Travis W. Peters

Ph.D. Candidate, Department of Computer Science, Dartmouth College

traviswp@cs.dartmouth.edu

Research Interests

Computer and Network Security; mHealth and IoT security; Trusted Computing; Mobile and Wireless Systems

Education

Ph.D., Computer Science *2013 - present (expected: June 2019)*
Dartmouth College, Hanover, NH
Thesis Title: Securing Personal Devices and Networks in the Internet of Things (IoT)
Advisor: Dr. David Kotz
Doctoral Committee: Dr. David Kotz, Dr. Sean Smith, Dr. Xia Zhou, Dr. José Camacho

B.S., Mathematics & Computer Science *2008 - 2012*
Western Washington University (WWU), Bellingham, WA

Teaching Experience

Teaching

Problem Solving via Object-Oriented Programming (COSC 10), *Dartmouth College* *Winter 2015*

Teaching Assistantships

Software Design & Implementation (COSC 50), *Dartmouth College* *Spring 2016*
Introduction to Programming & Computing (COSC 1), *Dartmouth College* *Spring 2014*
Problem Solving via Object-Oriented Programming (COSC 10), *Dartmouth College* *Winter 2014*
Introduction to Programming & Computing (COSC 1), *Dartmouth College* *Fall 2013*
Programming Fundamentals in C++ (CSCI 140), *Western Washington University* *Fall 2012*
Teaching Assistant, *Family House Academy* *Summer 2009*

Guest Lectures

Debugging with GDB and Valgrind, *Dartmouth College (COSC 50)* *January 2018, April 2017, April 2016*
A 65-minute lecture on debugging program logic and memory leaks with GDB and Valgrind. This lesson includes an exercise where students get to discover and fix a buffer-overflow vulnerability.
Notes at `https://traviswp.github.io/classes/debugging-gdb-valgrind/`.

Introduction to Pebble Development, *Dartmouth College (COSC 50)* *April 2016*
A 65-minute lecture on programming on Pebble smartwatches and a culminating team project.
Notes at `https://traviswp.github.io/classes/pebble-project-intro/`.

Three Kinds of Memory, *Dartmouth College (COSC 50)* *April 2016*
A 65-minute lecture on understanding the different kinds of memory and basic memory management in C.
Notes at `https://traviswp.github.io/classes/memory/`.

Research Experience

Research Assistant, *Dartmouth College, Hanover, NH* *January 2014 - Present*
Researching security and privacy threats in mobile health (mHealth). We focus on system and network security within personal area networks and body area networks of health and wellness devices. To this end, we design and experimentally validate hardware and software architectures. To learn more, visit our websites: Trustworthy Health and Wellness (`thaw.org`) and The Amulet Project (`amulet-project.org`).

Security Research Intern, *Intel Labs, Hillsboro, OR* *June 2016 - September 2016*
Conducted a survey on security and privacy threats in the Internet of Things (IoT). Presented findings internally and worked with others to develop a larger IoT security research agenda.

Security Research Intern, *Intel Labs, Hillsboro, OR* *June 2015 - September 2015*
Designed a security architecture to enhance Bluetooth security. Our work is built on top of Intel's SGX – state-of-the-art system security features. Our work was published in *HASP'18* and a related patent has been filed.

Industry Experience

DevOps Engineer, *Attachmate, Bellingham/Seattle, WA* *January 2013 - August 2013*

- Designed and built an automated virtual machine (VM) template management infrastructure using Chef and VMware's vCloud Director. The infrastructure automated how VMs running various operating systems (Windows, Red Hat Linux, SUSE) are deployed and maintained (patched & updated).
- Developed automation routines in Ruby, Bash, and Batch (install software, configure machine settings, etc.).
- Wrote and maintained design specifications and unit tests.

Software Engineer Intern, *Attachmate, Bellingham, WA* *August 2012 - December 2012*

- Extended Luminet (enterprise fraud management system) to integrate with various Security Information & Event Management (SIEM) systems. The extensions used our customizable XML configuration file to enable network operators to configure Luminet to log to various SIEMs.
- Demonstrated correctness of code through implementation of unit tests & automated testing methods.
- Presented and demoed project results to the Luminet product team.

Mobile Developer & Intern Team Lead, *Emergency Reporting, Bellingham, WA* *January 2012 - June 2012*

- Designed and implemented a mobile application to aid Fire/Rescue and EMS responders. Our application enabled better in-the-field access to Emergency Reporting's cloud-based record and reporting management system. (Our work spearheaded what is now the InspectER mobile app.)
- Led team of four interns to implement compatible mobile application on iOS and Android platforms.
- Implemented data security (at-rest and in-transit), database access, and integration with Google Maps.

Other Work Experience

Vice President for Business & Operations, *Associated Students of WWU* *June 2011 - June 2012*

- Elected by the student body of Western Washington University (more than 15,000 students).
- Charged with overseeing the internal operations of the Associated Students programs, services, and facilities.
- Managed six other student managers of departments with as many as 20 employees each.
- Facilitated organizational budgeting process, employee hiring process, and internal program assessment.
- Chaired committee to develop operating & non-operating budget for fiscal year 2012 ($3.1 million budget).

Marketing & Technical Associate, *Caso Inc., San Antonio TX* *June 2010 - January 2011*

- Collaborated with the marketing team to implement search engine optimization of company website.
- Advised a team of department leaders to pilot a new organizational management system.

Publications

Travis Peters, Reshma Lal, Srikanth Varadarajan, Pradeep Pappachan, and David Kotz. **BASTION-SGX: Bluetooth and Architectural Support for Trusted I/O on SGX**. In *Proceedings of the Workshop on Hardware and Architectural Support for Security and Privacy (HASP)*, pages 1–9, June 2018.

David Kotz and Travis Peters. **Challenges to ensuring human safety throughout the life-cycle of Smart Environments**. In *Proceedings of the ACM Workshop on the Internet of Safe Things (SafeThings)*, pages 1–7, November 2017.

Josiah Hester, Travis Peters, Tianlong Yun, Ronald Peterson, Joseph Skinner, Bhargav Golla, Kevin Storer, Steven Hearndon, Kevin Freeman, Sarah Lord, Ryan Halter, David Kotz, and Jacob Sorber. **Amulet: An Energy-Efficient, Multi-Application Wearable Platform**. In *Proceedings of the ACM Conference on Embedded Network Sensor Systems (SenSys)*, pages 216–229, November 2016.

Andres Molina-Markham, Ronald Peterson, Joseph Skinner, Tianlong Yun, Bhargav Golla, Kevin Freeman, Travis Peters, Jacob Sorber, Ryan Halter, and David Kotz. **Amulet: A Secure Architecture for mHealth Applications for Low-power Wearable Devices**. In *Proceedings of the Workshop on Mobile Medical Applications - Design and Development (WMMADD)*, pages 16–21. ACM, November 2014.

Travis Peters and Puneet Jain. **MobiSys 2014**. *IEEE Pervasive Computing*, 13(4):93–96, Oct.–Dec. 2014.

Chip Jackson, Lucas Bourne, and Travis Peters. **Computing Along the Big Long River**. *The UMAP Journal for Undergraduate Mathematics & Research*, 33(3):231–246, Fall 2012.

Patents

Srikanth Varadarajan, Reshma Lal, Steven B. McGowan, Hakan Magnus Eriksson, and Travis W. Peters. **System, apparatus and method for providing trusted input/output communications (pending)**, May 2018.

Demos, Posters, Tech Reports, Work in Progress, etc.

Timothy Pierson, Travis Peters, Ronald Peterson, and David Kotz. **Poster: Proximity detection with single-antenna IoT devices (accepted)**. In *Proceedings of the International Conference on Mobile Computing and Networking - Posters (MobiCom'18 Posters)*, August 2018.

Travis Peters. **A Survey of Trustworthy Computing on Mobile & Wearable Systems**. Technical Report TR2017-823, Dartmouth Computer Science, May 2017.

Josiah Hester, Travis Peters, Tianlong Yun, Ronald Peterson, Joseph Skinner, Bhargav Golla, Kevin Storer, Steven Hearndon, Sarah Lord, Ryan Halter, David Kotz, and Jacob Sorber. **The Amulet Wearable Platform: Demo Abstract**. In *Proceedings of the ACM Conference on Embedded Network Sensor Systems (SenSys)*, pages 290–291, November 2016.

Travis Peters, Srikanth Varadarajan, and Reshma Lal. **Poster: Security in IoT: What is IoT Security, Really?!** *Intel Labs Open House*, September 2016.

Travis Peters, Srikanth Varadarajan, Pradeep Pappachan, and Reshma Lal. **Poster & Demo: Protecting Bluetooth Input from Malware**. *Intel Labs Open House*, September 2015.

Travis Peters, Srikanth Varadarajan, Pradeep Pappachan, and Reshma Lal. **Poster: Trusted I/O and Bluetooth Devices**. *Intel Labs Intern Poster Show*, August 2015.

Travis Peters. **An Assessment of Single-Channel EMG Sensing for Gestural Input**. Technical Report TR2015-767, Dartmouth Computer Science, September 2014.

Talks & Presentations

[**Workshop Talk**] BASTION-SGX: Bluetooth and Architectural Support for Trusted I/O on SGX. Workshop on Hardware and Architectural Support for Security and Privacy (HASP) at the International Symposium on Computer Architecture (ISCA), Los Angeles, California, June 2018.

[**Workshop Talk**] Physical Emanations and Potential Applications. Annual Trustworthy Health and Wellness Workshop, University of Illinois at Urbana-Champaign, Champaign, IL, September 2017.

[**Invited Talk**] An IoT Survey: Security, Privacy, and Safety in the Future of IoT. Intern Tech Talk Series, Intel Labs, Hillsboro, Oregon, September 2016.

[**NSF Research Outreach**] Fitbit Project: Discussing the Fitbit System, Data, and Security & Privacy Awareness. Hanover High School (Statistics Class), Hanover, New Hampshire, May 2015.

[**Invited Talk**] Delivering Secure Bluetooth Device Input to a Trusted Execution Environment. Intern Tech Talk Series, Intel Labs, Hillsboro, Oregon, September 2015.

[**Poster Presentation**] Security in IoT: What is IoT Security, Really?! Intel Labs Open House, Intel Labs, Hillsboro, Oregon, September 2016.

[**Poster Presentation & Demo**] Protecting Bluetooth Input from Malware. Intel Labs Open House, Hillsboro, Oregon, September 2015.

[**Poster Presentation**] Trusted I/O and Bluetooth Devices Intern Poster Show, Intel Labs, Hillsboro, Oregon, August 2015.

Technical Skills

Programming Languages: Python, C, Java, Javascript, Matlab, x86 assembly, Bash, Ruby, SQL, LaTeX, HTML/CSS. ***Software Development & Prototyping:*** OSX, Linux, Android, iOS; Linux and Android Bluetooth stacks; Raspberry Pi, Arduinos, and other custom platforms (e.g., Amulet); Git, SVN, Perforce; Vagrant, Docker, Chef. ***System & Software Inspection & Diagnostics:*** software inspection, e.g., GDB, dtrace, strace, ptrace, perf; physical inspection, e.g., oscilloscopes, spectrum analyzers. ***Data Collection & Analysis:*** Wireshark, GNU Radio, Jupyter, MATLAB. ***Wireless and Software Defined Radios (SDRs):*** Ubertooth; USRP, LimeSDR; GNU Radio. ***Databases & Web Frameworks:*** MySQL, MongoDB; Node.js.

Awards & Honors

Funding Acknowledgements *2014 - 2018*

My research as a PhD student has been conducted under the guidance of my advisor, Dr. David Kotz, and has primarily been funded by the following awards:

NSF SaTC, $10,000,000 (Dartmouth share $4,000,000) for 2013-2018.
Enabling trustworthy cybersystems for health and wellness (THaW). PIs: David Kotz (Dartmouth), Kevin Fu (University of Michigan), Carl Gunter (University of Illinois at Urbana-Champaign), and Avi Ruben (Johns Hopkins University) Learn more at `thaw.org`.

NSF CNS, $2,712,286 (Dartmouth share $1,815,866) for 2013-2018.
Computational Jewelry for Mobile Health (Amulet). PIs: David Kotz, Ryan Halter, Andrés Molina-Markham, Sarah Lord (Dartmouth); Jacob Sorber and Kelly Caine (Clemson). Learn more at `amulet-project.org`.

Best Teaching Assistant Award[1], Department of Computer Science, Dartmouth College *2014 - 2015*

Outstanding Graduate Student Teacher, Dartmouth Center for the Advancement of Learning *April 2015*

Graduate Student Teaching Award[2], Dartmouth College *2013 - 2014*

Dartmouth Fellowship, Dartmouth College *2013 - 2014*

Oscar Edwin Olson Scholarship, Western Washington University *2012*

Outstanding Winner, Frank Giordano Award[3], Contest in Mathematical Modeling *2012*

Kaiser Borsari Scholarship, Western Washington University *2011 - 2012*

Giusti Scholarship, Western Washington University *2011 - 2012*

Leadership & Volunteer Experience

Topo Ambassador, Topo Athletic *2018 - present*

Co-Webmaster, Upper Valley Running Club *2018 - present*

Lead Sunday School Teacher, Christ Redeemer Church *2014 - present*

Assistant Track Coach, Hanover High School *Winter-Spring 2017*

Free Geek Build Volunteer, Free Geek (Portland, OR) *Summer 2016*

Assistant Track Coach, Hanover High School *Spring 2016*

Organizer & Facilitator, Graduate Student TA Workshop *December 2015*

Graduate Student Council Rep., Dartmouth College Computer Science *2013 - 2015*

Graduate Student Web Team, Dartmouth College Computer Science *2014 - 2015*

Lead Teacher & RK Coordinator, Redeemer Kids at Redeemer Church *November 2011 - June 2013*

Vice President of Business & Operations, Associated Students of WWU *June 2011 - June 2012*

Chair, AS Management Council & AS Facilities & Services Council *June 2011 - June 2012*

Vice-Chair, AS Board of Directors & AS Budget Committee *June 2011 - June 2012*

Member, Academic Honesty Board *June 2011 - June 2012*

Big Brother, Big Brothers Big Sisters of Whatcom County *September 2010 - September 2011*

4-year member of Varsity Track & Field, Western Washington University *2008 - 2012*

4-year member of Junior Varsity Cross Country, Western Washington University *2008 - 2011*

References

Available upon request.

[1] An award voted on by all CS faculty at Dartmouth.
[2] An award given to only three graduate students across Dartmouth.
[3] Less than 3% of teams (10 out of more than 3,600) are selected as Outstanding Winners of the contest.