

Alexandru G. Bardas

Curriculum Vitae

(last update: September 2020)

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Education

Kansas State University, Manhattan, KS 2010 – 2016

PhD in Computer Science

– Co-Major Professors: Xinming Ou, Scott A. DeLoach

– Area of Study: Cybersecurity (Systems and Network Security)

– GPA: 4.0

– Dissertation Title: *Evaluating and Quantifying the Feasibility and Effectiveness of Whole IT System Moving Target Defenses*

James Madison University, Harrisonburg, VA

M.S. - Computer Science (Secure Software Systems) 2008 – 2010

Undergraduate Exchange Student 2007 – 2008

Romanian-American University, Bucharest, Romania 2005 – 2008

Diploma - Computer Science for Business Management

Diploma - Domestic and International Business, Banking and Finance
(“Bachelor’s Degree Thesis” Presentation July 2009)

Appointments

- **The University of Kansas**, Lawrence, KS
 - *Assistant Professor*, July 2017 – present
- **Kansas State University**, Manhattan, KS
 - *Visiting Assistant Professor*, June 2016 – June 2017
Coordinated (co-PI role) the research activities in various projects such as “Moving Target Defenses”, “Analyzing Security-Relevant Network Data”; and was involved in “Bringing Anthropology Into Cybersecurity”. Taught the following courses: “Computer and Information Security” (three credit-hours) and “Cyber Defense Basics” (one credit-hour).
 - *Graduate Research Assistant and Instructor*, May 2011 – May 2016
Worked on different research projects that resulted in various peer-reviewed publications. One of the projects required working daily in an operational security environment (01/2013 - 05/2013). Designed and taught the “Cyber Defense Basics” class together with Xinming Ou.
 - *Graduate Teaching Assistant*, August 2010 – May 2011
Taught the practical laboratory for an introductory programming class.

- **Hewlett Packard Labs**, Princeton, NJ
Research Associate Intern, May 2014 – August 2014
Mentors: Pratyusa Manadhata, William Horne

Worked on and enhanced an existing prototype for processing large amounts of Domain Name System (DNS) traffic in real-time. The project was transitioned to the product team and was recently converted into a commercial solution.
- **Arbor Networks**, Ann Arbor, MI
ASERT Engineer Intern, May 2013 – August 2013
Mentor: Marc R. Eisenbarth

Worked on developing techniques for mitigating DNS amplification abuses (resulted in a granted patent) and on clustering malware using fuzzy hashing (resulted in a poster at USENIX Sec. 2013).
- **James Madison University**, Harrisonburg, VA
Graduate Teaching Assistant, August 2008 – May 2010
Mentor: Ramon Mata-Toledo

Responsible for grading assignments and exams, holding office hours, and for organizing exam preparation sessions for various courses in computer science and mathematics.

Grants

1. University of Kansas GenCyber Summer Camp. PI: B. Luo co-PI: A. G. Bardas, F. Li, C. Seasholtz, D. Davidson. National Security Agency (NSA). \$99,871; Summer 2020 (postponed for 2021).
2. EAGER: SaTC: Early-Stage Interdisciplinary Collaboration: Collaborative: A Sociotechnical Metrics Framework for Network and Security Operations Centers. PIs: A. G. Bardas (lead), B. Fidler. National Science Foundation (NSF). \$300,000; June 2019 - estimated May 2021.
3. CRII: SaTC: Creating and Managing Structurally-Morphing IT Systems - Moving Targets. PI: A. G. Bardas. National Science Foundation (NSF). \$174,898; June 2019 - estimated May 2021.
4. University of Kansas GenCyber Summer Camp. PI: B. Luo co-PI: A. G. Bardas, F. Li, C. Seasholtz, D. Davidson. National Security Agency (NSA). \$99,871; Summer 2019.
5. University of Kansas GenCyber Summer Camp. PI: B. Luo co-PI: A. G. Bardas, F. Li, C. Seasholtz. National Security Agency (NSA). \$99,840; Summer 2018.
6. NSA Science of Security Lablet. PI: W. P. Alexander and co-PIs: A. G. Bardas, P. Kulkarni, F. Li, B. Luo, J. G. Morris, W. Staples, J. Sterbenz, J. Symons, M. Vitevitch, A. Williams, H. Yun. National Security Agency (NSA). *Pending project*.
7. Understanding and Quantifying the Impact of Moving Target Defenses on Computer Networks. PI: S. A. DeLoach and co-PIs: X. Ou, A. G. Bardas (starting summer 2016). Air Force Office of Scientific Research (AFOSR). \$1,000,311; April 2012 - September 2017.

Publications

1. Kailani R. Jones, Ting-Fang Yen, Sathya Chandran Sundaramurthy, Alexandru G. Bardas. “Deploying Android Security Updates: An Extensive Study Involving Manufacturers, Carriers, and End Users”. In *ACM SIGSAC Conference on Computer and Communications Security (CCS)*, November 2020.
2. Arman Ghasemi, Amin Shojaeighadikolaei, Kailani R. Jones, Morteza Hashemi, Alexandru G. Bardas, Reza Ahmadi. “A Multi-Agent Deep Reinforcement Learning Approach for a Distributed Energy Marketplace in Smart Grids”. In *IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm)*, November 2020.
3. Amin Shojaeighadikolaei, Arman Ghasemi, Kailani R. Jones, Alexandru G. Bardas, Morteza Hashemi, Reza Ahmadi. “Demand Responsive Dynamic Pricing Framework for Prosumer Dominated Microgrids using Multiagent Reinforcement Learning”. In *IEEE 2020 North American Power Symposium (NAPS)*, October 2020.
4. Dalton A. Hahn, Drew Davidson, and Alexandru G. Bardas. “MisMesh: Security Issues and Challenges in Service Meshes” (Short Paper). In *EAI Security and Privacy in Communication Networks (SecureComm)*, October 2020.
5. Yousif Dafalla, Bo Liu, Dalton A. Hahn, Hongyu Wu, Reza Ahmadi, and Alexandru G. Bardas. “Prosumer Nanogrids: A Cybersecurity Assessment”. In *IEEE Access*, Volume 8, July 2020.
6. Ron Andrews, Dalton A. Hahn, Alexandru G. Bardas. “Measuring the Prevalence of the Password Authentication Vulnerability in SSH”. In *IEEE International Conference on Communications (ICC) – Communications and Information System Security (CISS) Symposium*, June 2020.
7. Chandan Chowdhury, Dalton A. Hahn, Matthew R. French, Eugene Y. Vassermann, Pratyusa K. Manadhata, Alexandru G. Bardas. “eyeDNS: Monitoring a University Campus Network”. In *IEEE International Conference on Communications (ICC) – Communications and Information System Security (CISS) Symposium*, Kansas City, MO, USA, May, 2018.
8. Alexandru G. Bardas, Sathya C. Sundaramurthy, Xinming Ou, Scott A. DeLoach. “MTD CBITS: Moving Target Defense for Cloud-Based IT Systems”. In *22nd European Symposium on Research in Computer Security (ESORICS)*, Oslo, Norway, September, 2017.
9. Sathya C. Sundaramurthy, Michael Wesch, Xinming Ou, John McHugh, Siva Raj Rajagopalan, Alexandru G. Bardas. “Humans are dynamic. Our tools should be too. Innovations from the Anthropological Study of Security Operations Centers”. In *IEEE Internet Computing*, May/June, 2017.
10. Sathya Chandran Sundaramurthy, John McHugh, Xinming Ou, Michael Wesch, Alexandru G. Bardas, Siva Raj Rajagopalan. Turning contradictions into innovations or: how we learned to stop whining and improve security operations. In *12th on Symposium on Usable Privacy and Security (SOUPS 2016) in-cooperation with USENIX*, Denver, CO, USA, June, 2016.
11. Sathya Chandran Sundaramurthy, Alexandru G. Bardas, Jacob Case, Xinming Ou, Michael Wesch, John McHugh, Siva Raj Rajagopalan. A human capital model for mitigating security analyst burnout. In *2015 Symposium on Usable Privacy and Security (SOUPS 2015) in-cooperation with USENIX*, Ottawa, Canada, July, 2015. **Distinguished Paper Award**
12. Rui Zhuang, Alexandru G. Bardas, Scott A. DeLoach, Xinming Ou. A theory of cyber attacks – a step towards analyzing MTD systems. In *2nd ACM Workshop on Moving Target Defense (MTD)*, Denver, CO, USA, October, 2015.

13. Yuping Li, Sathya Chandran Sundaramurthy, Alexandru G. Bardas, Xinming Ou, Doina Caragea, Xin Hu, Jiyong Jang. Experimental study of fuzzy hashing in malware clustering analysis. In *8th USENIX Workshop on Cyber Security Experimentation and Test (CSET)*, Washington D.C., USA, August, 2015.
14. Ian Unruh, Alexandru G. Bardas, Rui Zhuang, Xinming Ou, Scott A. DeLoach. Compiling abstract specifications into concrete systems – bringing order to the cloud. In *28th USENIX Large Installation System Administration Conference (LISA)*, Seattle, WA, USA, November, 2014.
15. Rui Zhuang, Su Zhang, Alexandru G. Bardas, Scott A. DeLoach, Xinming Ou, Anoop Singhal. Investigating the application of moving target defenses to network security. In *6th International Symposium on Resilient Control Systems (ISRCS)*, San Francisco, CA, USA, August, 2013.
16. Alexandru G. Bardas and Xinming Ou. Setting up and using a cyber security lab for education purposes. In *Journal of Computing Sciences in Colleges*, Vol. 28, Issue 5, May, 2013.
17. Alexandru G. Bardas, Loai Zomlot, Sathya Chandran Sundaramurthy, Xinming Ou, S. Raj Rajagopalan, Marc R. Eisenbarth. Classification of UDP traffic for DDoS detection. In *5th USENIX Workshop on Large-Scale Exploits and Emergent Threats (LEET)*, San Jose, CA, USA, April, 2012.

Research Projects in Progress / Works Under Review

- Structurally-morphing IT systems – Moving targets in enterprise and CPS environments
- Developing metrics for network and security operations centers
- Embedding security in DevOps tools
- Cybersecurity assessments in prosumer environments (picogrids, microgrids, etc.)
- Prevalence of known vulnerabilities and shortcomings in large-scale operational environments
- Assessing software updating ecosystems

Refereed Posters

1. Alexandru G. Bardas. Creating and Managing Structurally-Morphing IT Systems – Moving Targets. The 2019 NSF Secure and Trustworthy CyberSpace Principal Investigators' Meeting. October 2019. Poster paper. (Invited)
2. Alexandru G. Bardas and Bradley Fidler. A Sociotechnical Metrics Framework for Network and Security Operation Centers. The 2019 NSF Secure and Trustworthy CyberSpace Principal Investigators' Meeting. October 2019. Poster paper. (Invited)
3. Dalton A. Hahn and Alexandru G. Bardas. Introducing Moving Target Defense Methods to Secure the World of IoT Devices in Cyber-Physical Systems. In the University of Kansas NSA Science of Security Lablet Workshop on Securing the Internet of Things. Kansas City, KS, USA, October 2018.
4. Alexandru G. Bardas, Ian Unruh, Rui Zhuang, Xinming Ou, Scott A. DeLoach. Compiling abstract specifications into concrete systems – bringing order to the cloud. In *USENIX Annual Technical Conference (ATC)*, Philadelphia, PA, USA, June, 2014.

5. Jason Jones, Marc R. Eisenbarth, Michael Barr, Alexandru G. Bardas. A survey of fuzzy hashing algorithms for malware clustering. In *USENIX Security*, Washington D.C., USA, August, 2013.
6. Alexandru G. Bardas, Loai Zomlot, Sathya Chandran Sundaramurthy, Xinming Ou, Siva Raj Rajagopalan, Marc R. Eisenbarth. Classification of UDP traffic for DDoS detection. In *USENIX Security*, Seattle, WA, USA, August, 2012.

Patents

- [*Protecting Computing Assets from Resource Intensive Querying Attacks*](#). US Patent 20150312272 A1. Roland E. Dobbins, Alexandru G. Bardas and Marc R. Eisenbarth. October 29, 2015.

Awards

- Bellows Scholar, School of Engineering, University of Kansas, 2019.
- University of Kansas New Faculty General Research Fund (NFGRF) Award, July 2018.
- Distinguished Paper Award in USENIX SOUPS 2015.
- Member of The Honor Society of Phi Kappa Phi ($\Phi\text{K}\Phi$), 2011.
- PhD Fellowship, Department of Computing and Information Sciences Kansas State University, 2010.
- Undergraduate Exchange Program Scholarship to study at James Madison University (2007 - 2008).
- Romanian National Olympiad in Logic, Argumentation and Communication, awarded finalist, 2005.

Invited Talks

- Invited Speaker at DataVisor, Cybersecurity Everywhere, Santa Clara CA, August 2019.
- Invited Speaker at the University of South Florida, Cybersecurity at the Crossroads of Science, Engineering, and Human Behavior, Tampa FL, May 2019.
- Presenter and panelist at “The Organizational Science & Cybersecurity Workshop” (sponsored by the National Science Foundation), George Mason University, Fairfax VA, July 2018.
- Panelist at CCSC Central Plains Regional Conference “Growing a Cybersecurity Program: Comparing and Contrasting Multiple Attempts”, Northwest Missouri State Univ., Maryville MO, April 2018.
- Panelist at the Global Headline Series event “Has Our Democracy Been Hacked? Russian Interference, Cybersecurity, Micro-Targeting & the 2016 Election”, Center for Global and International Studies at the University of Kansas, Lawrence KS, November 2017.
- Cybersecurity at the Intersection of Science, Engineering, and Human Behavior. Central Area Networking and Security Workshop (CANSec 2017), Rolla MO, October 2017.

- Invited Speaker at James Madison University, Cybersecurity at the Intersection of Science, Engineering, and Human Behavior, Harrisonburg VA, November 2016.
- Moving Target Defenses Quantification Workshop at George Mason University, A Security Metric Tailored for an MTD Platform, Fairfax VA, June 2016.
- Kansas Linux Fest, ANCOR – next gen. framework for cloud automation, Lawrence KS, March 2015.
- Hewlett Packard Labs - Princeton NJ, Compiling Abstract Specifications into Concrete Systems – Bringing Order to the Cloud through ANCOR, July 2014.

Courses Taught (Instructor)

- EECS 765: Introduction to Cryptography and Computer Security (Fall 2020)
Course website: www.alexbardas.com/sec/
- EECS 465: Cyber Defense (Fall 2020)
Course website: www.alexbardas.com/cyberdefense/
- EECS 448: Software Engineering I (Spring 2018)
Course website: www.alexbardas.com/eecs448/
- EECS 690: Cyber Defense (Spring 2019, Fall 2019, Spring 2020)
- EECS 765: Introduction to Cryptography and Computer Security (Fall 2017, 2018, 2019)
- CIS 751/551: Computer and Information Security (Fall 2016)
- CIS 490/798: Cyber Defense Basics (Fall 2016, 2015; Spring 2017, 2016)
- CIS 490K: Cyber Defense Basics (South Korean Summer Institute - Summer 2015)
- CIS 490/798: Cyber Defense Basics
(co-taught with Xinming Ou, Fall 2014, 2013, 2012, 2011; Spring 2015, 2014, 2013, 2012)

Courses as a Graduate Teaching Assistant

- Kansas State University
 - Spring 2011: CIS200 - Fundamentals of Software Design
 - Fall 2010: CIS200 - Fundamentals of Software Design
- James Madison University
 - Spring 2010: CS 228 - Discrete Structures II
 - Spring 2010: CS 227 - Discrete Structures I
 - Fall 2009: MATH 155- College Algebra
 - Fall 2009: CS 227 - Discrete Structures I
 - Spring 2009: MATH 205 - Introductory Calculus I
 - Spring 2009: CS 228 - Discrete Structures II
 - Fall 2008: MATH 205 - Introductory Calculus I
 - Fall 2008: CS 228 - Discrete Structures II

Professional Services

- Committees
 - Treasurer of ACM Conference on Computer and Communications Security (CCS 2020)
 - Program committee member of IEEE International Performance Computing and Communications Conference (IPCCC 2020)
 - Session chair at Kansas Power and Energy Conference (KPEC 2020)
 - Program committee member of NSA Hot Topics in the Science of Sec. (HotSoS 2019, 2020)
 - Program committee member of ACM Workshop on Moving Target Defense co-located with Conference on Computer and Communications Security (MTD 2018, 2019, 2020)
 - Chair for the Student Poster Session part of the University of Kansas Science of Security Lablet Workshop on Securing the Internet of Things (KU SoS 2018)
 - Co-chair for the CANSec 2017 Cyber Defense Competition
 - Member of the EECS “Ph.D. Qualifying Exam” committee
 - Member of the School of Engineering “Computer Committee”
 - Member on the “Advisory Board” of the Computer Science Dept. at Kansas State University
- External reviewer for journals and conferences
 - IEEE Transactions on Information Forensics and Security (TIFS 2019, 2020)
 - Journal of Cybersecurity - Springer (2018, 2019, 2020)
 - MDPI Sensors - Open Access Journal (Sensors 2019, 2020)
 - IEEE Transactions on Services Computing (TSC 2018, 2019)
 - ACM Workshop on Moving Target Defense (MTD 2014, 2015, 2016, 2017)
 - Journal of Computer Science and Technology - Springer (2018)
 - ACM Workshop on Cyber-Physical Systems Security & Privacy (CPS-SPC 2017)
 - IEEE Transactions on Internet Technology (2017)
 - IEEE Transactions on Dependable and Secure Computing (2017)
 - European Symposium on Research in Computer Security (ESORICS 2016)
 - ACM Conference on Computer and Communications Security (CCS 2015)
 - ACM Symposium on Information, Computer and Communications Security (ASIACCS 2014, 2015)
 - Conference on Network and System Security (NSS 2015)
- Cyber Defense Club at Kansas State University
 - Founded the club and coordinated club activities (2011 – 2014)
 - Built and managed the Cyber Defense Laboratory (approx. \$500,000 worth of equipment)
- Graduate Student Advisory Council (GSAC), Fall 2014 – Spring 2016
 - E-Seminars Committee, Fall 2015

Competitive Events, Trainings and Certifications

- Cyber Defense Competitions (coached and/or participated):
 - CANSec Cyber Defense Competition: 2018 (1st place)
 - National Cyber Defense Competition (NCDC) organized and hosted by Iowa State University: 2015 (3rd place), 2014 (2nd place)
 - Rocky Mountain Collegiate Cyber Defense Competition (RMCCDC) at Regis University: 2013 (2nd place), 2012 (5th place)
- Inquiry-based Cyber Defense Competition (CDC) Workshop, Iowa State University, March 2014
- Black Hat USA 2012 – Hacking by Numbers: BlackOps
- Certification for Information Systems Security Professionals (NSTISSI No. 4011), May 2010

Professional Affiliations

- Member of the Association for Computing Machinery (ACM)
- Member of the USENIX Association
- Member of The Honor Society of Phi Kappa Phi (ΦΚΦ)

Language Certifications

- German Language Certification (Deutsches Sprachdiplom – Zweite Stufe), 2005
- Cambridge English: Advanced (CAE), 2004