

Paulo Shakarian, Ph.D.

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Paulo Shakarian, Ph.D.

Assistant Professor and
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Paulo Shakarian is a Fulton Entrepreneurial Professor (tenure-track) at Arizona State University. He has written numerous articles in scientific journals and has authored several books, including Elsevier's *Introduction to Cyber-Warfare* and Cambridge's *Darkweb Cyber Threat Intelligence Mining*. Recently, his work was featured in major news media including *CNN*, *The Economist*, and *Business Insider*. He was named a "KDD Rising Star" by Microsoft Research Asia, was recipient of the Air Force Young Investigator award, FOSINT-SI Best Paper, and MIT Tech. Review "Best of 2013". He also held fellowships with both DARPA and New America. CYR3CON™, the ASU spin-out company for which Paulo co-founded and serves as CEO, was named a finalist in the Defense Innovation Technology Challenge (2017), won a National Science Foundation Innovation Corps award (2017), and was a semi-finalist in the Cisco Innovation Grand Challenge (2016).

PROFESSIONAL EXPERIENCE:

2014-Present	Assistant Professor, CIDSE, Arizona State University, Tempe AZ
2011-2014	Assistant Professor, D/EECS, U.S. Military Academy, West Point NY
2008-2011	Graduate Research Assistant, University of Maryland, College Park, MD
2007	Military Fellow, DARPA Service Chiefs' Fellows Program (3 months)
2002-2014	Commissioned Officer, U.S. Army

EDUCATION:

University of Maryland College Park, Computer Science, Ph.D., 2011
University of Maryland College Park, Computer Science, Master of Science, 2009
U.S. Military Academy, Computer Science, Bachelor of Science, 2002
U.S. Military Academy, Information Assurance, Depth of Study, 2002

CURRENT PROJECT AWARDS:

- Principle Investigator (ASU team) for "EFFECT," IARPA CAUSE program, 2016-2018.
- Principal Investigator for "Understanding Social Influence without Markov Assumptions," ARO Single Investigator Program, 2015-2018.
- Principal Investigator for "Toward Anti-Inhibitory Influence of Online Social Networks," USAFOSR (Young Investigator Award), 2015-2018.
- Principal Investigator for "Reasoning about Cyber-Attribution," ONR, 2015-2018.
- Co-Principal Investigator for "New Analytics for Measuring and Countering Social Influence and Persuasion of Extremist Groups" DoD (Minerva), 2015-2018.
- Co-Principle Investigator for "NEPTUNE", ONR, 2015-2019.

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PREVIOUS PROJECT AWARDS:

- Principle Investigator for “Commercialization of Social Influence Algorithms for Information Operations”, DoD @ I-Corps grant, 2016-2017.
- Principle Investigator for “High-memory workstations in support of cyber-socio research,” ARO DURIP, 2016.
- Principal Investigator for “Viral Marketing for Social Networks” USAF A2II, 2013-2014.
- Principal Investigator, DARPA UROP program, 2013-2014.
- Principal Investigator for “Combinatorial and Scalable Initiation in Complex Networks,” ARO Single Investigator Program, project, 2012-2014.
- Consultant (to the Program Manager), “Integrated Cognitive-Neuroscience Architectures for Understanding Sensemaking (ICArUS)” IARPA, 2012-2014.

AWARDS AND ACCOLADES:

- (CYR3CON, company co-founded by Paulo Shakarian) Selected as a finalist for PwC’s Most Promising Company award, held during PwC’s Cybersecurity Week (2017)
- (CYR3CON, company co-founded by Paulo Shakarian) Selected as a semi-finalist for MD5 Starts Austin
- (CYR3CON, company co-founded by Paulo Shakarian) Selected for Innovation Showcase at the Defense Innovation Technology Challenge (2017)
- Paper “A review of evolutionary graph theory with applications to game theory” was the most cited article of the Elsevier journal *BioSystems* (2017)
- (CYR3CON, company co-founded by Paulo Shakarian) Semi-Finalist, Cisco Innovation Grand Challenge (2016)
- Named a KDD Rising Stars by Microsoft Research Asia (2016)
- Best Paper, FOSINT-SI (2016)
- Fulton Entrepreneurial Professor (2016-2017)
- Selected for Innovation Showcase at TechConnect 2016
- (CYR3CON, company co-founded by Paulo Shakarian) DoD @ I-Corps grant award (2016)
- Cybersecurity Initiative Fellow, New America (2016-2017)
- AFOSR Young Investigator Award (2015)
- MIT Technology Review “Best of 2013” (2013)
- DARPA Service Chiefs’ Fellowship (2007)

RECENT MEDIA:

- July 2017: Quoted in Business Insider, interviewed on Arizona Horizon.
- June 2017: Quoted in Business Insider and Sputnik News.
- May 2017: Mentioned in Gizmodo, TECH.CO and Free Enterprise (US Chamber of Commerce).
- May 2017: Coverage in Slate, The Economist, quoted by CNN and interviewed on CBC.
- Apr. 2017: Featured in National Defense Magazine.
- Mar. 2017: Interviewed on Canada’s CBC.
- Feb. 2017: Featured on AZ Central and TECH.CO.
- Dec. 2016: Quoted in Phoenix Business Journal and KTAR.
- Dec. 2016: Quoted by the New York Times.
- Sep. 2016: Interviewed on radio station KJZZ and Phoenix 3TV news for darkweb cybersecurity research.
- Aug. 2016: Quoted on Bloomberg.
- Aug. 2016: Darkweb scraping technology featured on Forbes, Cisco Continuum, and MIT Technology Review.

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SELECTED RECENT INVITED TALKS:

- 2017 P. Shakarian, *Leveraging Actionable Cyber Threat Intelligence from the Darkweb using Machine Learning*, StateFarm #doITdifferently, Dec. 2017
- 2017 P. Shakarian (invited panelist for panel moderated by Rep. Tom O'Halleran), ASU Congressional Conference on Cybersecurity, August 2017.
- 2017 R. Leong, R. Los, P. Shakarian, Machine Learning and Malware: What You Need to Know, ISC(2) ThinkTank (sponsored by McAfee), webinar, April 2017. 448 viewers. (invited panel)
- 2016 P. Shakarian, Scaling to the Adversary: Machine Learning Driven Mining of Threat Intel from the Darkweb, POC Security Conference, Seoul, Korea, Nov., 2016 (invited talk).
- 2016 P. Shakarian, Toward a Threat-Centric Paradigm, *Army Cyber Talks*, New York, NY, Sep. 2016.
- 2016 P. Shakarian, Reducing Risk in the Face of Adaptive Threats in Cyberspace, *IEEE ISI 2016*, plenary panel talk, Sep. 2016.
- 2016 P. Shakarian, Data-Driven Modeling and Reasoning About Cyber Adversaries, Invited talk at Kings College, London, UK, June 2016.
- 2016 P. Shakarian, Influence and Inhibition in Information Cascades, *EU RISE Workshop, Prague, Czech Republic*, June 2016.
- 2016 P. Shakarian, Cybersecurity Initiative Business – Policy Roundtable #11: The Darkweb with New America Fellow Dr. Paulo Shakarian, *New America Foundation*, Washington D.C., June 2016.
- 2016 P. Shakarian, Diffusion in Social Networks. AAI Tutorial, Phoenix, AZ, Feb., 2016.

BOOKS (STUDENT CO-AUTHORS ARE IN ITALICS):

- 2017 J. Robertson, A. Diab, E. Marin, E. Nunes, J. Shakarian, **P. Shakarian**, *Darkweb Cyber Threat Intelligence Mining*, Cambridge University Press (March, 2017).
- 2015 **P. Shakarian**, A. Aleali, A. Bhatnagar, R. Guo, E. Shaabani, *Diffusion in Social Networks*, Springer (Sep., 2015).
- 2015 S. Jajodia, **P. Shakarian**, V.S. Subrahmanian, V. Swarup, C. Wang (eds.), *Cyber Warfare: Building the Scientific Foundation*, Springer, May 2015. Translated into Chinese.
- 2013 **P. Shakarian**, J. Shakarian, A. Ruef, *Introduction to Cyber Warfare: A Multidisciplinary Approach*, Elsevier/Syngress, June 2013. 9 out of 10 rating on *Slashdot*. Translated into Chinese.
- 2011 **P. Shakarian**, V.S. Subrahmanian, *Geospatial Abduction: Principles and Practice*, hardcover, Springer, November 2011.

BOOK CHAPTERS (STUDENT CO-AUTHORS ARE IN ITALICS):

- 2016 J. Shakarian, A. Gunn, **P. Shakarian**, Exploring Malicious Hacker Forums, in *Cyber Deception: Building the Scientific Foundation*, eds. S. Jajodia, V.S. Subrahmanian, V. Swarup, C. Wang, Springer.
- 2016 E. Nunes, N. Kulkarni, **P. Shakarian**, A. Ruef, J. Little, Cyber-Deception and Attribution in Capture-the-Flag Exercises, (extended version) in *Cyber Deception: Building the Scientific Foundation*, eds. S. Jajodia, V.S. Subrahmanian, V. Swarup, C. Wang, Springer.
- 2015 **P. Shakarian**, N. Kulkarni, M. Albanese, S. Jajodia, Keeping Intruders at Bay: A Graph-Theoretic Approach to Reducing the Probability of Successful Network Intrusions, in *E-Business and Telecommunications*, eds. M. S. Obaidat, A. Holzinger, J. Filipe, Springer.
- 2015 **P. Shakarian**, M. Martin, J. Bertetto, B. Fischl, J. Hannigan, G. Hernandez, E. Kenney, J. Lademan, D. Paulo, C. Young. Criminal Social Network Intelligence Analysis with the GANG Software. In *Illuminating Dark Networks: The Study of Clandestine Groups and Organizations*, ed. L. M. Gerdes, Cambridge University Press.
- 2015 **P. Shakarian**, G. I. Simari, G. Moores, S. Parsons. Cyber Attribution: An Argumentation-Based Approach. In *Cyber Warfare: Building the Scientific Foundation*, eds. Sushil Jajodia et al, Springer.
- 2011 **P. Shakarian**, V.S. Subrahmanian. Region-based Geospatial Abduction with Counter-IED Applications. In *Counterterrorism and Open Source Intelligence*, ed. U. Kock Wiil, Springer.

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PUBLICATIONS IN REFEREED JOURNALS (STUDENT CO-AUTHORS ARE IN ITALICS):

- 2017 *H. Alvari, P. Shakarian, J. Snyder, Semi-Supervised Learning for Detecting Human Trafficking, Springer Security Informatics, 2017 (accepted).*
- 2016 **P. Shakarian**, G. I. Simari, *G. Moores. D. Paulo, S. Parsons, M. Falappa, A. Aleali, Belief Revision in Structured Probabilistic Argumentation: Model and Application to Cyber Security, Springer Annals of Mathematics and Artificial Intelligence 78(3), Dec. 2016.*
- 2016 *R. Guo, E. Shaabani, A. Bhatnagar, P. Shakarian, Toward Early and Order-of-Magnitude Cascade Prediction in Social Networks, Social Network Analysis and Mining, 6(1), 2016. DOI 10.1007/s13278-016-0372-7*
- 2016 *J. Robertson, A. Diab, E. Marin, E. Nunes, V. Paliath, J. Shakarian, P. Shakarian, Darkweb Mining and Game Theory for Enhanced Cyber Threat Intelligence, Cyber Defense Review 1(2), fall 2016.*
- 2016 *G. I. Simari, P. Shakarian, M. Falappa, A Quantitative Approach to Belief Revision in Structured Probabilistic Argumentation, Springer Annals of Mathematics and Artificial Intelligence 76(3), April, 2016.*
- 2015 **P. Shakarian**, *A Multidisciplinary Survey of Social Network Diffusion Models, IEEE Intelligent Informatics Bulletin, 16(1), Dec. 2015.*
- 2014 *G. Moores, P. Shakarian, B. Macdonald, N. Howard. Finding Near-Optimal Groups of Epidemic Spreaders in a Complex Network, PLoS ONE 9(4).*
- 2013 **P. Shakarian**, *S. Eyre, D. Paulo. A Scalable Heuristic for Viral Marketing Under the Tipping Model, Social Network Analysis and Mining. Springer 3(4). “Best of 2013” by MIT Technology Review.*
- 2013 **P. Shakarian**, *P. Roos, G. Moores. A Novel Analytical Method for Evolutionary Graph Theory Problems, BioSystems. 111(2).*
- 2013 *D. Callahan, P. Shakarian, J. Nielsen, A.N. Johnson. Shaping Operations to Attack Robust Terror Networks, ASE Human Journal 1(1).*
- 2013 **P. Shakarian**, *M. Broecheler, V.S. Subrahmanian, C. Molinaro. Using Generalized Annotated Programs to Solve Social Network Diffusion Optimization Problems, ACM Transactions on Computational Logic. 14(2) 2013.*
- 2012 **P. Shakarian**, *J.K. Wickiser, Similar Pathogen Targets in Arabidopsis thaliana and Homo sapiens Protein Networks, PLoS ONE 7(9).*
- 2012 **P. Shakarian**, *P. Roos, A. Johnson. A Review of Evolutionary Graph Theory with Applications to Game Theory, BioSystems 107(2). #1 cited article of the journal since 2012 (as of July, 2017).*
- 2012 **P. Shakarian**, *J.P. Dickerson, V.S. Subrahmanian. Adversarial Geospatial Abduction Problems, ACM Transactions on Intelligent Systems and Technology 3(2).*
- 2012 **P. Shakarian**, *G. I. Simari, V.S. Subrahmanian. Annotated Probabilistic Temporal Logic: Approximate Fixpoint Implementation, ACM Transactions on Computational Logic 13(2).*
- 2011 **P. Shakarian**, *V.S. Subrahmanian, M.L. Sapino. GAPs: Geospatial Abduction Problems, ACM Transaction on Intelligent Systems and Technology 3(1).*
- 2011 **P. Shakarian**, *A. Parker, G.I. Simari, V.S. Subrahmanian. Annotated Probabilistic Temporal Logic, ACM Transactions on Computational Logic 12(2).*
- 2011 **P. Shakarian**, *The 2008 Russian Cyber-Campaign against Georgia, Military Review 91(6).*
- 2011 **P. Shakarian**, *C. Otsott. What is old is New: Counter-IED by Disrupting the Weapons Supply, Military Review 91(4).*

PUBLICATIONS IN REFEREED CONFERENCE AND WORKSHOP PROCEEDINGS (STUDENT CO-AUTHORS ARE IN ITALICS):

- 2017 *M. Almukaynizi, E. Nunes, K. Dharaiya, M. Senguttuvan, J. Shakarian, P. Shakarian, Proactive Identification of Exploits in the Wild Through Vulnerability Mentions Online, 2017 International Conference on Cyber Conflict (CyCon-US) (Nov. 2017).*
- 2017 *E. Marin, R. Guo, P. Shakarian, Temporal Analysis of Influence to Predict User's Adoption in Online Social Networks, International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS) 2017 (July, 2017).*
- 2017 *H. K. Kwon, J. H. Priniski, S. Sarkar, J. Shakarian, P. Shakarian, Crisis and Collective Problem Solving in Dark Web: An Exploration of a Black Hat Forum, 2017 International Conference on Social Media and Society (SMSociety) (July, 2017).*
- 2017 *A. Ruef, E. Nunes, P. Shakarian, G. Simari, Measuring Cyber Attribution In Games, 2017 IEEE Symposium on Electronic Crime Research (eCRIME 2017) (Apr. 2017).*
- 2016 *R. Guo, P. Shakarian, A Comparison of Methods for Cascade Prediction, 2016 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM-2016) (Aug. 2016).*
- 2016 *E. Nunes, P. Shakarian, G. Simari, A. Ruef, Argumentation Models for Cyber Attribution, Foundations of Open-Source Intelligence and Security Informatics (FOSINT-SI, held in conjunction with ASONAM-16) (Aug. 2016). Best Paper.*
- 2016 *E. Shaabani, H. Alvari, P. Shakarian, J. Snyder, MIST: Missing Person Intelligence Synthesis Toolkit, 25th ACM International Conference on Information and Knowledge Management (CIKM-16) (Oct. 2015). 19.8% acceptance rate.*
- 2016 *E. Nunes, A. Diab, Andrew Gunn, E. Marin, V. Mishra, V. Paliath, J. Robertson, J. Shakarian, A. Thart, P. Shakarian, Darknet and Deepnet Mining for Proactive Cybersecurity Threat Intelligence, 2016 IEEE Conference on Intelligence and Security Informatics (ISI-16) (Sep. 2016). Featured in *MIT Technology Review* and *Forbes*.*
- 2016 *E. Marin, A. Diab, P. Shakarian, Product Offerings in Malicious Hacker Markets, 2016 IEEE Conference on Intelligence and Security Informatics (ISI-16) (Sep. 2016). Featured in *Softpedia*.*
- 2016 *H. Alvari, P. Shakarian, J. Snyder, A Non-Parametric Learning Approach to Identify Online Human Trafficking, 2016 IEEE Conference on Intelligence and Security Informatics (ISI-16) (Sep. 2016).*
- 2016 *V. Paliath, P. Shakarian, Modeling Cyber-attacks on Industrial Control Systems, 2016 IEEE Conference on Intelligence and Security Informatics Doctorial Consortium (ISI-16) (Sep. 2016).*
- 2016 *N. Kumar, R. Guo, A. Aleali, P. Shakarian, An Empirical Evaluation of Social Influence Metrics, ASONAM Workshop on Social Influence (Aug. 2016).*
- 2016 *J.J. Robertson, V. Paliath, J. Shakarian, A. Thart, P. Shakarian, Data Driven Game Theoretic Cyber Threat Mitigation, 28th Innovative Applications of Artificial Intelligence (IAAI-16) (Feb. 2016). Provisional patent 62/261,200 (Nov. 30, 2015)*
- 2016 *E. Nunes, P. Shakarian, G. I. Simari, Toward Argumentation-Based Cyber Attribution, AAAI-16 Workshop on Artificial Intelligence and Cyber Security (Feb. 2016).*
- 2016 *P. Shakarian, J. Shakarian, Socio-Cultural Modeling for Cyber Threat Actors, AAAI-16 Workshop on Artificial Intelligence and Cyber Security (Feb. 2016).*
- 2015 *E. Shaabani, A. Aleali, P. Shakarian, J. Bertetto, Early Identification of Violent Criminal Gang Members, 21st ACM SIGKDD Conference on Knowledge, Discovery, and Data Mining (KDD) (Aug. 2015). [Video] Nominated for best paper; Provisional patent 62/191,086 (July 10, 2015); Featured on *Data Skeptic*.*
- 2015 *A. Stanton, A. Thart, A. Jain, P. Vyas, A. Chatterjee, P. Shakarian, Mining for Causal Relationships: A Data-Driven Study of the Islamic State, 21st ACM SIGKDD Conference on Knowledge, Discovery, and Data Mining (KDD) (Aug. 2015). [Video] Featured as *BBC Technology*'s lead story; also featured in the *Huffington Post*, *Business Insider*, and the Australian news media.*
- 2015 *R. Guo, E. Shaabani, A. Bhatnagar, P. Shakarian, Toward Order-of-Magnitude Cascade Prediction, 2015 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM-2015) (Aug. 2015). 11% acceptance rate. Provisional patent 62/201,517 (Aug. 5, 2015)*

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- 2015 X. Chen, S. Candan, M. L. Sapino, **P. Shakarian**, KSGM: Keynode-driven Scalable Graph Matching, *24th ACM International Conference on Information and Knowledge Management (CIKM-15)* (Oct. 2015). 18% acceptance rate.
- 2015 E. Nunes, N. Kulkarni, **P. Shakarian**, A Ruef, J. Little, Cyber-Deception and Attribution in Capture-the-Flag Exercises, *Foundations of Open-Source Intelligence and Security Informatics (FOSINT-SI, held in conjunction with ASONAM-15)* (Aug. 2015).
- 2015 E. Nunes, C. Buto, **P. Shakarian**, C. Lebiere, S. Bennati, R. Thomson, H. Jaenisch, Malware Task Identification: A Data Driven Approach, *Foundations of Open-Source Intelligence and Security Informatics (FOSINT-SI, held in conjunction with ASONAM-15)* (Aug. 2015). Provisional patent 62/182,006 (June 19, 2015); Related invention “Improved Malware Detection Technology” selected for Innovation Showcase at TechConnect 2016.
- 2015 R. Thomson, C. Lebiere, S. Bennati, **P. Shakarian**, E. Nunes. Malware Identification Using Cognitively-Inspired Inference. *24th Conference on Behavior Representation in Modeling and Simulation (BRIMS-15)* (April, 2015).
- 2015 C. Lebiere, S. Bennati, R. Thomson, **P. Shakarian**, E. Nunes. Functional Cognitive Models of Malware Identification. *13th International Conference on Cognitive Modeling (ICCM-15)* (April, 2015).
- 2014 **P. Shakarian**, J. Salmento, W. Pulleyblank, J. Bertetto. Reducing Gang Violence through Network Influence Based Targeting of Social Programs. *20th ACM SIGKDD Conference on Knowledge, Discovery, and Data Mining (KDD)* (Aug. 2014). 22% acceptance rate.
- 2014 **P. Shakarian**, D. Paulo, M. Albanese, S. Jajodia. Keeping Intruders at Large: A Graph-Theoretic Approach to Reducing the Probability of Successful Network Intrusions. *11th Intl. Conf. on Security and Cryptography (SECRYPT)* (Aug. 2014). 9% acceptance rate. Selected for inclusion in a subsequent edited volume.
- 2014 **P. Shakarian**, G. Simari, G. Moores, S. Parsons, M. Falappa. An Argumentation Based Framework to Address the Attribution Problem in Cyber Warfare. *Cyber Security 2014* (May 2014).
- 2014 **P. Shakarian**, H. Lei, R. Lindelauf. Power Grid Defense Against Malicious Cascading Failure. *13th Intl. Conf. on Autonomous Agents and Multiagent Systems (AAMAS-14)* (May 2014). 23.8% acceptance rate. Featured in *Foreign Policy* (online).
- 2014 **P. Shakarian**, G. Simari, M. Falappa. Belief Revision in Structured Probabilistic Argumentation. *Foundation of Information and Knowledge Systems 2014 (FoIKS 2014)* (Mar. 2014). 26.9% acceptance rate. Selected for journal version (42% of accepted papers).
- 2014 J. Hannigan, S. Matthews, J. Wickiser and **P. Shakarian**. A Network-Based Approach for Identifying Cancer Causing Pathogens. *ACM SE 2014* (Mar. 2014). Poster version was selected as “Best Student Poster” at ACM Tapia 2014.
- 2014 **P. Shakarian**, L. Gerdes, H. Lei. Circle-Based Tipping Cascades in Social Networks. *WSDM 2014 Workshop on Diffusion Networks and Cascade Analytics* (Feb. 2014).
- 2013 J. Hannigan, G. Hernandez, R. Medina, P. Roos, **P. Shakarian**. Mining for Spatially-Near Communities in Geo-Located Social Networks. *AAAI Fall Symposium* (Nov. 2013).
- 2013 D. Paulo, B. Fischl, T. Markow, M. Martin, **P. Shakarian**. Social Network Intelligence Analysis to Combat Street Gang Violence. *Foundations of Open-Source Intelligence and Security Informatics (FOSINT-SI, held in conjunction with ASONAM-13)* (Aug. 2013). Featured in the Jan. 2014 print edition of *Popular Science*.
- 2013 **P. Shakarian**, P. Roos, D. Callahan, C. Kirk. Mining for Geographically Disperse Communities in Social Networks by Leveraging Distance Modularity. *19th ACM SIGKDD Conference on Knowledge, Discovery, and Data Mining (KDD)* (Aug. 2013). 17% acceptance rate.
- 2013 **P. Shakarian**, G.I. Simari, D. Callahan. Reasoning about Complex Networks: A Logic Programming Approach. *29th Intl. Conference on Logic Programming (ICLP-13)* (tech. communication) (Aug. 2013).
- 2013 **P. Shakarian**, G.I. Simari, R. Schroeder. MANCaLog: A Logic for Multi-Attribute Network Cascades. *12th Intl. Conf. on Autonomous Agents and Multiagent Systems (AAMAS-13)* (May 2013).
- 2013 **P. Shakarian**, V.S. Subrahmanian. Geospatial Optimization Problems. *IEEE Network Science Workshop* (April 2013).

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- 2012 D. Callahan, **P. Shakarian**, *J. Nielsen*, A.N. Johnson. Shaping Operations to Attack Robust Terror Networks. *Social Informatics 2012* (Dec. 2012). 11.5% acceptance rate, selected for journal publication (top 3% of papers); featured in WIRED (online); presented to senior staffers from the House Permanent Select Committee on Intelligence (HPSC-I) at the U.S. Capitol; presented at the Central Intelligence Agency.
- 2012 **P. Shakarian**, D. Paulo. Large Social Networks can be Targeted for Viral Marketing with Small Seed Sets. *2012 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM-2012)* (Aug. 2012). 16% acceptance rate, Nominated for best paper and invited for journal publication.
- 2012 M. Albanese, A. De Benedictis, S. Jajodia, **P. Shakarian**. A Probabilistic Framework for the Localization of Attackers in MANETs. *17th European Symposium on Research in Computer Security (ESORICS 2012)* (Sep. 2012). 21% acceptance rate.
- 2011 **P. Shakarian**, P. Roos. Fast and Deterministic Computation of Fixation Probability in Evolutionary Graphs. *6th International Conference on Computational Intelligence and Bioinformatics (CIB-11)* (Nov. 2011).
- 2011 G. Johnson, **P. Shakarian**, N. Gupta, A. Agrawala. Towards Shrink-Wrapped Security: Practically Incorporating Context into Security Services. *Intl. Symposium on Frontiers in Ambient and Mobile Systems (FAMS-2011)* (Sep. 2011).
- 2011 **P. Shakarian**, M. K. Nagel, B. E. Schuetzle, V.S. Subrahmanian. Abductive Inference for Combat: Using SCARE-S2 to Find High-Value Targets in Afghanistan. *23rd Innovative Applications of Artificial Intelligence (IAAI-11)* (Aug. 2011). Featured in *The Economist* in April, 2012.
- 2010 M. Broecheler, **P. Shakarian**, V.S. Subrahmanian. A Scalable Framework for Modeling Competitive Diffusion in Social Networks. *2nd IEEE International Conference on Social Computing (SocialCom-10)* (symposium section) (Aug. 2012)
- 2010 **P. Shakarian**, V.S. Subrahmanian, M.L. Sapino. Using Generalized Annotated Programs to Solve Social Network Optimization Problems. *26th Intl. Conference on Logic Programming (ICLP-10)* (tech. communication) (Jul. 2010).
- 2009 **P. Shakarian**, V.S. Subrahmanian, M.L. Sapino. SCARE: A Case Study with Baghdad. *3rd Intl. Conference on Computational Cultural Dynamics (ICCCD-09)* (Dec. 2009). Featured in the *Baltimore Sun* and the online edition of *Popular Science* in Dec., 2009.

OTHER PUBLICATIONS (SOME NOT PEER-REVIEWED, STUDENT CO-AUTHORS IN ITALICS):

- 2017 **P. Shakarian**, The Enemy has a Voice. *New America Cybersecurity Initiative* (policy paper), 2017. Featured in *National Defense Magazine*, in Apr., 2017.
- 2016 **P. Shakarian**, Combating the Dangers of Big Data Analysis. *NGA Pathfinder*, 14(2), 2016.
- 2015 A. Kott, D. Alberts, A. Zalman, **P. Shakarian**, F. Maymi, C. Wang, G. Qu. Visualizing the Tactical Ground Battlefield in the Year 2050: Workshop Report. *U.S. Army Research Laboratory*, ARL-SR-0327, June 2015.
- 2015 J. Shakarian, **P. Shakarian**, A. Ruef. Cyber Attacks and Public Embarrassment: A Survey of Some Notable Hacks. *Elsevier SciTechConnect*, January, 2015.
- 2013 **P. Shakarian**, J. Shakarian, A. Ruef, The Dragon and the Computer: Why Intellectual Property Theft is Compatible with Chinese Cyber-Warfare Doctrine. *Elsevier SciTechConnect*, July, 2013.
- 2012 S. Eyre, R. Rotte, T. Taggart, C. Chewar, A. Johnson, P. Roos, **P. Shakarian**. Using RASCAL to Find Key Villages in Afghanistan. *Small Wars Journal*.
- 2011 **P. Shakarian**. Stuxnet: Cyberwar Revolution in Military Affairs. *Small Wars Journal*.

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PROVISIONAL PATENTS (U.S.):

- 62/409,291 (Oct. 17, 2016) Systems and Methods for an Intelligent Infrastructure for Cyber Threat Intelligence Gathering
- 62/345,193 (June 3, 2016) Missing Person Intelligence Synthesis Toolkit
- 62/261,200 (Nov. 30, 2015) Systems and Methods for Data Driven Game Theoretic Cyber Threat Mitigation, Non-provisional patent submitted
- 62/201,517 (Aug. 5, 2015) Systems and Methods for Order-of-Magnitude Viral Cascade Prediction in Social Networks, Non-provisional patent submitted
- 62/191,086 (July 10, 2015) Systems and Methods for Early Identification of Violent Criminal Gang Members
- 62/182,006 (June 19, 2015) Systems and Methods for Data Driven Malware Task Identification, Non-provisional patent submitted

ACADEMIC DUTIES AND SERVICE:

- Mentor, IEEE-ISI 2016 Doctoral Consortium
- Faculty Advisor, Fulton Student Veterans Organization (ASU) 2016-Present
- Mentor, Fulton Undergraduate Research Initiative (FURI) (ASU) Spring 2015-Present
- Committee Member, Admissions Committee, CIDSE (ASU) 2014-2016
- Faculty Advisor, West Point UPE (Computer Science Honor Society) Chapter, 2011-2014
- Faculty Advisor, Department Scholarship Program, West Point, 2011-2014
- Department Academic Counselor (Computer Science), West Point, 2011- 2014

PROFESSIONAL ACTIVITIES:

- Chairs
 - Co-Chair, *SI 2017: 3rd Workshop on Social Influence* (held in conjunction with ASONAM 2017)
 - Co-Chair, *SI 2016: 2nd Workshop on Social Influence* (held in conjunction with ASONAM 2016)
 - Co-Chair, *SI 2014: Workshop on Social Influence* (held in conjunction with SocInfo 2014)
 - Co-Chair, *ARO Workshop on Cyber Warfare: Building the Scientific Foundation* (2014)
 - Track chair, IEEE International Conference on Behavioral, Economic and Socio-cultural Computing (BESC) - International Security and Data Analytics Track (2014)
- Editorial Duties
 - Editorial board member, *Cyber Defense Review* (2017-present)
 - Guest editor, Springer *Social Network Analysis and Mining* (special issue “Diffusion of Influence and Information in Social Networks”) (2016)
- Committee Memberships
 - PC member, FOSINT-SI (co-located with ASONAM) (2014, 2015, 2016, 2017)
 - PC member, AAAI-2016
 - PC member, KDD (2015, 2016)
 - PC member, AAMAS (2015, 2016)
- Reviewer Duties
 - Reviewer for journal IEEE Transaction on Big Data (2017)
 - Reviewer for Springer *Social Network Analysis and Mining* (2016-2017)
 - Reviewer for Cambridge *Knowledge Engineering Review* (2016)
 - Reviewer for *Proceedings of the Royal Society A* (PRSA) (2013, 2015)
 - Reviewer for Europhysics Letters (EPL) (2015)
 - Reviewer for IEEE Transactions on Human-Machine Systems (2015)
 - Reviewer for Journal of Autonomous Agents and Multi-Agent Systems (2015)
 - Reviewer for Elsevier journal *BioSystems* (2012-2014)
 - Reviewer for Springer *Security Informatics* (2014)
 - Reviewer for *IEEE Transactions on Multimedia* (2013)