

# Annetta G. Burger

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## Computational Anthropologist

Conducting interdisciplinary research on human behavior in complex adaptive systems utilizing methods in agent-based modeling, social network analysis, text mining, GIS technology, big data and machine learning, surveys, and ethnographic research. Current research is focused on human mobility, migration patterns, community resilience, and human behavior in disasters. Dissertation work includes development of a geo-spatially explicit agent-based model of a Nuclear Weapon of Mass Destruction (NWMD) event in the New York City region. Agents in the model respond to the event with respect their surroundings and social networks. Past work experience includes 10 years of program management in Department of Defense (DoD) Science and Technology (S&T).

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## Education

PhD, Computational Social Science, 2012-2020 George Mason University	Fairfax, VA
MA, Business Administration, 1999, University College University of Maryland / Bowie State	Naples, Italy
BA, Foreign Affairs, 1996, University of Virginia	Charlottesville, VA

## Technical Skills

Programming with Java, Python, R, JSON, HTML & C++  
Modeling in Mason, NetLogo, VenSim and ACT-R  
Data analysis utilizing Python Notebook, RStudio, QGIS, Gephi and Spark

## Technical Experience

Research & Development Scientist, *Oak Ridge National Laboratory* 2022 – Present  
Utilizing metrics of spatial-temporal data to develop individual profiles of mobility patterns. Researching theories of migration and drivers of migratory patterns due to climate change and developing models of human migratory behavior. Providing expertise in applications of social computational methodologies for understanding human behavior.

Postdoctoral Associate, *New York University* 2020 – 2022  
Developed agent-based models of religious change in NetLogo. Provided consulting expertise to operationalize theories of secularization and religious change into agent-based models. Conducted research on religious demographic trends and the psychological processes of religious conversion.

Student and Graduate Research Assistant, *George Mason University* 2012 – 2020  
Developed agent-based models for disaster, migratory responses to climate change in Peru, impacts of education on communities, and information flow in social and physical

networks using the NetLogo modeling platform. Using Python, R and machine learning algorithms analyzed the Open Payment data set to identify influence from financial contributions, Twitter data to study the impact of extreme weather, and artificially created data to study the effects of economic payoffs in game theory models. Analyzed a social network utilizing data on congressional bill co-sponsorship in Peru with Python and Gephi. Developed a Systems Dynamic Model of education and employment impacts in VenSim. Extended a cognitive model in ACT-R for playing Blackjack.

### Professional Experience

Program Manager, *QinetiQ – North America and Vencore* 2007 – 2016  
Provide technical and financial management expertise to the Office of Naval Research for their training and social science program portfolio. Research and implement S&T solutions for training systems and decision support tools from advances in modeling and simulation, human behavior analytics, and cognitive and social sciences. Conduct routine management of projects transitioning technology into Navy and Marine Corps Acquisition. Responsibilities include ongoing liaison and outreach with DoD program offices, federal agencies, universities, and industry.

Senior Acquisition Specialist, *Anteon and Alion*, 2006 – 2007  
Provided policy, programmatic and financial support to the Deputy Technical Director / Chief Scientist, the SwampWorks program office, the Counter Improvised Explosive Device (CIED) Basic Research Program and the front office at the Office of Naval Research (ONR).

### Publications

**Burger, Annetta**, William G. Kennedy, and Andrew Crooks. 2021. Organizing Theories for Disasters into a Complex Adaptive System Framework. *Urban Science* 5(3). Multidisciplinary Digital Publishing Institute: 61.

**Burger, Annetta**, Talha Oz, William G. Kennedy, and Andrew T. Crooks. 2019. Computational Social Science of Disasters: Opportunities and Challenges. *Future Internet* 11(5): 103.

Hawkins, Harold, Glenn White, Gregg Smith, **Annetta Burger**. Fall 2014. “Multimission Training for the Synthetic Age.” *Future Force: Naval Science and Technology Magazine* 1(03).

Rolland, Philippe, William Krebs, and **Annetta Burger**. 2011. Naturalistic Data Sets for Image and Behavior Analysis - “Normal” versus “Anomalous” Events. *In* 2011 8th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS) Pp. 325–330.

### Presentations

**Burger, Annetta G.** and William G. Kennedy. October 2021. “A Complex Adaptive Systems Framework for Understanding Disasters and Impacts to Public Health,”

presented at the 2021 International Webinar on European Public Health. Scientific Meditech. Online Meeting.

**Burger, Annetta G.** 2019. “Community Resilience in Complex Adaptive Systems: an Agent-Based Model of Disaster,” presented at the 2019 Annual Meeting of the American Anthropological Association in Vancouver, Canada.

**Burger, Annetta.** January 2019. “Operationalizing an Agent-Based Model of Community Resilience in Complex Adaptive Systems. Computational Social Science Friday Seminar at George Mason University, Fairfax, Virginia.

**Burger, Annetta G.** November 2018. “From Networks to Recovery: An Agent-Based Model of Community Resilience in Disaster,” presented as guest speaker for Computational Data Sciences 201 at George Mason University, Fairfax, Virginia.

### **Posters**

**Burger, Annetta G.** 2019. “Poster on Modeling Society Reacting to a Nuclear Weapon of Mass Destruction Event,” presented at the 2019 International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction and Behavior Representation in Modeling and Simulation in George Washington University, Washington, DC.

**Burger, Annetta, Talha Oz, Andrew Crooks, William G. Kennedy.** 2017. “Generating Realistic Mega-City Populations and Social Networks for Agent-Based Modeling.” Presented at the 2017 Computational Social Science Society of the Americas in Santa Fe, New Mexico.

**Burger, Annetta, Jose Manuel Magallanes, Murali, Nikhil.** 2013. “Organizing and exploring political interactions in legislators for computational network analysis.” Polnet Conference, Bloomington, Indiana.

### **Grant Proposal Co-Authorship**

2018 NSF Proposal for the Humans, Disasters, and the Built Environment Program, “Social Infrastructure in Community Resilience and Disaster Recovery.”

2018 DoD Whitepaper Proposal for the 2018 Minerva Research Initiative Topic, Sociopolitical (In)Stability, Resilience, and Recovery, “Community Resilience, Social Networks, and Complex Social Systems in the Caribbean Corridor.”