

# Travis W. Peters

Ph.D. Candidate, Computer Science, Dartmouth College, Hanover, NH

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## RESEARCH INTERESTS

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Mobile Health and IoT Security; Computer and Wireless Network Security; Trusted Computing; Mobile and Wireless Systems; Machine Learning & Multivariate Statistics

## CURRENT APPOINTMENTS *(Beginning Fall 2019)*

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**Assitant Professor**, *Gianforte School of Computing, Montana State University* August 2019 - Present

**Director of Cybersecurity**, *clinicIQ* August 2019 - Present

## EDUCATION

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**Ph.D., Computer Science** 2013 - Present (Expected: June 2019)

*Dartmouth College, Hanover, NH*

Dissertation Title: "Enabling Trustworthy Interactions Between User-Centric Ubiquitous Devices"

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

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### INSTRUCTOR

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

*Class details: approximately 120 students; majors and non-majors; course staff of 13 TAs*

*My course website is available at <https://traviswp.github.io/cs10/>.*

### TEACHING ASSISTANT

**Software Design & Implementation (COSC 50)**, *Dartmouth College* Spring 2016

*Class details: approximately 50 students; majors*

**Introduction to Programming & Computing (COSC 1)**, *Dartmouth College* Spring 2014

*Class details: approximately 180 students; majors and non-majors*

**Problem Solving via Object-Oriented Programming (COSC 10)**, *Dartmouth College* Winter 2014

*Class details: approximately 100 students; majors and non-majors*

**Introduction to Programming & Computing (COSC 1)**, *Dartmouth College* Fall 2013

*Class details: approximately 120 students; majors and non-majors*

**Programming Fundamentals in C++ (CSCI 140)**, *Western Washington University* Fall 2012

*Class details: approximately 40 students; majors and non-majors*

**Teaching Assistant (K-8)**, *Family House Academy* Summer 2009

*Class details: approximately 20 students; subjects: mathematics, reading, and writing*

## GUEST LECTURER

**Debugging with GDB and Valgrind**, Dartmouth College (COSC 50) April 2016, April 2017, January 2018  
 A 65-minute lecture on debugging program logic and memory leaks with GDB and Valgrind.  
 Notes available 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 available 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 available at <https://traviswp.github.io/classes/memory/>.

## RESEARCH EXPERIENCE

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**Research Assistant**, Dartmouth College, Hanover, NH January 2014 - Present  
 I collaborate with multidisciplinary teams to research security and privacy threats in mobile health (mHealth). My work focuses on system and network security within personal area networks and body area networks of health and wellness devices. My work achieves security through the design and experimental validation of novel hardware and software architectures. My current research is investigating how to detect malicious or errant devices in networks of personal devices by developing models based on network traffic and conducting comparative analysis.

**Security Research Intern**, Intel Labs, Hillsboro, OR June 2016 - September 2016  
 Worked with industry experts to conduct a survey on security and privacy threats in the Internet of Things (IoT). Presented findings to researchers and product groups; aided team in developing a larger IoT security research agenda.

**Security Research Intern**, Intel Labs, Hillsboro, OR June 2015 - September 2015  
 Designed and implemented a security architecture to enhance Bluetooth security on Intel's SGX-enabled platforms. Published and presented a paper in *HASP'18*, and filed for a related patent.

## INDUSTRY EXPERIENCE

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**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 project results and live demo 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. This 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

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### 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

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### REFEREED CONFERENCE & WORKSHOP PAPERS

- RC1. Timothy J. Pierson, Travis Peters, Ronald Peterson, and David Kotz. **Proximity Detection with Single-Antenna IoT Devices**. In *Proceedings of the ACM International Conference on Mobile Computing and Networking (MobiCom)*, pages 1–12. ACM Press, Oct. 2019. Accepted for Publication. Acceptance Rate 24%. DOI: [10.1145/3300061.3300120](https://doi.org/10.1145/3300061.3300120).
- RC2. Timothy Pierson, Travis Peters, Reza Rawassizadeh, Ronald Peterson, and David Kotz. **CloseTalker: secure, short-range ad hoc wireless communication**. In *Proceedings of the ACM International Conference on Mobile Systems, Applications, and Services (MobiSys)*, pages 1–12. ACM Press, June 2019. Accepted for Publication. Acceptance Rate 23%.
- RC3. 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 International Workshop on Hardware and Architectural Support for Security and Privacy (HASP)*, pages 1–9. ACM, June 2018. Acceptance Rate 42%. DOI: [10.1145/3214292.3214295](https://doi.org/10.1145/3214292.3214295).
- RC4. 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. ACM, Nov. 2017. Acceptance Rate 54%. DOI: [10.1145/3137003.3137012](https://doi.org/10.1145/3137003.3137012).
- RC5. 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 Networked Sensor Systems (SenSys)*, pages 216–229. ACM Press, Nov. 2016. Acceptance Rate 18%. DOI: [10.1145/2994551.2994554](https://doi.org/10.1145/2994551.2994554).
- RC6. Andrés 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. Nov. 2014. Acceptance Rate 57%. DOI: [10.1145/2676431.2676432](https://doi.org/10.1145/2676431.2676432).

### REFEREED JOURNAL ARTICLES

- RJ1. Travis Peters and Puneet Jain. **MobiSys 2014**. *IEEE Pervasive Computing*, 13.4 (Oct. 2014). ISSN: 1536-1268. DOI: [10.1109/MPRV.2014.69](https://doi.org/10.1109/MPRV.2014.69).
- RJ2. Chip Jackson, Lucas Bourne, and Travis Peters. **Computing Along the Big Long River**. *The UMAP Journal for Undergraduate Mathematics & Research*, 33.3 (Fall 2012).

## REFEREED CONFERENCE POSTERS AND DEMOS

- RP1. Timothy J. Pierson, Travis Peters, Ronald Peterson, and David Kotz. **Poster: Proximity Detection with Single-Antenna IoT Devices.** In *Proceedings of the ACM International Conference on Mobile Computing and Networking (MobiCom)*, pages 663–665. ACM Press, Oct. 2018. Best Poster Award. Acceptance Rate 50%. DOI: [10.1145/3241539.3267751](https://doi.org/10.1145/3241539.3267751).
- RP2. 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 Networked Sensor Systems (SenSys)*, pages 290–291. ACM Press, Nov. 2016. DOI: [10.1145/2994551.2996527](https://doi.org/10.1145/2994551.2996527).

## PATENTS

- PT1. Srikanth Varadarajan, Reshma Lal, Steven B. McGowan, Hakan Magnus Eriksson, and Travis W. Peters. **System, apparatus and method for providing trusted input/output communications.** Patent Pending. Priority date 2016-11-21; Filing date 2016-11-21; Publication date 2018-05-24. May 2018.

## TECHNICAL REPORTS

- TR1. Travis Peters. **A Survey of Trustworthy Computing on Mobile & Wearable Systems.** Technical Report TR2017-823. Dartmouth Computer Science, May 2017, pages 1–10.
- TR2. Travis Peters. **An Assessment of Single-Channel EMG Sensing for Gestural Input.** Technical Report TR2015-767. Dartmouth Computer Science, Sept. 2014, pages 1–14.

## UNREFEREED WORKS

- UW1. Travis Peters, Srikanth Varadarajan, and Reshma Lal. **Poster: Security in IoT: What is IoT Security, Really?!** Sept. 2016.
- UW2. Travis Peters, Srikanth Varadarajan, Pradeep Pappachan, and Reshma Lal. **Poster & Demo: Protecting Bluetooth Input from Malware.** Sept. 2015.
- UW3. Travis Peters, Srikanth Varadarajan, Pradeep Pappachan, and Reshma Lal. **Poster: Trusted I/O and Bluetooth Devices.** Aug. 2015.

## TALKS & PRESENTATIONS

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[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

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**Programming Languages:** Python, C, Java, Javascript, Matlab, x86 assembly, Bash, Ruby, SQL,  $\text{\LaTeX}$ , HTML/CSS. **Software Development & Prototyping:** Linux, Android, OSX, 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

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<b>Funding Acknowledgements</b>	2014 - 2018
<i>My research as a PhD student has been conducted under the guidance of my advisor, Dr. David Kotz, and has been funded by two large, multidisciplinary NSF grants: Amulet (<a href="https://amulet-project.org/">https://amulet-project.org/</a>), a collaboration between Dartmouth College and Clemson University; and Trustworthy Health and Wellness (<a href="https://thaw.org/">https://thaw.org/</a>), a collaboration between Dartmouth College, U. Michigan, UIUC, Johns Hopkins, and Vanderbilt.</i>	
<b>Best Teaching Assistant Award</b> , Department of Computer Science, Dartmouth College	2015
<i>An award voted on by all CS faculty at Dartmouth.</i>	
<b>Outstanding Graduate Student Teacher</b> , Dartmouth Center for the Advancement of Learning	2015
<i>An award given annually through DCAL; nominated by students.</i>	
<b>Graduate Student Teaching Award</b> , Dartmouth College	2014
<i>An award given to only three graduate students across Dartmouth.</i>	
<b>Dartmouth Fellowship</b> , Dartmouth College	2013, 2014
<i>Computer Science fellowship.</i>	
<b>Outstanding Winner, Frank Giordano Award</b> , Contest in Mathematical Modeling	2012
<i>Less than 3% of teams (10 out of more than 3,600) are selected as Outstanding Winners of the contest.</i>	
<b>Oscar Edwin Olson Scholarship</b> , Western Washington University	2012
<i>Awarded for academic excellence in Computer Science.</i>	
<b>Kaiser Borsari Scholarship and Giusti Scholarship</b> , Western Washington University	2011
<i>Awarded for academic excellence in Computer Science.</i>	

## LEADERSHIP & VOLUNTEER EXPERIENCE

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<b>Topo Athletic Ambassador</b> , Topo Athletic	2018 - present
<b>Co-Webmaster</b> , Upper Valley Running Club	2018 - present
<b>Couch-to-5k Volunteer Coach</b> , Upper Valley Running Club	2016 - present
<b>Lead Sunday School Teacher</b> , Christ Redeemer Church	2014 - present
<b>Assistant Track Coach</b> , Hanover High School	2016 - 2017
<b>Free Geek Build Volunteer</b> , Free Geek (Portland, OR)	2016
<b>Organizer &amp; Facilitator</b> , Graduate Student TA Orientation	2015
<b>Graduate Student Council Rep.</b> , Dartmouth College Computer Science	2013 - 2015
<b>Graduate Student Web Team</b> , Dartmouth College Computer Science	2014 - 2015
<b>Lead Teacher &amp; RK Coordinator</b> , Redeemer Kids at Redeemer Church	2011 - 2013

<b>Vice President of Business &amp; Operations</b> , Associated Students of WWU - <b>Chair</b> , AS Management Council & AS Facilities & Services Council - <b>Vice-Chair</b> , AS Board of Directors & AS Budget Committee - <b>Member</b> , Academic Honesty Board	2011 - 2012
<b>Big Brother</b> , Big Brothers Big Sisters of Whatcom County	2010 - 2011
<b>WWU Cross Country and Track &amp; Field</b> , Western Washington University	2008 - 2012

## REFERENCES

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**David Kotz** (PhD Advisor)

Professor

Department of Computer Science

Dartmouth College

Email: [david.f.kotz@dartmouth.edu](mailto:david.f.kotz@dartmouth.edu)

**Thomas Cormen** (Teaching Mentor)

Professor

Department of Computer Science

Dartmouth College

Email: [thc@cs.dartmouth.edu](mailto:thc@cs.dartmouth.edu)

**Chris Bailey-Kellogg** (Teaching Mentor)

Professor

Department of Computer Science

Dartmouth College

Email: [cbk@cs.dartmouth.edu](mailto:cbk@cs.dartmouth.edu)

**Reshma Lal** (Manager)

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