

Experience

RAND Corporation, Santa Monica, CA

Aug 2012 – Present

Full Engineer

Director of Methods Center for Applied Network Analysis and System Science

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

- **Assessing impact of cyber attacks for the Air Force:** Developed methodology for prioritizing logistics functions to detect, evaluate, and mitigate effects of cyber attack on Air Force logistics IT systems. Designed new analysis framework for assessing mission impact of cyber attack on Air Force weapon systems using graph theory. Analyzed AF and DoD policy related to weapon system acquisition, including program protection and intelligence support to acquisition. Created and analyzed network model to assess impact of cyber attacks on AF logistics systems.
- **Improving intelligence and targeting:** 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.
 - o CVE and Information Operations: Leading projects to apply resonance analysis to predict extremism based on language use on Twitter; to detect impact of Russian propaganda on Russian-speaking communities in Eastern European countries through lexical analysis of social media data; to assess and improve impact of CENTCOM social media information operations to counter ISIS. Analyzed Twitter data (over 23 million tweets from more than 770K users) on ISIS support and opposition networks; research findings supported new US State Department countermessaging strategy.
 - 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: Using 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.
- (2015) Methods Lab: Supported efforts to shepherd DataSift contract and expand social media usage within RAND.
- (2014) Methods Lab: Determined research approach, tool options, and internal policies and procedures for social media research at RAND (**Silver Medal Award for Innovation**)

Education

Caltech Ph.D. Research

Sept 2007 – July
2012

(Advisors: Adam Wierman and Babak Hassibi)

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 (332E)

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

RAND Publications

- Russian Social Media Influence: Understanding Russian Propaganda in Eastern Europe, RR-2237-OSD, 2018
- Empowering ISIL Opponents, 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, 2014
- Using Network Analysis Methods to Support the Global SOF Network, PT-128-SOCOM, 2014 (video)
- Geographic Regions for the Global SOF Network, RR-339/1-SOCOM, 2013

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.

Elizabeth Bodine-Baron

- **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 4th 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.
- **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	Fall 2007 – June 2012
Ph.D. Electrical Engineering	June 2012
M.S. Electrical Engineering, <i>GPA 3.70/4.00</i>	June 2009
University of Texas Austin, TX	August 2002 – December 2006
B.S. Electrical Engineering, <i>GPA 4.00/4.00</i>	
B.A. Plan II Honors, <i>GPA 4.00/4.00</i>	

Honors and Affiliations

• Term member, Council on Foreign Relations	2017 - present
• 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

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