Brad Reaves

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Education

University of Florida
Doctor of Philosophy, Computer Engineering *2017*
Dissertation: "Authentication Techniques for Heterogeneous Telephone Networks"

Georgia Institute of Technology
Master of Science, Computer Science *2015*
Higher Education Certificate

Mississippi State University
Master of Science, Computer Engineering *2011*
Thesis: "An Open Virtual Testbed for Industrial Control System Security Research"
Information Security Certificate

Mississippi State University
Bachelor of Science, Computer Engineering *2010*
Summa cum laude with minors in Spanish and Mathematics

Academic Appointments

North Carolina State University
Assistant Professor, Computer Science *August 2017 – Present*

University of Florida
Predoctoral Fellow, Computer and Information Science and Engineering *January 2015 – July 2017*

Georgia Institute of Technology
Graduate Research Assistant, School of Computer Science *August 2011 – December 2014*

Mississippi State University
Graduate Research Assistant, Electrical and Computer Engineering *May 2010 – July 2011*

Mississippi State University
Undergraduate Research Assistant, Electrical and Computer Engineering *January 2009 – April 2010*

Industry Experience

Qualcomm Technologies Inc. **San Diego, CA**
Intern, Product Security *May 2015 – August 2015*

Hewlett Packard Company **Alpharetta, GA**
Intern, Web Security Research *May 2012 – August 2012*

Awards

- National Science Foundation Faculty Early Career Development (CAREER) Award, 2022
- Facebook Internet Defense Prize, First Place, 2020
- Distinguished Paper Award, 2020 USENIX Security Symposium
- Best Student Paper Award, 2022 ACM Symposium on Access Control Models and Technologies (SACMAT)
- Best Paper Award, 2019 ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)
- Best Paper Award, 2013 ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)
- Best Paper Award, 2010 IEEE eCrime Researchers Summit,
- Runner-up Best Paper Award, 2021 Measurements, Attacks, and Defenses for the Web (MADWeb) Workshop
- Best Poster Presentation Award: "Who's Calling? Characterizing Robocalls through Audio and Metadata Analysis" at NDSS 2020
- Distinguished Poster Award: "AuthentiCall: Efficient Identity and Content Authentication for Phone Calls" at NDSS 2017
- Best Networking Poster Award: "AuthentiCall: Efficient Identity and Content Authentication for Phone Calls" at 2017 FICS Conference
- Best Poster Award: "Boxed Out: Blocking Cellular Interconnect Bypass Fraud at the Network Edge" at 2016 FICS Conference
- Best Undergraduate Poster: B. Reaves and T. Morris, "Vulnerabilities in a Proprietary SCADA Wireless System." 2010 IEEE Power Energy Society Transmission and Distribution Conference.
- Engineering Poster Award: B. Reaves and T. Morris, "Vulnerabilities in a Proprietary SCADA Wireless System." Shackouls Honors College Undergraduate Research Symposium, Mississippi State University, April 2010.
- National Science Foundation Graduate Research Fellowship *2010*
- Gartner Group Info Tech Fund Scholarship *University of Florida, 2016*
- Symantec Research Labs Fellowship Finalist *2015*
- Harris Corporation Fellowship *University of Florida, 2015*
- Student Travel Grants to CCS 2012, the 2013 Trusted Infrastructure Workshop, ACSAC 2014 and 2015, NDSS 2015, USENIX Security 2015, and WiSec 2017
- Most Outstanding Computer Engineering Senior, *Mississippi State University, 2010*
- James Worth Bagley Supplemental Fellowship *Mississippi State University, 2010*
- Arts and Sciences Society of Scholars (Limited to top 1.5% of graduating seniors), *Mississippi State University, 2010*
- Shackouls Summer Undergraduate Research Fellow (Competitive research grant), *Mississippi State University, 2009*
- Joseph Barrier Engineering Scholarship *Mississippi State University, 2006*

- Nucor Foundation Academic Scholarship *Mississippi State University, 2006*
- National Merit Scholarship *Mississippi State University, 2006*

Teaching

Semester	Course	Class Size
North Carolina State University		
Spring 2023	CSC/ECE 574	*75 students*
Spring 2022	CSC/ECE 774	*20 students*
Fall 2021	CSC/ECE 574	*63 students*
Spring 2021	CSC 591/791	*13 students*
Fall 2020	CSC/ECE 574	*51 students*
Spring 2020	CSC/ECE 774	*12 students*
Fall 2019	CSC 474	*59 students*
Spring 2019	CSC 591/791	*12 students*
Fall 2018	CSC 474	*51 students*
Spring 2018	CSC/ECE 774	*21 students*
Fall 2017	CSC/ECE 574	*48 students*
Georgia Institute of Technology		
Summer 2014	CS 4235	*14 students*

PhD Students

- Dawuda Ahmed [Fall 2022 – present]
- Hafiza Ramzah Rehman [Spring 2021 – present]
- Aleksandr Nahapetyan [Fall 2020 – present; co-advised with Dr. Alexandros Kapravelos]
- Trevor Dunlap [Fall 2020 – present; co-advised with Dr. William Enck]
- Alex Ross [Fall 2020 – present]
- Lorenzo Neil [Fall 2019 – present]
- Sathvik Prasad [Fall 2019 – present]

Publications

Dr. Reaves's students are suffixed with a superscript "*".

Journal Publications

[J1] **Reaves, Bradley**, Luis Vargas, Nolen Scaife, Dave Tian, Logan Blue, Patrick Traynor, and Kevin R. B. Butler. Characterizing the security of the SMS ecosystem with public gateways. *ACM Transactions on Privacy and Security*, 22(1):2:1–2:31, December 2018.

[J2] Stephan Heuser, **Bradley Reaves**, Praveen Kumar Pendyala, Henry Carter, Alexandra Dmitrienko, William Enck, Negar Kiyavash, Ahmad-Reza Sadeghi, and Patrick Traynor. Phonion: Practical protection of metadata in telephony networks. *Proceedings on Privacy Enhancing Technologies*, 2017(1), January 2017.

[J3] **Bradley Reaves**, Jasmine Bowers, Nolen Scaife, Adam Bates, Arnav Bhartiya, Patrick Traynor, and Kevin R.B. Butler. Mo(bile) money, mo(bile) problems: Analysis of branchless banking applications in the developing world. In *ACM Transactions on Privacy and Security*, 2017.

[J4] **Bradley Reaves**, Jasmine Bowers, Sigmond A. Gorski III, Olabode Anise, Rahul Bobhate, Raymond Cho, Hiranava Das, Sharique Hussain, Hamza Karachiwala, Nolen Scaife, Byron Wright, Kevin Butler, William Enck, and Patrick Traynor. *droid: Assessment and evaluation of Android application analysis tools. *ACM Computing Surveys*, 49(3), October 2016.

[J5] **Bradley Reaves** and Thomas Morris. Analysis and mitigation of vulnerabilities in short-range wireless communications for industrial control systems. *International Journal of Critical Infrastructure Protection*, 2012.

[J6] **Bradley Reaves** and Thomas Morris. An open virtual testbed for industrial control system security research. *International Journal of Information Security*, 11(4):215–229, 2012.

[J7] Thomas Morris, Anurag Srivastava, **Bradley Reaves**, Wei Gao, Kalyan Pavurapu, and Ram Reddi. A control system testbed to validate critical infrastructure protection concepts. *International Journal of Critical Infrastructure Protection*, August 2011.

Peer-reviewed Full Conference Publications

[C1] S. Prasad*, T. Dunlap*, A. Ross*, and **B. Reaves**. Diving into Robocall Content with SNORCall. In *Proceedings of the USENIX Security Symposium*, August 2023.

[C2] Setu Kumar Basak, Lorenzo Neil*, **Bradley Reaves**, and Laurie Williams. What Challenges Do Developers Face About Checked-in Secrets in Software Artifacts? In *Proceedings of the IEEE/ACM International Conference on Software Engineering*, May 2023.

[C3] Setu Basak, Lorenzo Neil*, **Bradley Reaves**, and Laurie Williams. What are the practices for secret management in software artifacts? In *Proceedings of the IEEE Secure Development Conference*, Atlanta, GA, October 2022.

[C4] Igibek Koishybayev, Aleksandr Nahapetyan*, Raima Zachariah, Siddharth Muralee, **Bradley Reaves**, Alexandros Kapravelos, and Aravind Machiry. Characterizing the security of GitHub CI workflows. In *Proceedings of the USENIX Security Symposium*, Boston, MA, August 2022. (Acceptance Rate: 14%).

[C5] Trevor Dunlap*, William Enck, and **Bradley Reaves**. A study of application sandbox policies in Linux. In *Proceedings of the ACM on Symposium on Access Control Models and Technologies*, pages 19—30, New York, NY, USA, June 2022. (Acceptance Rate: 31%).

[C6] Iffat Anjum, Daniel Kostecki, Ethan Leba, Jessica Sokal, Rajit Bharambe*, William Enck, Cristina Nita-Rotaru, and **Bradley Reaves**. Removing the reliance on perimeters for security using network

views. In *Proceedings of the 27th ACM on Symposium on Access Control Models and Technologies*, pages 151—162, New York, NY, 2022. (Acceptance Rate: 31%).

[C7] Lorenzo Neil*, Elijah Bouma-Sims*, Evan Lafontaine, Yasemin Acar, and **Bradley Reaves**. Investigating web service account remediation advice. In *Proceedings of the USENIX Symposium on Usable Privacy and Security*, August 2021. (Acceptance Rate: 26%).

[C8] Abida Haque, Varun Madathil, **Bradley Reaves**, and Alessandra Scafuro. Anonymous device authorization for cellular networks. In *ACM Conference on Security and Privacy in Wireless and Mobile Networks*, pages 25–36, Abu Dhabi, United Arab Emirates, July 2021. (Acceptance Rate: 28%).

[C9] Matthew McNiece*, Ruidan Li, and **Bradley Reaves**. Characterizing the security of endogenous and exogenous desktop application network flows. In *Proceedings of the Passive and Active Measurement Conference*, March 2021. (Acceptance Rate: 44%).

[C10] Benjamin Andow, Samin Yaseer Mahmud, Justin Whitaker*, William Enck, **Bradley Reaves**, Kapil Singh, and Serge Egelman. Actions speak louder than words: Entity-sensitive privacy policy and dataflow analysis with PoliCheck. In *Proceedings of the USENIX Security Symposium*, August 2020. (Acceptance Rate: 16%).

[C11] Samin Yaseer Mahmud, Akhil Acharya, Benjamin Andow, William Enck, and **Bradley Reaves**. Cardpliance: PCI DSS compliance of Android applications. In *Proceedings of the USENIX Security Symposium*, August 2020. (Acceptance Rate: 16%).

[C12] Sathvik Prasad*, Elijah Bouma-Sims*, Athishay Kiran Mylappan*, and **Bradley Reaves**. Who's calling? Characterizing robocalls through audio and metadata analysis. In *Proceedings of the USENIX Security Symposium*, August 2020. (Acceptance Rate: 16%).

[C13] Justin Whitaker*, Sathvik Prasad*, **Bradley Reaves**, and William Enck. Thou shalt discuss security: Quantifying the impacts of instructions to RFC authors. In *Proceedings of the Security Standardisation Research Conference*, November 2019. (Acceptance Rate: 35%).

[C14] Benjamin Andow, Samin Yaseer Mahmud, Wenyu Wang, Justin Whitaker*, William Enck, **Bradley Reaves**, Kapil Singh, and Tao Xie. PolicyLint: Investigating internal privacy policy contradictions on Google Play. In *Proceedings of the USENIX Security Symposium*, August 2019. (Acceptance Rate: 16.2%).

[C15] TJ O'Connor, William Enck, and **Bradley Reaves**. Blinded and confused: Uncovering systemic flaws in device telemetry for smart-home internet of things. In *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks*, May 2019. (Acceptance Rate: 25.6%).

[C16] TJ O'Connor, Reham Mohamed, Markus Miettinen, William Enck, **Bradley Reaves**, and Ahmad-Reza Sadeghi. HomeSnitch: Behavior transparency and control for smart home IoT devices. In *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks*, May 2019. (Acceptance Rate: 25.6%).

[C17] Michael Meli*, Matthew McNiece*, and **Bradley Reaves**. How bad can it git? Characterizing secret leakage in public GitHub repositories. In *Proceedings of the Networked and Distributed Systems Security Symposium (NDSS)*, February 2019. (Acceptance Rate: 17.1%).

[C18] Dominik Wermke, Nicolas Huaman, Yasemin Acar, **Bradley Reaves**, Patrick Traynor, and Sascha Fahl. A large scale investigation of obfuscation use in Google Play. In *Proceedings of the Annual Computer Security Applications Conference*, December 2018. (Acceptance Rate: 20.1%).

[C19] Christian Peeters, Hadi Abdullah, Nolen Scaife, Jasmine Bowers, Patrick Traynor, **Bradley Reaves**, and Kevin Butler. Sonar: Detecting SS7 redirection attacks via call audio-based distance bounding. In *Proceedings of the IEEE Symposium on Security and Privacy*, May 2018. (Acceptance Rate: 10.4%).

[C20] Jasmine Bowers, **Bradley Reaves**, Imani N. Sherman, Patrick Traynor, and Kevin Butler. Regulators, mount up? Analysis of privacy policies for mobile money applications. In *Proceedings of the USENIX Symposium on Usable Privacy and Security*, August 2017. (Acceptance Rate: 26.5%).

[C21] **Bradley Reaves**, Logan Blue, Hadi Abdullah, Luis Vargas, Patrick Traynor, and Tom Shrimpton. AuthentiCall: Efficient identity and content authentication for phone calls. In *Proceedings of the USENIX Security Symposium*, August 2017. (Acceptance Rate: 16.3%).

[C22] Adam Bates, Wajih Ul Hassan, Kevin Butler, Alin Dobra, **Bradley Reaves**, Patrick Cable, Thomas Moyer, and Nabil Schear. Transparent web service auditing via network provenance functions. In *Proceedings of the International World Wide Web Conference*, April 2017. (Acceptance Rate: 17%).

[C23] **Bradley Reaves**, Logan Blue, and Patrick Traynor. Authloop: Practical end-to-end cryptographic authentication for telephony over voice channels. In *Proceedings of the USENIX Security Symposium*, Austin, TX, August 2016. (Acceptance Rate: 15.5%).

[C24] **Bradley Reaves**, Nolen Scaife, Dave Tian, Logan Blue, Patrick Traynor, and Kevin Butler. Sending out an SMS: Characterizing the security of the SMS ecosystem with public gateways. In *Proceedings of the IEEE Symposium on Security and Privacy*, San Jose, CA, May 2016. (Acceptance Rate: 13.0%).

[C25] **Bradley Reaves**, Nolen Scaife, Adam Bates, Patrick Traynor, and Kevin R.B. Butler. Mo(bile) money, mo(bile) problems: Analysis of branchless banking applications in the developing world. In *Proceedings of the USENIX Security Symposium*, August 2015. (Acceptance Rate: 15.7%).

[C26] **Bradley Reaves**, Ethan Shernan, Adam Bates, Henry Carter, and Patrick Traynor. Boxed out: Blocking cellular interconnect bypass fraud at the network edge. In *Proceedings of the USENIX Security Symposium*, August 2015. (Acceptance Rate: 15.7%).

[C27] David Dewey, **Bradley Reaves**, and Patrick Traynor. Uncovering use-after-free conditions in compiled code. In *Proceedings of the International Conference on Availability, Reliability, and Security*, 2015. (Acceptance Rate: 22.0%).

[C28] Saurabh Chakradeo, **Bradley Reaves**, Patrick Traynor, and William Enck. MAST: Triage for market-scale mobile malware analysis. In *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks*, April 2013. (Acceptance Rate: 15.0%).

[C29] Charles Lever, Manos Antonakakis, **Brad Reaves**, Patrick Traynor, and Wenke Lee. The core of the matter: Analyzing malicious traffic in cellular carriers. In *Proceedings of the Network and Distributed System Security Symposium*, San Diego, CA, February 2013. (Acceptance Rate: 18.8%).

[C30] Wei Gao, Thomas Morris, **Bradley Reaves**, and Drew Richey. On SCADA control system command and response injection and intrusion detection. In *IEEE eCrime Researchers Summit*, Dallas, TX, October 2010.

[C31] Thomas Morris, Anurag Srivastava, **Bradley Reaves**, Kalyan Pavurapu, Sharif Abdelwahed, Rayford Vaughn, Wesley McGrew, and Yoginder Dandass. Engineering future cyber-physical energy systems: Challenges, research needs, and roadmap. In *2009 IEEE North American Power Symposium*, Starkville, MS, October 2009.

[C32] **Bradley Reaves** and Thomas Morris. Discovery, infiltration, and denial of service in a process control system wireless network. In *2009 eCrime Researchers Summit*, Tacoma, WA, USA, October 2009.

Peer-reviewed Short Conference and Workshop Publications

[SC1] Elijah Bouma-Sims* and **Bradley Reaves**. A first look at scams on YouTube. In *Proceedings of the Workshop on Measurements, Attacks, and Defenses for the Web (MADWeb)*, 2021. (Acceptance Rate: 25.6%).

[SC2] Sanket Goutam*, William Enck, and **Bradley Reaves**. Hestia: Simple least privilege network policies for smart homes. In *Proceedings of the 12th Conference on Security and Privacy in Wireless and Mobile Networks*, May 2019. *Short Paper.* (Acceptance Rate: 25.6%).

[SC3] **Bradley Reaves**, Logan Blue, Dave Tian, Patrick Traynor, and Kevin R. B. Butler. Detecting SMS spam in the age of legitimate bulk messaging. In *Proceedings of the 9th ACM Conference on Security and Privacy in Wireless and Mobile Networks*, July 2016. *Short Paper.* (Acceptance Rate: 28.0%) .

Magazine Articles

[M1] Sathvik Prasad* and **Bradley Reaves**. Does ignoring robocalls make them stop? Here's what we learned from getting 1.5 million calls on 66,000 phone lines. *The Conversation*, September 2020.

[M2] Patrick Traynor, Kevin Butler, Jasmine Bowers, and **Bradley Reaves**. FinTechSec: Addressing the security challenges of digital financial services. *IEEE Security & Privacy Magazine*, 15(5):85–89, 2017.

External Service

Conference and Workshop Organization

Workshops Co-Chair: ISOC Network and Distributed System Security Symposium (NDSS), 2020–2021.

Artifact Evaluation Co-Chair: ACM Conference in Security and Privacy in Wireless and Mobile Networks (WiSec): 2021 – 2022.

Poster Chair: Usenix Security Symposium, 2019.

Awards Committee: Usenix Security Symposium, 2020.

Scholarship Committee: Tapia Celebration of Diversity in Computing, 2018.

Publicity Chair: ISOC Network and Distributed System Security Symposium (NDSS), 2018.

Web Chair: IEEE Symposium on Security and Privacy (Oakland), 2017.

Technical Program Committee Chair (Total = 1)

- ACM Conference on Security and Privacy in Wireless Networks: 2023
  [*with Nils Tippenhauer*]

Technical Program Committee Member (Total = 30)

- USENIX Security Symposium: 2018–2023.
- ISOC Network and Distributed System Security Symposium (NDSS): 2018–2021.
- IEEE Symposium on Security and Privacy (S&P): 2023.
- ACM Conference on Computer and Communications Security (CCS): 2018.
- IEEE European Symposium on Security and Privacy (EuroS&P): 2022.
- ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec): 2018–2023.
- Passive and Active Measurement Conference (PAM): 2021.
- International Workshop on Ethics in Computer Security (EthiCS): 2022–2023.
- Workshop on Technology and Consumer Protection (ConPro): 2021–2023.
- Workshop on Usable Security (USEC): 2018, 2019.
- Mobile Security Technologies (MoST) Workshop: 2017.
- European Workshop on Usable Security: 2017.
- USENIX Workshop on Offensive Technologies: 2016.

Journal Reviews

- ACM Transactions on Internet Technology 2016
- ACM Transactions on Privacy and Security 2016–2020
- Communications of the ACM 2012
- IEEE Transactions on Dependable and Secure Computing 2013, 2019
- IEEE Transactions on Emerging Topics in Computer Science 2014
- IEEE Transactions on Information Forensics and Security 2016–2017
- Journal of Information Security and Applications 2017

- Journal of CyberSecurity 2019

Relevant Skills

Programming Languages: Python, C, Java, Matlab, JavaScript, bash, zsh, CoffeeScript, Groovy, PLC Ladder Logic, SQL, Gremlin, C++, C#, Tcl, R, Dalvik

System Administration:: MacOS, Ubuntu and Fedora Linux, Windows, ESXi/vCenter, proxmox, pfSense

Tools: Vim, LaTeX, Git, Subversion, PostGres, MongoDB, Neo4J, Docker, Jupyter, Sci-kit Learn, Hugo, CSS, OpenBTS

Methodologies: Statistics, Machine Learning, Natural Language Processing, Reverse Engineering, Digital Signal Processing, Digital Communications, Program Analysis, Network Analysis, Cryptography, Qualitative Analysis

Natural Languages: English (native), Spanish (B2), French (A1 spoken, B1 reading), German (A1)

Citizenship: United States of America

Membership in Professional Organizations

- Association for Computing Machinery 2009 – Present
- Institute of Electrical and Electronics Engineers 2007 – Present
- USENIX, the Advanced Computing Systems Association 2017 – Present
- Communications Fraud Control Association 2018 – Present