

AMY L. SLIVA–ASSISTANT PROFESSOR–KING’S COLLEGE

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Education

Ph.D. Computer Science, University of Maryland College Park, 2011

Master of Public Policy International Security and Economic Policy, University of Maryland, 2010

M.S. computer Science, University of Maryland College Park, 2007

B.S. Computer Science, Georgetown University, 2005

Academic Positions

Program Director of Computer Science, King’s College, Wilkes-Barre, PA, 2020 – Present

Assistant Professor of Computer Science, King’s College, Wilkes-Barre, PA, 2019 – Present

Assistant Professor of Computer Science & Political Science, Northeastern University, Boston, MA, 2011 – 2014

Researcher, National Defense University, Washington, DC, 2012 – 2013

Research Assistant, University of Maryland, College Park, MD, 2005 – 2011

Professional Experience

Senior Computer Scientist, The Bulls Run Group, Bethesda, MD, 2021 – Present

Senior Scientist, Charles River Analytics, Cambridge, MA, 2017 – 2020

Scientist, Charles River Analytics, Cambridge, MA, 2013 – 2017

Consultant, The World Bank, Washington, DC, 2008 – 2009

Software Systems Developer, The MITRE Corporation, McLean, VA, 2003 – 2005

External Funding

Guarding Against Malicious Biased Threats (GAMBiT). Intelligence Advanced Research Projects Agency (IARPA) Reimagining Security with Cyberpsychology-Informed Network Defenses (ReSCIND) Program. October 2023 – October 2025 (tentative dates).

Sensitivity Analysis of Uncertainty in Causal Environments (SAUCE). Defense Advanced Research Project Agency (DARPA). World Modelers. (\$4,400,000). September 2018 – January 2020.

Game-Theoretic Reasoning and Analysis of Vulnerability (GRAVITY). Air Force Research Laboratory Aerospace Systems Directorate Small Business Innovation Research (SBIR) Phase II: (\$1,000,000). November 2018 – November 2020.

Game-Theoretic Reasoning and Analysis of Vulnerability (GRAVITY). Air Force Research Laboratory Aerospace Systems Directorate Small Business Innovation Research (SBIR) Phase I: (\$150,000). August 2017 – June 2018.

Platform for Research Optimization and Creation of Experiments in Social Science (PROCESS) II. Defense Advanced Research Project Agency (DARPA) Small Business Innovation Research (SBIR) Phase II: Next Generation Research Tools for Understanding Human Social Systems (\$1,000,000). July 2018– July 2020.

Platform for Research Optimization and Creation of Experiments in Social Science (PROCESS). Defense Advanced Research Project Agency (DARPA) Small Business Innovation Research (SBIR) Phase I: Next Generation Research Tools for Understanding Human Social Systems (\$150,000). April 2017 – January 2018.

Predictive System for Cyber Hostility using Integrated Computational Models (PSYCHIC). Intelligence Advanced Research Project Agency (IARPA). Cyber-attack Automated Unconventional Sensor Environment (CAUSE) (\$8,613,360). July 2016 – July 2020.

Cyber Attribution Network Training & Education Engine (CANTEEN)(Co-PI). U.S. Army Research, Development and Engineering Command (RDECOM) Communications Electronics Research, Development and Engineering Center (CERDEC) Small Business Innovation Research (SBIR) Phase II (\$1,000,000). June 2016 – June 2018.

Cyber Attacker and Network Vulnerability Analysis and Simulation (CANVAS) Phase II (Co-PI). U.S. Army Research, Development and Engineering Command (RDECOM) Communications Electronics Research, Development and Engineering Center (CERDEC) Small Business Innovation Research (SBIR) Phase II (\$1,000,000). September 2015 – September 2017.

Cyber Attacker and Network Vulnerability Analysis and Simulation (CANVAS) Phase I (Co-PI). U.S. Army Research, Development and Engineering Command (RDECOM) Communications Electronics Research, Development and Engineering Center (CERDEC) Small Business Innovation Research (SBIR) Phase I (\$200,000). September 2014 – November 2015.

Teaching

King's College

CS 112: Introduction to Computer Programming, Fall 2020; Fall 2023
CS 120: Object-Oriented Software Development, Spring 2022, Spring 2023
CS 256 / CIS 356: Database Management Systems, Fall 2019; Fall 2021
CS 270: Computer Organization, Spring 2020; Spring 2022, Spring 2023
CS 328: Theory of Algorithms, Spring 2020
CS 380: Image Processing with Parallelism, Fall 2019
CS 448: Artificial Intelligence, Fall 2019; Fall 2021; Fall 2023
CS 480: Software Engineering, Fall 2021, Fall 2022, Fall 2023
CS 481: Applied Software Engineering, Spring 2022, Spring 2023
CS 490: Special Topics in Computer Science—Cyber Security, Fall 2020; Fall 2022
CS 490: Special Topics in Computer Science—Machine Learning, Spring 2020; Spring 2022

Northeastern University College of Computer and Information Science

CS 7180: Behavioral Modeling and Decision-Making in AI, Fall 2012
CS 2500: Fundamentals of Computer Science, Spring 2012
CS 5100: Foundations of Artificial Intelligence, Fall 2011

Northeastern University Department of Political Science

POLS 3408: International Security, Spring 2013

University of Maryland Department of Computer Science—Adjunct Instructor

CMSC 330: Organization of Programming Languages, Summer 2010

Professional Activities and Service

Conference Chairs

Area Chair (Military/Security), Conference on Social Computing, Behavioral Modeling, & Prediction (2014)

Conference Program Committees

International Joint Conference on Artificial Intelligence (IJCAI) 2019
International Conference on Social Computing, Behavioral Modeling and Prediction (SBP) 2014, 2015, 2016, 2017

IEEE International Conference on Intelligence and Security Informatics (ISI) 2012, 2013
European Intelligence and Security Informatics Conference 2011, 2012, 2013
International Symposium on Foundation of Open Source Intelligence and Security Informatics (FOSINT) 2012
International Symposium on Open Source Intelligence & Web Mining (OSINT-WM) 2011
International Conference on Computational Cultural Dynamics (ICCCD) 2008

Honors and Awards

Kings College

Faculty Summer Research Grant for 2023
CELT Innovation in Teaching Grant for 2020 – 2021

American Management Association certificate in Technical Project Management 2014

Northeastern University

Excellence in Teaching Award–Nomination February 2012

Booz Allen Hamilton

Case Competition February 2008

Department of Computer Science, University of Maryland

Outstanding Dissertation Award–Nomination 2011
Verizon Graduate Fellowship 2005

Professional Affiliations

Member: IEEE, ACM, AAAI, American Political Science Association

Books

Data-driven Generation of Policies (with Gerardo Simari, Austin Parker, and V.S. Subrahmanian). Springer-Verlag. 2014.

Computational Analysis of Terrorist Groups: Lashkar-e-Taiba (with V.S. Subrahmanian, Aaron Mannes, Jana Shakarian, and John Dickerson). Springer-Verlag. 2012.

Journal Publications

"Fake News Detection on Social Media: A Data Mining Perspective." (with Kai Shu, Suhang Wang, Jiliang Tang, and Huan Liu). *KDD Explorations*, 2017.

"Super-solutions: Succinctly Representing Solutions in Abductive Annotated Probabilistic Temporal Logic" (with C. Molinaro and V.S. Subrahmanian). *Transactions on Computational Logic*. 2013.

"A Temporal Database Forecasting Algebra" (with F. Parisi and V.S. Subrahmanian). *International Journal of Approximate Reasoning*. 54(7). 2013.

"Parallel Abductive Query Answering in Probabilistic Logic Programs" (with Gerardo I. Simari, John Dickerson, and V.S. Subrahmanian). *ACM Transactions on Computational Logic*, vol. 14, no. 2. 2013.

"Focused Most Probable World Computations in Probabilistic Logic Programs" (with Gerardo I. Simari, Maria Vanina Martinez, and V.S. Subrahmanian). *Annals of Mathematics and Artificial Intelligence*, vol. 64, no. 2-3, pp. 113-143. May 2012.

- “CONVEX: Context Vectors as a Paradigm for Learning Group Behaviors based on Similarity” (with Vanina Martinez, Gerardo I. Simari, and V.S. Subrahmanian). *IEEE Intelligent Systems*, vol. 23, no. 4, pp. 51-57. Jul/Aug 2008.
- “Computing Most Probable Worlds of Action Probabilistic Logic Programs: Scalable Estimation for $10^{30,000}$ Worlds” (with S. Khuller, M.V. Martinez, D. Nau, G.I. Simari, and V.S. Subrahmanian). *Annals of Mathematics and Artificial Intelligence*. November, 2007.
- “CARA: A Cultural-Reasoning Architecture” (with V.S. Subrahmanian, Massimiliano Albanese, Maria Vanina Martinez, Dana Nau, Diego Reforgiato, Gerardo I. Simari, Octavian Udrea, and Jonathan Wilkenfeld). *IEEE Intelligent Systems*, vol. 22, no. 2, pp. 12-16. Mar/Apr, 2007.
- “A Component-Based Data Management and Knowledge Discovery Framework for Aviation Studies” (with M. B. Blake, L. Singh, A. B. Williams, and W.N. Norman). *International Journal of Information Technology and Web Engineering*, vol. 1, no. 1, pp. 76-90. January-March 2006.

Conference Publications

- “Decision Analysis in Stochastic Sociocultural Systems” (with Emanuele Borgonovo, Alexander Levis, Christopher Pawlenok, and Nathaniel Plasphohl). *Proceedings of 27th International Conference on Analytical & Stochastic Modelling Techniques & Applications (ASMTA)*, 2023.
- “Causal Analysis Graph Modeling for Strategic Decisions” (with Alexander Levis). In *Proceedings of European Council for Modelling and Simulation (ECMS) 36th International Conference on Modelling and Simulation*, 2022,
- “Food Security in Developing Economies: A Decision Analysis Approach” (with Alexander Levis, Emanuele Borgonovo, and Glenn Takata). *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*. 2020.
- “Using Social Media to Understand Cyber Attack Behavior” (with Kai Shu and Huan Liu). In *Proceedings of the International Conference on Cross Cultural Decision Making at the International Conference on Applied Human Factors and Ergonomics*. July 2018.
- “Understanding Cyber Attack Behaviors with Sentiment Information on Social Media” (with Kai Shu, Justin Sampson, and Huan Liu). In *Proceedings of the International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS)*, July 2018.
- “Hybrid Modeling of Cyber Adversary Behavior” (with Sean Guarino, Peter Weyhrauch, Peter Galvin, Daniel Mitchell, Jason Taylor, and Joseph Campolongo). In *Proceedings of the International Conference on Social Computing, Behavioral Modeling, and Prediction*. July 2017
- “Complex Causality: Computational Formalisms, Mental Models, and Objective Truth” (with Mukesh Dalal and David Blumstein). In *Proceedings of the 8th International Conference on Applied Human Factors and Ergonomics*. July 2017.
- “Modeling Causality in Sociocultural Systems using Ensemble Methods.” (with Scott Neal Reilly, David Blumstein, Steve Hookway, and John Chamberlain). In *Proceedings of the 7th International Conference on Applied Human Factors and Ergonomics*. July 2016. (Awarded Best Paper at the Cross Cultural Decision Making track).
- “Combining Cognitive Engineering and Information Fusion Architectures to Build Effective Joint Systems.” (with Joseph Gorman, Martin Voshell, James Tittle, and Christopher Bowman). In *SPIE Defense + Commercial Sensing*, April 2016.
- “Modular Analytics Management Architecture for Interoperability and Decision Support” (with Steve Marotta, Max Metzger, and Joseph Gorman). In *SPIE Defense + Commercial Sensing*, April 2016.

- “Tools for Validating Causal and Predictive Claims in Social Science Models” (with Scott Neal Reilly, Randy Casstevens, and John Chamberlain). In *Proceedings of the 6th International Conference on Applied Human Factors and Ergonomics*. July 2015.
- “Dual Node Decision Wheels: an Architecture for Interconnected Information Fusion and Decision making” (with Joe Gorman, Christopher Bowman, and Martin Voshell). In *SPIE Defense + Security*, Baltimore, MD. April 2015.
- “A Big Data Methodology for Bridging Quantitative and Qualitative Political Science Research” (with Scott Neal Reilly). American Political Science Association Annual Meeting, Washington DC. 2014.
- “Threats to Peace: Threat Perception and the Persistence or Desistence of Violent Conflict” (with M. Malyutov, G. Pierce, and X. Li). In *Proceedings of the European Intelligence and Security Informatics Conference*. Uppsala, Sweden. August 2013.
- “Risk-based Models of Attacker Behavior in Cybersecurity” (with S. Li and R. Rickert). In *Proceedings of the International Conference on Social Computing, Behavioral Modeling, & Prediction*. Washington, DC. April, 2013.
- “Embedding Forecast Operators in Databases” (with Francesco Parisi and V. S. Subrahmanian). In *Proceedings of the Fifth International Conference on Scalable Uncertainty Management (SUM)*. October 2011.
- “A Computationally-Enabled Analysis of Lashkar-e-Taiba Attacks in Jammu & Kashmir” (with Aaron Mannes, Jana Shakarian, and V.S. Subrahmanian). In *Proceedings of the European Intelligence and Security Informatics Conference (EISIC)*. Athens, Greece. September 2011 (short paper).
- “Abduction in Annotated Probabilistic Temporal Logic” (with Cristian Molinaro and V.S. Subrahmanian). In *Leibniz International Proceedings in Informatics, Technical communication of the International Conference on Logic Programming*. July 2011.
- “Approximate Achievability in Event Databases” (with Austin Parker, Gerardo I. Simari, and V.S. Subrahmanian). In *Proceedings of Eleventh European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty (ECSQARU)*. June 2011.
- “Scaling Most Probable World Computations in Probabilistic Logic Programs” (with Gerardo I. Simari, Maria Vanina Martinez, and V.S. Subrahmanian). In *Proceedings of the First International Conference on Scalable Uncertainty Management (SUM)*. October 2008.
- “Stochastic Opponent Modeling Agents: A Case Study with Hamas” (with Aaron Mannes, V.S. Subrahmanian, and Jonathan Wilkenfeld). In *Proceedings of the Second International Conference on Computational Cultural Dynamics (ICCCD)*. September 2008.
- “The SOMA Terror Organization Portal (STOP): Social Network and analytic Tools for the Real-time Analysis of Terror Groups” (with V. Martinez, G.I. Simari, and V.S. Subrahmanian). In *First International Workshop on Social Computing, Behavioral Modeling, and Prediction*. April 2008.
- “Stochastic Opponent Modeling Agents: A Case Study with Hezbollah” (with Aaron Mannes, Mary Michael, Amy Pate, V.S. Subrahmanian, and Jonathan Wilkenfeld). In *First International Workshop on Social Computing, Behavioral Modeling, and Prediction*. April 2008.
- “Finding Most Probable Worlds of Probabilistic Logic Programs” (with Samir Khuller, Vanina Martinez, Dana Nau, Gerardo Simari, and V.S. Subrahmanian). In *Proceedings of the First International Conference on Scalable Uncertainty Management (SUM)*. October 2007.
- “Tractable Methods for Predicting an Agents Most Probable Actions” (with Maria Vanina Martinez, Gerardo I. Simari, and V.S. Subrahmanian). In *Proceedings of the 2007 Grace Hopper Celebration of Women in Computing*. October 2007.
- “SOMA Models of the Behaviors of Stakeholders in the Afghan Drug Economy: A Preliminary Report” (with Maria Vanina Martinez, Gerardo I. Simari, and V.S. Subrahmanian). *Proceedings of the First International Conference on Computational Cultural Dynamics (ICCCD)*. August 2007.

- “Binding Now or Binding Later: The Performance of UDDI Registries” (with M. B. Blake, M. zur Muehlen, and J. Nickerson). In *IEEE Hawaii International Conference of System Sciences (HICSS-2007)*, Track on Technology and Strategies for Realizing Service-Oriented Architectures with Web services. Hawaii. 2007.
- “A Stochastic Language for Modeling Opponent Agents” (with Gerardo I. Simari, Dana Nau, and V.S. Subrahmanian). In *Proceedings of the Fifth International Joint Conference on Agents and Multiagent Systems (AAMAS)*. 2006.
- “Web Services-Based Data Management: Evaluating the Performance of UDDI Registries” (with G. Saez, and M. B. Blake). In *Proceedings of the International Conference on Web Services (ICWS)*. San Diego, CA. July 2004 (short paper).
- “Evaluating the Impacts of Internet Dynamism on UDDI Mechanisms and Frameworks for Web Services” (with G. Saez and M. B. Blake). In *Technical Symposium in Computer Science Education SIGCSE* (also ACM National Research Competition) Norfolk, VA. March 2004 (abstract and presentation).

Book Chapters

- “Combining Data-Driven and Theory-Driven Models for Causality Analysis in Sociocultural Systems” (with Scott Neal Reilly, David Blumstein, and Glenn Pierce), In Jonathan Pfautz, Paul Davis, and Angela O’Mahoney (Eds.) *Social and Behavioral Modeling for Complex Systems*, Wiley. 2019.
- “Validating Causal and Predictive Claims in Sociocultural Models” (with Scott Neal Reilly, David Blumstein, John Chamberlain, and Randy Casstevens), In Joseph V. Cohn, Sae Schatz, Hannah Freeman, David J. Y. Combs (Eds.) *Modeling Sociocultural Influences on Decision Making: Understanding Conflict, Enabling Stability*. CRC Press. 2016.
- “Methods and Tools to Analyze Responding to, Counteracting, or Utilizing Sociocultural Behaviors,” In Egeth, J.E., Klein, G.L., and Schmorow, D. (Eds.) *Sociocultural Behavior Sensemaking: State of the Art in Understanding the Operational Environment*. McLean, VA: The MITRE Corporation. 2014.
- “SOMA: Stochastic Opponent Modeling Agents for Forecasting Violent Behavior” (with Gerardo I. Simari, Maria Vanina Martinez, and V.S. Subrahmanian). *Handbook of Computational Approaches to Counter-Terrorism*. Springer-Verlag. 2012.
- “Forecasting Changes in Terror Group Behavior” (with Maria Vanina Martinez, Gerardo I. Simari, and V.S. Subrahmanian). *Handbook of Computational Approaches to Counter-Terrorism*. Springer-Verlag. 2012.
- “Policy Analytics Generation using Action Probabilistic Logic Programs” (with Gerardo I. Simari, John P. Dickerson, and V.S. Subrahmanian). *Handbook of Computational Approaches to Counter-Terrorism*. Springer-Verlag. 2012.
- “CAPE: Automatically Predicting Changes in Group Behavior” (with V. S. Subrahmanian, V. Martinez, and G. I. Simari). In *Mathematical Methods in Counterterrorism*, N. Memon, J. D. Farley, D. L. Hicks, and T. Rosenorn, Eds. Springer Verlag. 2009.

Short Articles and Op-Eds

- Op-Ed: "Black Hole for Foreign Aid—As U.S. Funds Increase, So Does Terrorism" (with V.S. Subrahmanian and Aaron Mannes). *The Washington Times*, September 24, 2010.

Invited Talks

- “Leveraging Systemic Functional Grammars for Script Analysis and Understanding Human Behavior.” 45th International Systemic Functional Congress (ISFC 2018). July 2018.
- “Combining Data-Driven and Theory-Driven Models for Causality Analysis in Sociocultural Systems.” Current Challenges in Computing (CCubed) Conference on Computational Social Science, September 2017.
- Panel: What Constitutes an Act of Cyber War Under International Law? 3rd Annual Journal of Law & Cyberwarfare Conference, July 2016.

- “Predicting Events Using Diverse Ensemble Models.” Society of Applied Mathematics Annual Meeting Mini-Symposium on Forecasting from Big, Noisy Data: Challenges and Techniques
- “Scalable Analysis of Behavioral Models and Decision-Making.” Computer Science Colloquium, University of Massachusetts Lowell. December 11, 2013.
- “Scalable Analysis of Behavioral Models and Decision-Making.” Harvard Applied Statistics Workshop, Harvard University. November 6, 2013.
- “Using Artificial Intelligence to Understand Global Conflict.” Faculty Works-in-Progress Colloquium, Northeastern Humanities Center, Northeastern University. November 5, 2012.
- “Security Informatics.” Balkan Security, Technology, and Education Conference—the Challenges Within Cyber Infrastructure, Ministry of Security of Bosnia and Herzegovina & the American University of Bosnia and Herzegovina. September 2012.
- “Security Informatics: An Artificial Intelligence Approach to Security.” Boston University Computer Science Department Theory Seminar. December 2011.
- “Interdisciplinary Research at Northeastern: The Intersection of Artificial Intelligence and Political Science.” Northeastern University Board of Trustees Meeting. October 2011.
- “Predicting Changes in Terror Group Behaviors.” Second International Conference on Computational Cultural Dynamics (ICCCD). September 2008.