.html>

The data and tools described below have been and will be generated through the Minerva project “*Political Reach, State Fragility, and the Incidence of Maritime Piracy: Explaining Piracy and Pirate Organizations, 1993-2015*” described on page 93.

### Global Piracy Incidents Data Project

**Production Date:** October 1, 2014

The GPI database records information on maritime piracy incidents at the incident, month, and year level. This country-year level dataset includes year counts on maritime piracy attacks in every littoral country from 1995-2013. We also include societal, economic, political, and resource information for each littoral country by year. This dataset enables researchers to test conjectures about the structural drivers of modern maritime piracy while controlling for important country-level characteristics. We are currently building country-month datasets that should enable researchers to evaluate trends in maritime piracy in individual countries and forecast piracy incidents several months into the future.

#### Resource utilization:

- **Researchers** exploring the drivers of maritime piracy and or intrastate conflict will find these data useful in testing theoretical conjectures.
- **Policymakers** interested in trends in piracy along with others forms of political conflict may find these data helpful.

### Maritime Piracy Event & Location Dataset

**Production Date:** August 1, 2014

This MPELD data project geo-codes and maps maritime piracy incidents from 1993-2014. Reports from the International Maritime Bureau are the basis of these data. The database includes information on the location of the attack, the day and time, whether the vessel was stationary or steaming, and information on the attacked vessel. Users of the database can filter by country and or by year. The database will be continually updated as new reports are produced. We also are carefully checking the data by comparing IMB reports with IMO and ASAM data collection efforts. The data are currently available in Excel and GIS Shapefile formats from the website listed above.

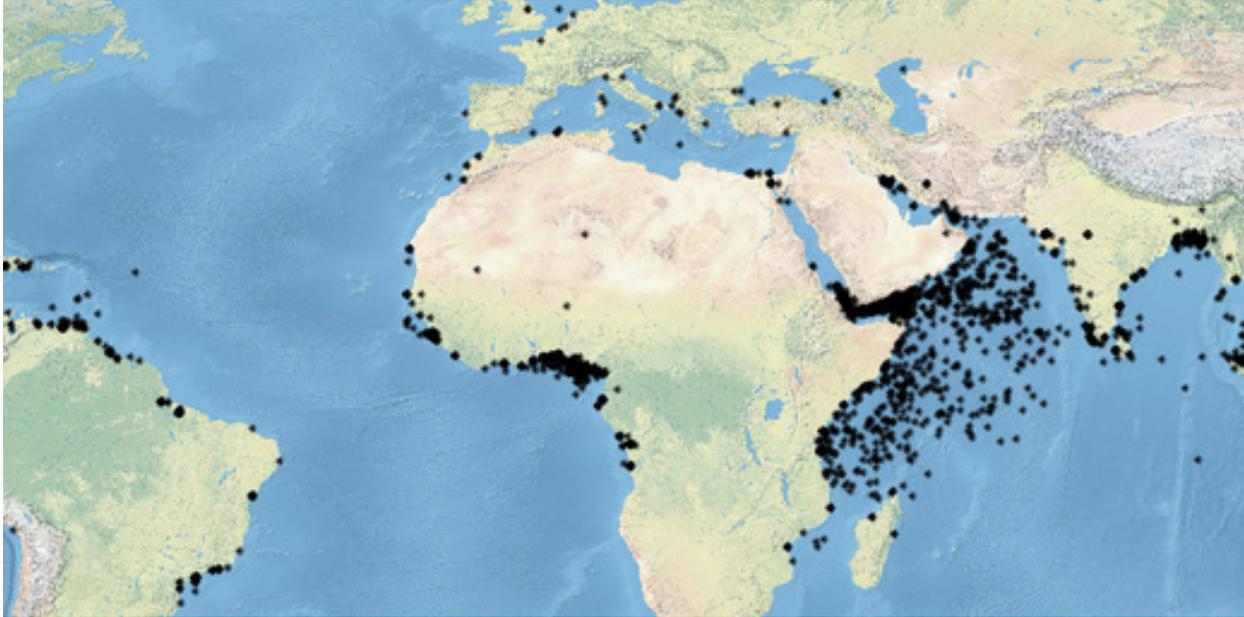


Figure 38. Screenshot from MPELD tool

**Related materials:**

- Maritime Piracy Event & Location Dataset November 2014 Report: Focus on Piracy in Indonesia and the Philippines.
- Maritime Piracy Event & Location Dataset March 2015 Report: Focus on Piracy in Greater Gulf of Aden.
- Maritime Piracy Event & Location Dataset June 2015 Report: Focus on Piracy in the Americas.
- Maritime Piracy Event & Location Dataset June 2014 Report: Focus on Piracy in Sub-Saharan Africa. [[link](#)]

**Resource utilization:**

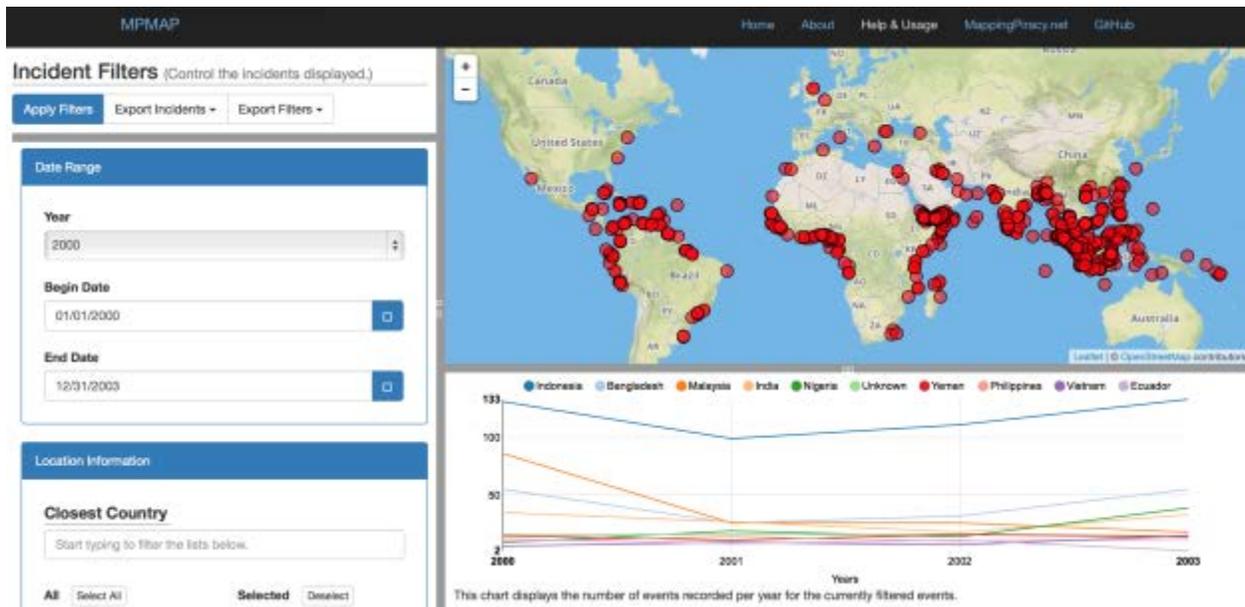
Scholars interested in spatial analyses of maritime piracy will find these data useful. Also, policymakers interested in over-time trends in the location of maritime piracy and visually displaying these data and trends using maps will find this dataset useful. Once the project review of the IMO and ASAM datasets is complete, **this will be the only comprehensive datafile on maritime piracy existence.**

## Maritime Piracy Mapping Application

**Resource URL:** <http://mpmap.mappingpiracy.net/#/map>

**Production Date:** Still in development

MPMAP is an online portal for mapping maritime piracy incidents. The incidents come from the Maritime Piracy Event & Location Dataset (MPELD). Reports from the International Maritime Bureau, IMO, and ASAM are the basis of these data. The online application will allow users to filter by year, closest country, territorial water status, vessel flag, vessel type, and vessel status, as well as by characteristics of the incidents themselves. The database will be continually updated as new reports are produced.



### Resource utilization:

Scholars interested in spatial analyses of maritime piracy will find these data useful. Also, policymakers interested in over-time trends in the location of maritime piracy and visually displaying these data and trends using maps will find this dataset useful. Users can filter by month and year as well as by country and may find drilling down into countries, years, and incidents useful.

## Empirical Studies of Conflict website and data sharing

**Principal Investigator:** Jacob Shapiro, Princeton University, [jns@princeton.edu](mailto:jns@princeton.edu)

**Resource Point of Contact:** Kristen Seith, [kseith@princeton.edu](mailto:kseith@princeton.edu)

**Production Date:** available online now, open access

<http://esoc.princeton.edu>

The investigators of the Minerva “*Terrorism, Governance, and Development*” (TGD) grant (see page 98) maximized the investment by the Department of Defense by establishing a research network called the Empirical Studies of Conflict project (ESOC). By combining the resources of the TGD grant with other funding and a broader network of interdisciplinary researchers, ESOC has declassified or otherwise collected data on more than 1,000,000 discrete geo-located incidents of violence in ten wars over seven countries in conflict since 1950. The project has produced 95 original datasets building on these data and other sources, including: precise information on aid spending in five conflicts; surveys of more than 225,000 respondents across five countries; intelligence flows to government forces in three; insurgent payments to thousands of individual fighters in one; interviews with thousands of surrendered rebels in one; and government force levels over time and space in four. The result is a data compilation that is unprecedented in its depth of objectively-measured information about the dynamics of armed conflict in the modern world. And the collection is growing all the time.

Many of these data (GIS and tabular format), publications, and working papers are available at the Empirical Studies of Conflict project’s (ESOC) website: <http://esoc.princeton.edu>. To date the website focuses on seven countries (Afghanistan, Colombia, Iraq, Mexico, Pakistan, the Philippines, and Vietnam) and includes the following:

- 38 GIS datasets for download
- 20 tabular datasets for download
- Over 60 publications and 20 working papers
- Over 50 links to external archives/data sources/data repositories relevant to ESOC research

### Related materials:

The publications on the ESOC website have collectively been cited more than 2,400 times according to the google scholar account, where they are tracked:

<https://scholar.google.com/citations?user=bqKSAqEAAAAJ&hl=en>

### Resource utilization

We have been informed that professors outside of our team have used data on the website for classes.

## Natural Resources, Transnational Crime, and Armed Conflict

**Resource Point of Contact:** James Igoe Walsh, Principal Investigator, [jwalsh@uncc.edu](mailto:jwalsh@uncc.edu)

The data and tools described below have been generated through the Minerva project “*Natural Resources, Transnational Crime, and Armed Conflict*” described on page 111.

### Natural Resource Exploitation and Armed Conflict Dataset

**Production Date:** 2016; early access by government is welcome

Data in armed group-year format for period 1990-2012 measuring degree to non-state violent actors earn income from extorting, stealing, or smuggling natural resources.

The dataset measures exploitation by armed groups of over two-dozen natural resources, including minerals (such as gold, alluvial diamonds, cassiterite), drugs (opium), valuable agricultural products (timber, cocoa), and high-value animal products (ivory). It also measures the manner in which armed groups profit from each of these resources through the extortion of producers, systematic theft and looting of the resources, and smuggling across international borders.

This disaggregation should allow researchers to determine if particular resources, types of resources, or resource values impact armed conflict duration, severity, and outcomes. It also permits analysis of how variation in the manner in which the group earns income from these resources influence its behavior. The individual resource columns can be easily combined to create theoretically-informed variables for analysis, for example by aggregating all profits from drugs or oil or animals.

Data is coded from text sources. We utilize two teams of coders who rely on different sources of information. One team uses media reports alone, while another relies on a range of sources, including United Nations reports, academic publications, reports by human rights and other non-governmental organizations, and specialized publications focused on particular regions or resources.

The dataset includes armed groups listed in the Uppsala Conflict Database, which includes those involved in conflicts that produce at least 25 battle deaths per year. Our project measures exploitation of resources by these groups for all years in which they exist. This expansion is important because it allows us to determine if profiting from natural resources allows armed groups to increase their combat effectiveness over time.

### Transnational Crime and Armed Conflict Dataset

**Production Date:** 2016; early access by government is welcome

Data in armed group-year format for period 1990-2012 measuring degree to which group earns income from crimes including piracy, smuggling, illegal taxation and extortion, kidnapping, and other crimes not involving natural resources.

The structure, coverage, and data collection processes for this dataset are similar to those used in the Natural Resource Exploitation and Armed Conflict dataset described above. When combined, these two datasets will provide a comprehensive picture of the degree to which armed groups earn income from illicit activities.

## Natural Resource Locations in Africa Dataset

**Production Date:** 2016; early access by government is welcome

This dataset provides comprehensive information about individual natural resource locations, such as mines or oil fields, in Africa. Data is collected from the United States Geological Survey’s annual country reports. It includes the name of the resource location, the minerals extracted at the location, the location’s geographic coordinates, estimates of the amount produced and the value of this production each year, and other variables.

The dataset will provide researchers with one of the most comprehensive collections of information on natural resources in Africa. In addition to its comprehensive scope, a key advantage of the dataset is that, unlike similar datasets developed for sale to corporate clients, will be freely-available to researchers. The dataset should be of value to researchers in a wide range of fields, including those with specific interests in environmental protection, local and national economic development, foreign assistance, and transportation fields.

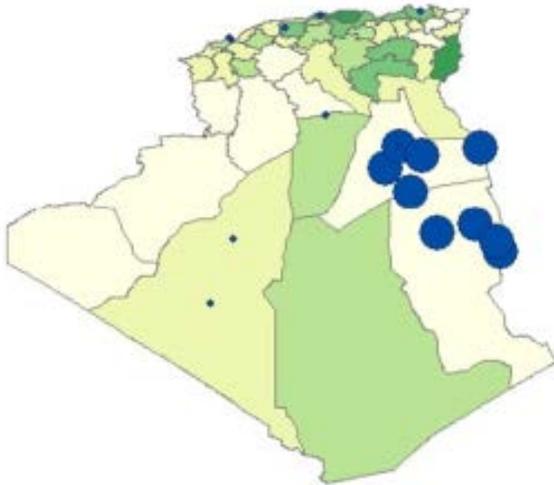


Figure 2.2 Fatalities per province

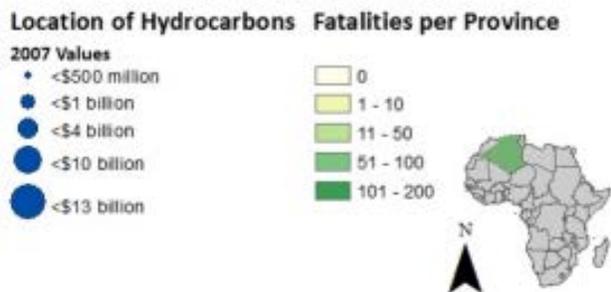


Figure 39. Locations of oil and gas output and fatalities from political violence per province in Algeria in 2007

This dataset can also be combined with other geo-located data to generate insights and to test hypotheses. Consider Figure 39, which maps the location of oil and gas output and fatalities from political violence per province in Algeria in 2007. Provinces where most revenues from oil and gas are generated in the south and east of the country experience little violence. Instead, violence concentrated in more populous provinces along Mediterranean coast.

## Territorial Control and Armed Conflict Dataset

**Production Date:** 2016; early access by government is welcome

Case studies and theory suggest that conflict over control of territory influences the political and military strategies of state and non-state armed groups. This dataset is the product of a methodology for collecting such data for conflicts in sub-Saharan Africa from 1989 to 2010, to combine information on territorial control with spatial data on terrain, population locations, transportation networks, and natural resources, and to use this to assess how variations in territorial control influence VNSA behavior. It measures territorial control based on events data recording which warring part initiated an attack and which party controlled the location of engagement after combat ends.

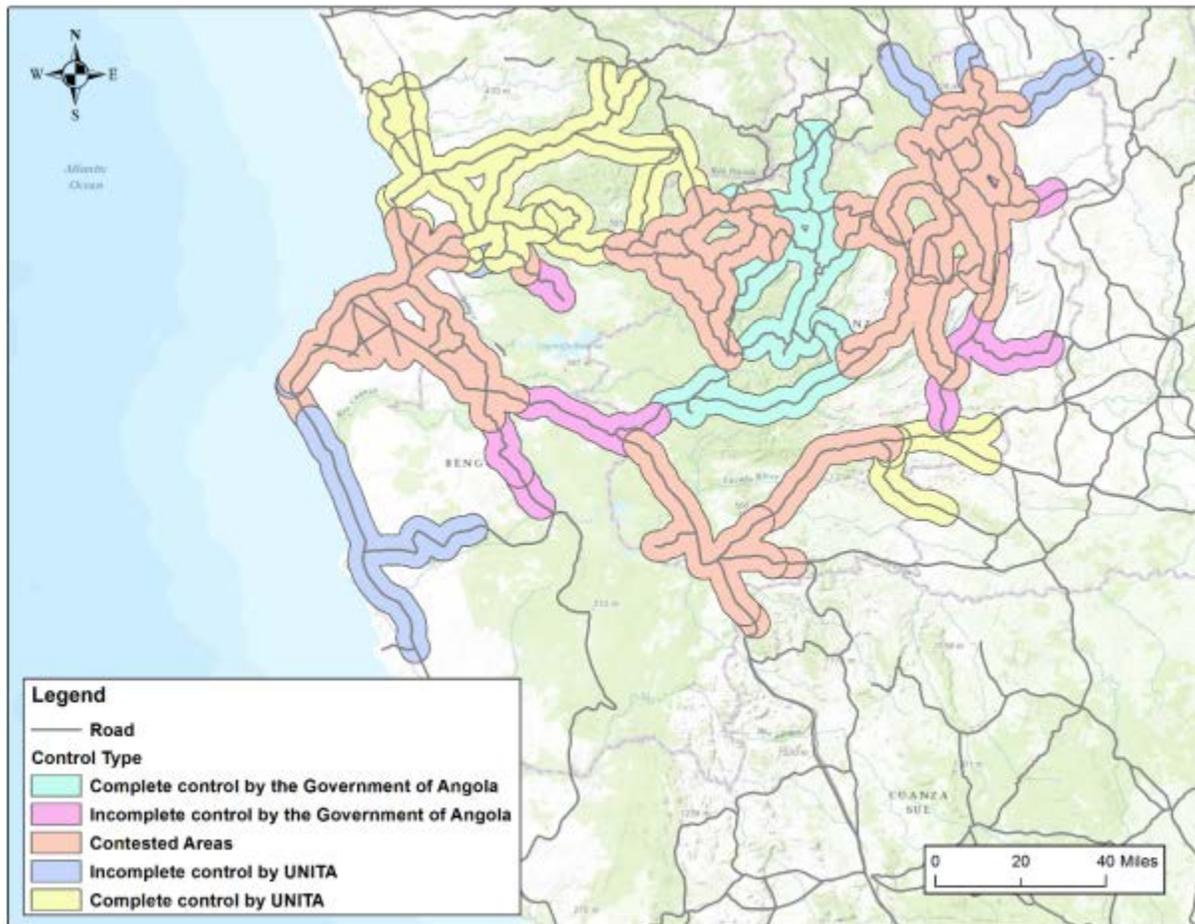


Figure 40. Preliminary data measuring control of territory in western Angola by government forces and UNITA rebels in 1992 and 1993.

The end result will resemble **Figure 40**, which measures control of territory in western Angola by government forces and UNITA rebels in 1992 and 1993. The dataset will record the specific locations controlled by each warring party over time, variation in the degree of control, and the amount of surrounding territory than can be plausibly assumed to be under the influence of each armed group given information about geographic features, road networks, and travel times. This data can also be easily aggregated up the group-year or country-year level to permit integration with data on other characteristics of the conflict.

## Topic Modeling Tools

**Resource Points of Contact:** Leah Windsor; [Leah.Windsor@memphis.edu](mailto:Leah.Windsor@memphis.edu)

and Zhiqiang Cai, [zca@memphis.edu](mailto:zca@memphis.edu)

**Resource URL:** <http://lac.cohmetrix.com>

The data and tools described below have been generated through the Minerva project “*Political Language and Crisis: A Computational Assessment of Social Disequilibrium and Security Threats*” described on page 114.

### Linguistic corpora for authoritarian leaders, social media and social movements

The table below lists data resources shared following linguistic analysis through Coh-Metrix<sup>28</sup>, LIWC<sup>29</sup>, and/or CAMEO<sup>30</sup> tools, several generated by the research team during the course of previous Minerva project “Modeling Discourse and Social Dynamics in Authoritarian Regimes” (led by Jeff Hancock of Cornell University).

Name	Location	Description
United Nations General Assembly Corpus	Harvard Dataverse Network	This corpus is comprised of speeches given by heads of state at the United Nations General Assembly annual general debate between the years 2004-2013 (N=1495). Coh-Metrix and LIWC variable values are provided by country-year.
Replication data for: The Language of Autocrats: Leaders’ Language in National Crises	Harvard Dataverse Network	This corpus is comprised of speeches given by Hosni Mubarak, Fidel Castro, and Mao Zedong and examines how their language changes in response to natural disasters. Both Coh-Metrix and LIWC values are represented in this corpus.
The Language of Populism in Venezuela: Hugo Chavez and Nicholas Maduro	Harvard Dataverse Network	This corpus is derived from the television series “Alo Presidente” that Hugo Chavez ran during his tenure as president of Venezuela. LIWC values (version 2001) using the original Spanish language are represented in the data (n=52).
North Korea State Media	Harvard Dataverse Network	This corpus is comprised of data from North Korean state media (N=100,864) between 1997 and 2015, covering the transition from Kim Jong Il to Kim Jong Un. Values for both Coh-Metrix and LIWC are represented.
North Korea Event Data	?	The Minerva Memphis project generated an event data set using the CAMEO coding procedure for political events affecting North Korea between 1997-2015. CAMEO code values rank events on a cooperation-conflict scale.
2014 Ebola Corpus	Harvard Dataverse Network	This corpus contains speeches from Barack Obama and Ellen Sirleaf Johnson as well as New York Times articles covering the Ebola crisis from 2014 (n=309). The corpus was analyzed using Coh-Metrix and LIWC.

<sup>28</sup> Coh-Metrix is a system for computing computational cohesion and coherence metrics for written and spoken texts, allowing researchers to instantly gauge the difficulty of written text for the target audience. See <http://www.cohmetrix.com/>.

<sup>29</sup> Linguistic Inquiry and Word Count (LIWC) calculates the degree to which people use different categories of words—positive or negative emotions, self-references, causal words, and 70 other language dimensions—across a wide array of texts. See <http://www.liwc.net/>.

<sup>30</sup> Conflict and Mediation Event Observations (CAMEO) is a framework for coding event data. See [https://en.wikipedia.org/wiki/Conflict\\_and\\_Mediation\\_Event\\_Observations](https://en.wikipedia.org/wiki/Conflict_and_Mediation_Event_Observations).

Name	Location	Description
The Language of Threats and Bluffs in International Politics	Harvard Dataverse Network	This corpus contains speeches classified as credible threats and bluffs from multiple countries and conflicts between 1970-2015. The data are directed dyads, where country A issues a threat against country B. Each speech has accompanying historical information and a description of key actors. The corpus was analyzed using Coh-Metrix and LIWC.
Syrian Civil War Events Data	Harvard Dataverse Network	The Minerva Memphis project generated an event data set using the CAMEO coding procedure for political events in the Syrian civil war for March-June 2012. CAMEO code values rank events on a cooperation-conflict scale.
Political Radicalization of Female ISIS Recruits	Harvard Dataverse Network	This corpus is derived from the blog posts of Aqsa Mahmoud, a young Muslim woman recruited to join ISIS (n=269), and was analyzed using both Coh-Metrix and LIWC.
The Language of Genocide in Rwanda	?	This corpus is derived from transcriptions of RTL (Radio Television Libre des Milles Collines) broadcasts (n=121) and from Kangura (n=90), a print publication. Both media sources endorsed hate speech and facilitated the 1994 genocide. The texts were analyzed using both Coh-Metrix and LIWC.

### Topic Modeling Evaluation Tool (TMET)

**Production Date:** February 2016

TMET is a tool newly developed to automatically optimize the number of topics based on Latent Semantic Analysis. This tool estimates the linguistic similarity of words within and between topic models to generate a cosine value showing the best model fit. Higher values reflect a better fit. Researchers are increasingly interested in modeling what international actors are talking about, but there is no consensus on how to select the appropriate number of topics to choose from. At present, topic number selection is both ad hoc and atheoretical. This tool helps to systematize topic number selection and make the process more transparent and replicable. It is currently in beta testing phase with proprietary corpora.

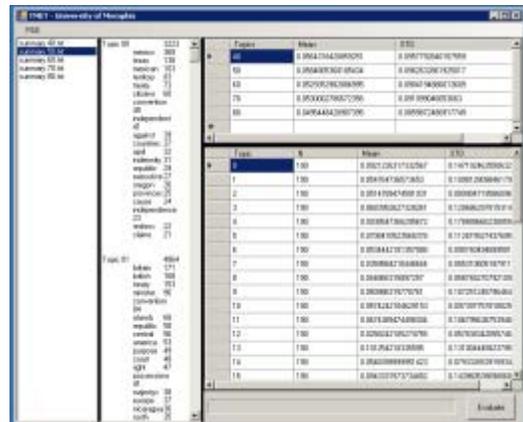


Figure 41. Topic Modeling Evaluation Tool

**Related materials:** Paper in progress analyzing state media from North Korea.

**Resource utilization:**

This tool will be useful for linguists, political scientists, and policymakers interested in optimizing the number of topics in a given corpora.

## Sensitive Data Encoder (SDE) Tool

**Production Date:** March 2015

The Sensitive Data Encoder was generated to encode personally identifiable information in corpora from the Conflict Records Resource Center at the National Defense University. While the original data include personally identifying information, potentially including names and locations of authors or individuals mentioned therein, the process of analyzing the texts with Coh-Metrix and LIWC generates numerical values that contain no lexical information that could provide reference to specific individuals.

**Related materials:** Publications in progress on Saddam Hussein and Al-Qaeda and associated movements from the Conflict Records Resource Center.

### **Resource utilization:**

The Sensitive Data Encoder would be useful for researchers from many disciplines, as well as from the government, who work with data having personally identifying information. Anyone using topic modeling with sensitive data would benefit from this tool.

## Latent Dimensions of Authoritarianism

Joseph Wright, Pennsylvania State University, jgw12@psu.edu

James Honaker, Harvard University

<http://dictators.la.psu.edu/>

The research “*Autocratic Stability During Regime Crises*” described on page 120 helps policy makers understand the influence of different foreign policy tools on the behavior of military and security organizations in dictatorships during periods of domestic unrest. It contributes to our knowledge of how foreign policy tools and domestic factors such as regime type and leadership-security ties interact to influence government repression and democratic regime change.

### Leadership Security Ties Data Base

**Production Date:** Spring 2016

The *Leadership-Security Ties* data base compiles information from historical case studies, news reports, and primary sources into a comprehensive list of the operationally independent military and security organizations in all dictatorships in the world from 1990-2015. The data contain a list of the leaders of these organizations and codes whether these organization leaders have a personal family or politically-relevant ethnic connection to the regime leader. We use this information on the leaders of military and security organizations to construct two new measures of the patrimonial security sectors. The first measures the extent to which the leaders of the security apparatus in dictatorships are connected to the regime leader through familial or ethnic ties. Because the data set identifies both the key security organizations that support a dictator and the names of the de facto leaders of these organizations, we also construct a measure of leadership turnover – or volatility – within the security apparatus.

The data will be publicly available in a time-series cross-section format, and will include:

- (1) A list of operationally independent military and security organizations in each year for each autocratic regime from 1990-2015;
- (2) The names of the leaders of these organizations;
- (3) A variable for shared (politically-relevant) ethnicity with the regime leader; and
- (4) A variable for directly family relationship (via blood or marriage) to the regime leader.

Each data cell links to a citation of a publicly available source for the information. The data page for each country also includes a link to a 2-4 page country study that details the difficult coding decisions and lists the references for the data.

Data collection for this project proceeds in three steps. First, coders are asked to read the case study literature on military institutions and security organizations in each country to identify the key operationally independent military and security organizations. Country-case study memos describe difficult coding decisions with respect identifying these organizations. Coders then record information on the organizations' names, the leaders of these organizations, and family and ethnic relations to the regime leader.

We then conduct a second round of coding in which we use an “actor list” for each country, which identifies the names of individuals and organizations in a particular country case, to conduct an automated search for articles and documents found in LexisNexus and Refworld.org. To facilitate human coding of these documents, we compile information from all the documents into one pdf file that contains the paragraphs in each document that mention a key word from the “actor list”. Human coders then read the

pdf file to verify existing information and fill-in missing data.

After the second round of data collection, we query country experts about the accuracy of the data from our initial collection efforts. The survey questionnaire will ask them to verify the names of the leaders of the military and security organizations as well as their family and ethnic ties to the regime leader.<sup>31</sup> It will also ask for additional source material and solicit open-ended feed-back. The experts will be contacted electronically and asked to provide information electronically on forms we have produced using Qualtrics survey software.

**Related materials:**

Thomas Brawner and Joseph Wright. “Introducing the Leadership Security Ties Data Base.” Paper presented at the 2014 Annual Meeting of the American Political Science Association (Washington D.C.)

### Latent Dimensions of Autocratic Rule

**Production Date:** Spring 2016

Research on autocratic regimes in comparative politics and international relations has burgeoned in the past two decades, and often uses categorical typologies of autocratic regimes to distinguish among different types of dictatorships. Building on advances in methods for estimating the latent dimensions of democracy, this project uses historical data on over 30 features of autocracies to estimate the latent dimensions of autocratic rule. The raw data consist of time-varying information on the relationships between autocratic leaders, their support parties, and their militaries. The raw data will be made publicly available with a code book describing the variables and coding criteria. All information in the data set will have links to citations of publicly-available sources.

We identify three time-varying dimensions of autocracy that correspond to ideal types theorized in previous research: party dominance, military rule, and personalism. We show that the dimensions of autocratic rule are orthogonal to commonly-used measures of democracy-autocracy; compare these dimensions to existing categorical typologies of autocratic regimes; and propose how this information can be structured as clusters. We then show the latent measures we construct perform as expected in an empirical model of autocratic regime breakdown. Finally, we show that while party dominance and military rule can be measured using existing data sets, the new time-varying measure of personalism is unique.

**Related materials:**

- Barbara Geddes, James Honaker, and Joseph Wright. 2014. “The Latent Characteristics That Structure Autocratic Rule.” Paper prepared for the 2014 Annual Meeting of the American Political Science Association (Washington D.C.)

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<sup>31</sup> The expert survey does not ask respondents to provide information about their own beliefs or behavior, and, more importantly, does ask them to subjectively assess or “rate” the concept on a predetermined scale. Instead, the respondents are asked to identify *objective* information and provide publicly-available sources to corroborate the information. Thus, our expert survey differs from surveys that either: (1) ask respondents to pairwise compare cases, for example, to assess the relative level of democracy or measure policy; or (2) ask respondents to subjectively assess the degree of a concept, such as democracy or party ideology.

## Minerva-Generated Resources for Academics and Policymakers

- Joseph Wright. 2014. “The Classification of Autocracies: A Principal Components Approach.” *APSA-Comparative Politics*. Volume 24, issue 1
- Barbara Geddes, Joseph Wright, and Erica Frantz. 2014. “Autocratic Breakdown and Regime Transitions: A New Data Set.” *Perspectives on Politics* 12(2): 313-331.
- Barbara Geddes, Erica Frantz, and Joseph Wright. 2015. *Autocratic Regimes*. Book manuscript under contract with Cambridge University Press.

## Minerva-Generated Curricula and Teaching Exercises

Many Minerva research efforts active in 2014-2015 have generated sharable teaching exercises and course curricula relating to their work along the way. Brief descriptions follow; reach out to the research team for more details.

### Multi-Source Assessment of State Stability (page 18)

PI: Kathleen Carley, Carnegie Mellon University, [kathleen.carley@cs.cmu.edu](mailto:kathleen.carley@cs.cmu.edu)

- New modules on network analysis and on simulating at-risk groups taught in classes at CMU.
- New metrics for assessing trust and identifying topic groups given high dimensional data.
- CASOS Summer Institute at CMU from 2014–2018 in June with training on new metrics.

### Climate Change and African Political Stability (page 21)

PI: Bobby Chesney, UT Austin

POC: Ashley Moran, [amoran@austin.utexas.edu](mailto:amoran@austin.utexas.edu)

Designed for use in military education institutes, CCAPS course modules provide background material, scenarios, and exploratory questions on issues related to climate change and national security, conflict management, disaster response, and the sociopolitical impacts of climate change. Course modules are available for download at [www.strausscenter.org/ccaps/publications](http://www.strausscenter.org/ccaps/publications).

CCAPS has also developed and taught eight graduate and two undergraduate courses on climate change and security, conflict management, disaster response, urban resilience, governance challenges in Africa, international adaptation aid, the sociopolitical impacts of climate change, and using GIS in social science research.

### The Evolving Relationship between Technology and National Security in China: Innovation, Defense Transformation, and China's Place in the Global Technology Order (page 25)

PI: Tai Ming Cheung, UC San Diego, [tcheung@ucsd.edu](mailto:tcheung@ucsd.edu)

- Fifth Summer Training Workshop on the Relationship Between National Security and Technology in China, La Jolla, California, August 4–10, 2014. Curriculum is available and shareable.
- One-day workshop on “New Insights into Chinese Defense Science, Technology, and Innovation,” jointly organized by IGCC and the School of Advanced International Studies, Johns Hopkins University, July 29, 2015.

**Explorations in Cyber International Relations** (page 28)

PI and POC: Nazli Choucri, MIT, [nchoucri@mit.edu](mailto:nchoucri@mit.edu)

The ECIR Project has created **5 new courses**: Curricula publicly available.

- **Cybersecurity Model Curriculum** Harvard's Berkman Center's tool providing resources with various elements of the course plans and "drag and drop" to create customizable syllabi.
- **Cyber Politics in International Relations**, MIT Political Science with participation from Computer Science and Management (on line)
- **International Relations Theory in the Cyber Age**, MIT Political Science (on line)
- **J-Term Course**, Harvard with all supporting materials.]
- **Cybersecurity and the Future of Cyberspace** MIT Department of Political Science, with participation from Sloan School and Computer Science.

**Deterring Complex Threats: The Effects of Asymmetry, Interdependence, and Multipolarity on International Strategy** (page 37)

PI: Erik Gartzke, UC San Diego, [egartzke@ucsd.edu](mailto:egartzke@ucsd.edu)

- Intro to Strategic Studies (UCSD IRPS 2014, 2015)
- Grand Strategy and Defense Policy (UCSD IRPS 2014, 2015)
- The Future of Cyberspace and the Future of War (U of Toronto 2016)
- The Impact of Technology on Grand Strategy (U of Toronto 2016)

**A Global Value Chain Analysis of Food Security and Food Staples for Major Energy-Exporting Nations in the Middle East and North Africa** (pg. 47)

PI: Gary Gereffi, Duke University, [ggere@soc.duke.edu](mailto:ggere@soc.duke.edu)

- Graduate level independent study: Food Security in the MENA and Black Sea Countries. Spring 2015. The objective of this independent study was to explore in greater detail the contributions of global value chain (GVC) analysis to food systems and food security discussions. The anticipated outcomes, upon completion, were: (i) a deeper understanding of how the GVC framework can contribute to our understandings and conceptualization of the food system; (ii) insights into how global, regional, and local firms participate in the agri-food system, especially with regards to critical grains, such as wheat and corn; and (iii) a more nuanced analysis of how the wheat and corn value chains operate through case studies of importers in the Middle East and North Africa (MENA) region and important suppliers to the region. Instruction was provided by Gary Gereffi, Ghada Ahmed and Danny Hamrick.
- Graduate and undergraduate student internships under the supervision of Ghada Ahmed and Danny Hamrick on food security and global value chains. Internship deliverables included developing a comprehensive list of global value chains actors and their activities in the chain and assist with developing case studies on priority countries in MENA and Black Sea regions.

**Dynamics of Sacred Values and Social Responsibilities in Governance and Conflict Management:  
The Interplay between Leaders, Devoted Actor Networks, General Populations, and Time** (pg. 53)

PI: Lawrence Hirschfeld, New School of Social Research

POC: Richard Davis, ARTIS Research, [rdavis@artisresearch.com](mailto:rdavis@artisresearch.com)

- Graduate Level Course by Scott Atran: “Terrorism & Apocalyptic Violence”, with Charles B. Strozier. John Jay College of Criminal Justice, CUNY.
- Professional Training Course by Richard Davis: “Building an NGO to be supported by the host population”. Prepared for the US Department of State.

**Aiding Resilience? The Impact of Foreign Assistance on the Dynamics of Intrastate Armed Conflict**  
(page 62)

PI: Paul Huth, University of Maryland

POC: David Backer, [dbacker@umd.edu](mailto:dbacker@umd.edu)

- An undergraduate course (*Geographies of Conflict and Development*) was organized in the Department of Government and Politics at the University of Maryland, enrolling 48 students during the Spring 2015 semester. The purposes included orienting the students in research on foreign aid and armed conflict, including available datasets and their applications. Assignments were undertaken in groups and focused on developing research topics; conducting data analysis; using mapping to visualize data; compiling profiles of patterns, trends and relationships of development aid and conflict events; and assembling work plans for data development during the Summer 2015. Related hands-on exercises were undertaken during class sessions. Instruction was led by David Backer and Paul Huth, with guest lectures provided by other members of the project team and other faculty from the Center for International Development and Conflict Management. A syllabus and sets of assignments and in-class exercises were designed for the express purpose of this course. All of these materials are available to share.
- Of the students enrolled in the course, 34 subsequently completed training to undertake geocoding of development aid projects as paid research assistants on the project. The training was conducted by two senior research assistants deployed from the AidData initiative at the College of William & Mary, supported by staff from AidData.
- Additional William & Mary undergraduate students have been trained by AidData on geocoding methodology, then worked as paid research assistants on this project. These students are part of a much larger group of 100+ William & Mary students who worked as research assistants for AidData on various tasks, including data development, for an assortment of internal and externally funded projects. These students are provided with additional opportunities for training on topics ranging from geographic information systems and professional networking. Training materials may be available to share on request.

**Quantifying Structural Transformation in China** (page 85)

PI and POC David Meyer UC San Diego, [dmeyer@math.ucsd.edu](mailto:dmeyer@math.ucsd.edu)

21<sup>st</sup> Century China Program, UC San Diego internal presentation on the political profile of Guizhou Governor Chen Min'er. The Chinese Political Elite data was used to generate a social network map for Chen Min'er (see attached)

**Political Reach, State Fragility, and the Incidence of Maritime Piracy: Explaining Piracy and Pirate Organizations, 1993–2015** (pg. 93)

PI and POC: Brandon Prins, University of Tennessee, [bprins@utk.edu](mailto:bprins@utk.edu)

- Undergraduate course on non-state actors and political violence is in development. Several of the lectures will focus on trends in, and the drivers of, maritime piracy. We hope to use our research on maritime piracy as part of the University of Tennessee-Knoxville's participation with the State Department in Diplomacy Lab (will be sharable)
- Presentation with slides on global trends in maritime piracy developed for undergraduate audience (sharable)
- Presentation with slides on maritime piracy in Gulf of Guinea and Nigeria developed for advanced undergraduate and graduate students (sharable)

**China's Emerging Capabilities in Energy Technology Innovation and Development** (page 105)

PI: Edward Steinfeld, Brown University, [edward\\_steinfeld@brown.edu](mailto:edward_steinfeld@brown.edu)

The research led to the development of a new course at Brown University on global energy technology development. The course, aimed at graduate students and advanced undergraduates, examines global patterns of knowledge flow across several domains of energy technology. The course also examines the relationship between firm-level outcomes and national energy and industrial policy.

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