

# Brad Reaves

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## Education

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### 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

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### North Carolina State University

*Assistant Professor, Computer Science* August 2017 – Present

### University of Florida

*Predocctoral 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

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### Qualcomm Technologies Inc.

*Intern, Product Security*

**San Diego, CA**

May 2015 – August 2015

### Hewlett Packard Company

*Intern, Web Security Research*

**Alpharetta, GA**

May 2012 – August 2012

## Awards

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- 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

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| Semester                               | Course      | Class Size  |
|--|-------------|-------------|
| <b>North Carolina State University</b> |             |             |
| 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 |
| <b>Georgia Institute of Technology</b> |             |             |
| Summer 2014                            | CS 4235     | 14 students |

## PhD Students

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- 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

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Dr. Reeves's students are suffixed with a superscript “\*”.

### Journal Publications

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[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 Trans. Priv. Secur.*, 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] **Reaves, Bradley** 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] **Reaves, Bradley** 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] 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. IEEE.

[C2] Igibek Koishybayev, Aleksandr Nahapetyan\*, Raima Zachariah, Siddharth Muralee, **Bradley Reaves**, Alexandros Kapravelos, and Aravind Machiry. Characterizing the security of github CI workflows. In *31st USENIX Security Symposium (USENIX Security 22)*, Boston, MA, August 2022. USENIX Association. (Acceptance Rate: 14%).

[C3] Iffat Anjum, Daniel Kostecki, Ethan Leba, Jessica Sokal, Bharambe, Rajit\*, William Enck, Cristina Nita-Rotaru, and **Reaves, Bradley**. Removing the reliance on perimeters for security using network views. In *Proceedings of the 27th ACM on Symposium on Access Control Models and Technologies*, page 151–162, New York, NY, USA, 2022. Association for Computing Machinery. (Acceptance Rate: 31%).

[C4] Trevor Dunlap\*, William Enck, and **Bradley Reaves**. A study of application sandbox policies in linux. In *Proceedings of the 27th ACM on Symposium on Access Control Models and Technologies*, page 19–30, New York, NY, USA, 2022. Association for Computing Machinery. (Acceptance Rate: 31%).

[C5] Abida Haque, Varun Madathil, **Bradley Reaves**, and Alessandra Scafuro. Anonymous device authorization for cellular networks. In *WiSec '21: 14th ACM Conference on Security and Privacy in Wireless and Mobile Networks, Abu Dhabi, United Arab Emirates, 28 June - 2 July, 2021*, pages 25–36, 2021. (Acceptance Rate: 28%).

- [C6] Lorenzo Neil\*, Elijah Bouma-Sims\*, Evan Lafontaine, Yasemin Acar, and **Bradley Reaves**. Investigating web service account remediation advice. In *Seventeenth Symposium on Usable Privacy and Security, SOUPS 2021, August 8-10, 2021*. USENIX Association, 2021. (Acceptance Rate: 26%).
- [C7] Matthew McNiece\*, Ruidan Li, and **Bradley Reaves**. Characterizing the Security of Endogenous and Exogenous Desktop Application Network Flows. In *Proceedings of the 2021 Passive and Active Measurement Conference*, 2021. (Acceptance Rate: 44%).
- [C8] 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*, 2020. (Acceptance Rate: 16%).
- [C9] 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*, 2020. (Acceptance Rate: 16%).
- [C10] 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*, 2020. (Acceptance Rate: 16%).
- [C11] 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%).
- [C12] 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%).
- [C13] TJ OConnor, William Enck, and **Reaves, Bradley**. Blinded and confused: Uncovering systemic flaws in device telemetry for smart-home internet of things. In *Proceedings of the 12th Conference on Security and Privacy in Wireless and Mobile Networks, WiSec '19*, May 2019. (Acceptance Rate: 25.6%).
- [C14] TJ OConnor, Reham Mohamed, Markus Miettinen, William Enck, **Reaves, Bradley**, and Ahmad-Reza Sadeghi. Homesnitch: Behavior transparency and control for smart home iot devices. In *Proceedings of the 12th Conference on Security and Privacy in Wireless and Mobile Networks, WiSec '19*, May 2019. (Acceptance Rate: 25.6%).
- [C15] Meli, Michael\*, McNiece, Matthew\*, and **Reaves, Bradley**. How Bad Can It Get? Characterizing Secret Leakage in Public GitHub Repositories. In *Proceedings of the Networked and Distributed Systems Security Symposium (NDSS)*, February 2019. (Acceptance Rate: 17.1%).
- [C16] 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%).

- [C17] 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 39th IEEE Symposium on Security and Privacy*, 2018. (Acceptance Rate: 10.4%).
- [C18] **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 26th USENIX Security Symposium*, August 2017. (Acceptance Rate: 16.3%).
- [C19] Adam Bates, Wajih UI 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 26th International World Wide Web Conference*, April 2017. (Acceptance Rate: 17%).
- [C20] Jasmine Bowers and **Bradley Reaves** and Imani N. Sherman and Patrick Traynor and Kevin Butler. Regulators, Mount Up? Analysis of Privacy Policies for Mobile Money Applications. In *Proceedings of the Thirteenth Symposium on Usable Privacy and Security*, 2017. (Acceptance Rate: 26.5%).
- [C21] **Bradley Reaves**, Logan Blue, and Patrick Traynor. Authloop: Practical End-to-End Cryptographic Authentication for Telephony over Voice Channels. In *Proceedings of 25th USENIX Security Symposium*, Austin, TX, August 2016. (Acceptance Rate: 15.5%).
- [C22] **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 37th IEEE Symposium on Security and Privacy*, San Jose, CA, May 2016. (Acceptance Rate: 13.0%).
- [C23] David Dewey, **Bradley Reaves**, and Patrick Traynor. Uncovering Use-After-Free Conditions In Compiled Code. In *Proceedings of the 2015 International Conference on Availability, Reliability, and Security (ARES)*, 2015. (Acceptance Rate: 22.0%).
- [C24] **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 24th USENIX Security Symposium*, 2015. (Acceptance Rate: 15.7%).
- [C25] **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 24th USENIX Security Symposium*, 2015. (Acceptance Rate: 15.7%).
- [C26] 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 20th Network and Distributed System Security Symposium*, San Diego, CA, February 2013. (Acceptance Rate: 18.8%).
- [C27] 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 (WiSec)*, 2013. (Acceptance Rate: 15.0%).

[C28] 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.

[C29] 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.

[C30] **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*, MADWeb '21, 2021. (Acceptance Rate: 25.6%).

[SC2] Goutam, Sanket\*, Enck, William, and **Reaves, Bradley**. Hestia: Simple least privilege network policies for smart homes. In *Proceedings of the 12th Conference on Security and Privacy in Wireless and Mobile Networks*, WiSec '19, 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] P. Traynor, K. Butler, J. Bowers, and **B. Reaves**. Fintechsec: Addressing the security challenges of digital financial services. *IEEE Security & Privacy Magazine*, 15(5):85–89, 2017.

## External Service

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### 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 = 22)**.....

- 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
- Workshop on Technology and Consumer Protection (ConPro) 2021–2022
- 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**

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

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



**Tools:** Vim, L<sup>A</sup>T<sub>E</sub>X, Git, Subversion, PostGres, MongoDB, Neo4J, Docker, Jupyter, Sci-kit Learn, 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

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- 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