

## Experience

**RAND Corporation, Arlington, VA**

**Aug 2012 – Present**

*Senior Information Scientist*

***Associate director of Force Modernization and Employment Program, Project AIR FORCE***

Assisting program director in all aspects of program management, including business development, managing program resources, quality assurance of FMEP briefings and reports, staff development, designing research strategy, and supporting PAF management tasks. Leading efforts to better integrate new RAND staff into the program and ensure continued support of established researchers.

***Co-director of Methods Center for Applied Network Analysis and System Science (2015 – 2020)***

Leading efforts to improve and extend network analysis and modeling with RAND. Organizing internal and external speaker series, connecting researchers with relevant projects, mentoring students and staff.

***Research and analysis in support of national security clients: USAF, Army, and DoD***

Official and unofficial leadership roles, including business development for research projects.

Developing research streams leveraging network modeling and analysis, especially of open source data.

Tasks include research design, budget and staff management, sponsor briefing and writing reports.

- **Assessing impact of cyber attacks:** Analyzed aerial refueling mission activities and logistics processes to prioritize critical systems for cybersecurity assessments. Developed framework for assessing cyber risk to NATO systems. Developed methodology for prioritizing logistics functions to detect, evaluate, and mitigate effects of cyber attack on Air Force IT and weapons systems, using graph theory. Analyzed AF and DoD policy related to weapon system acquisition, including program protection and intelligence support to acquisition. Developing framework and network model to assess risk to US electoral system from adversary cyber attacks, to possibly include impact of influence operations.
- **Improving intelligence and targeting:** Analyzed US Army and adversary policy for integrating kinetic and non-kinetic operations at a tactical level. Developed network concept for new AF target systems analysis methodology. Analyzed and made recommendations for intelligence and AF policy as related to personnel and national-tactical integration. Led analysis of small unmanned aerial systems for ISR applications in A2AD environments, including optical probe and communication relay applications. Analyzed social networks of historical political leaders and co-authored handbook for intelligence analysts.
- **Social media data analysis:** Developed novel methodology for characterizing communities of social media users combining lexical, network, and geo-spatial analysis of large social media data sets. Performed specialized network analysis at various levels of granularity to identify influencers and influential groups and model network structure. Assisted with development of software (RAND-Net and RAND-Lex) to automate workflows to implement methodology and successfully marketed to DoD clients, including CYBERCOM and CENTCOM.
  - o Information Operations: Led projects to measure impact of Russian propaganda on Russian-speaking communities in Eastern European countries through lexical analysis of social media data; to apply resonance analysis to predict extremism based on language use on Twitter; to assess and improve impact of CENTCOM social media information operations to counter ISIS; to analyze Twitter data on ISIS support and opposition networks.
  - o Marketing and Recruiting: Analyzed Twitter data to develop better social media marketing strategy for Army recruiting. Performed quick turn-around social media and network analysis relating to Twitter discussions of military sexual assault.
- **Organizational network analysis:** Developed global network concept for US Army partner cooperation. Analyzed networks for Special Operations Forces global posture using intelligence, economic, migration, and political data. Performed organizational network analysis of key stakeholders in DoD and SOCOM

policy processes. Gathered and analyzed network data to improve linkages between programs in the Army's Readiness and Resilience Campaign (R2C).

## **RAND-funded research**

- (2017) Gritton Award: Used social media data to predict extremist views and behavior.
- (2016) Methods Lab: Developed and tested network analysis modules for RAND-Net, an open source platform for analysis and visualization of large network datasets.
- (2015) IR&D: Gathered and analyzed Twitter data on ISIS support and opposition networks. Developed novel methodology integrating network and lexical analysis of big data (over 23 million tweets and more than 770K node network). Research led to client-funded work in 2016 and supported new US State Department countermessaging strategy.
- (2014-2015) Methods Lab: Supported efforts to shepherd DataSift contract and expand social media usage within RAND. 2014 ML determined research approach, tool options, and internal policies and procedures for social media research at RAND (**Silver Medal Award for Innovation**)

## **Caltech Ph.D. Research**

Sept 2007 – July 2012

Research in the areas of complex networks, graph theory, communications, and distributed algorithms.

## **Jet Propulsion Laboratory (JPL), Pasadena, CA**

Jan 2007 – June 2012

*Engineer, Advanced Signal Processing Projects Group*

Developed DoD and NASA communication standards, researching networks architecture and protocols.

## **RAND Publications**

- Countering Violent Extremism in Nigeria: Using a Text Message Survey to Assess Radio Programs, RR-4257-DOS, 2020
- Social Media and the Army: Implications for Outreach and Recruiting, RR-2686-A, 2019
- Countering Russian Social Media Influence, RR-2740-RC, 2018
- Russian Social Media Influence: Understanding Russian Propaganda in Eastern Europe, RR-2237-OSD, 2018
- Empowering ISIS Opponents on Twitter, PE-227, 2017
- Robust and Resilient Logistics Operations in a Degraded Information Environment, RR-2015-AF, 2017
- The Global Landpower Network: Recommendations for Strengthening Army Engagement, RR-1813-A, 2017
- Examining ISIS Support and Opposition Networks on Twitter, RR-1328, 2016
- Improving the Cybersecurity of U.S. Air Force Military Systems Throughout Their Life Cycles, RR-1007-AF, 2015

## **Academic Publications**

- **Bodine-Baron, E.** "Peer effects in social networks: search, matching markets, and epidemics," *Dissertation (Ph.D.)*, California Institute of Technology, 2012.
- **Bodine-Baron, E.**, Nowak, S., Vardavas, R., Sood, N. "Conforming and Non-conforming Peer Effects in Vaccination Decisions," *ArXiv*, 2012.
- **Bodine-Baron, E.**, Hassibi, B., Wierman, A. "Characterizing externalities and stability in matching markets via social networks," *ArXiv*, 2012.
- **Bodine-Baron, E.**, Bose, S., Hassibi, B., Wierman, A. "Epidemic cost in complex networks: A random matrix approach," *Submitted to Mathematics of Operations Research Journal*.
- **Bodine-Baron, E.**, Lee, C., Chong, A., Hassibi, B., Wierman, A. "Peer effects and Stability in Matching Markets," *Proceedings of the 4<sup>th</sup> International Symposium on Game Theory*, 2011.
- **Bodine-Baron, E.**, Bose, S., Hassibi, B., Wierman, A. "Minimizing the social cost of epidemics," *Proceedings of GameNets*, 2011.

# Elizabeth Bodine-Baron

- **Bodine-Baron**, E., Hassibi, B., Wierman, A. "Distance-Dependent Kronecker Graphs for Modeling Social Networks," *IEEE Journal of Selected Topics in Signal Processing*, vol.4, no.4, pp.718-731, 2010.
- Thai, D., **Bodine-Baron**, E., Hassibi, B. "A symmetric adaptive algorithm for speeding-up consensus," *Proceeding of IEEE International Conference on Acoustics Speech and Signal Processing*, pp.2686-2689, 2010.
- **Bodine**, E., Hassibi, B., Wierman, A. "Generalizing Kronecker graphs in order to model searchable networks," *Proceedings of the 47th Annual Allerton Conference on Communication, Control, and Computing*, pp.194-201, 2009.
- **Bodine**, E., Cheng, M. "Characterization of Luby Transform Codes with Small Message Size for Low-Latency Decoding," *Proceedings of the IEEE International Conference on Communications*, pp.1195-1199, 2008.

## Education

**California Institute of Technology Pasadena, CA**  
Ph.D. Electrical Engineering  
M.S. Electrical Engineering, *GPA 3.70/4.00*

Fall 2007 – June 2012  
June 2012  
June 2009

**University of Texas Austin, TX**  
B.S. Electrical Engineering, *GPA 4.00/4.00*  
B.A. Plan II Honors, *GPA 4.00/4.00*

August 2002 – December 2006

## Honors and Affiliations

- Term member, Council on Foreign Relations 2017 - present
- RAND Project AIR FORCE Team Innovation Award 2017
- Gritton Award for Innovation in Defense and National Security 2016
- RAND Silver Medal Award for Innovation 2015
- Caltech Atwood Fellowship 2010 - 2011
- National Defense Science and Engineering Graduate Fellowship 2007 - 2010
- Mars Micro-transceiver JPL Team Award 2008
- Phi Beta Kappa 2005
- UT College of Engineering Outstanding Scholar/Leader Runner-up 2006
- Engineering Honors Program 2002 - 2006
- Raytheon, SWE, Engineering Honors Scholarships 2002 - 2006
- IEEE 2002 - 2016
- Society of Women Engineers (SWE) 2002 - 2012

## Skills

Demonstrated project leadership and organization, including budget and staff management  
Established client relations, including business development for PAF and NSRD  
Strong research design skills, from initial scoping and project description to final deliverable  
Exceptional briefing skills, including sponsor briefing at the general officer level  
Excellent technical writing skills  
Strong leadership and teamwork skills  
Matlab, Mathematica, R simulation and programming  
UCINET, NetDraw, Gephi, R Social Network Analysis tools  
DataSift and GNIP social media aggregators  
CDSL, C, C++, UNIX Socket Programming, basic shell scripting, HTML, ASP  
LaTeX, Microsoft Access, Word, Excel, PowerPoint