Travis W. Peters

Assistant Professor, Gianforte School of Computing, Montana State University, Bozeman, MT

(Email) traviswp@gmail.com • *(Phone)* 360.441.7304 • *(Skype)* travis.w.peters • *(Website)* https://www.traviswpeters.com/

Research Interests

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

Current Appointments

Assistant Professor, Gianforte School of Computing, Montana State University — August 2019 - Present

Education

Ph.D., Computer Science — 2013 - 2019
Dartmouth College, *Hanover, NH*
Dissertation Title: "Trustworthy Wireless Personal Area Networks"
Doctoral Committee: Dr. David Kotz *(Advisor)*, Dr. Sean Smith, Dr. Xia Zhou, Dr. José Camacho

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

Teaching Experience

Instructor

Computer Security / Advanced Computer Security (CSCI 476/594), *Montana State University* — Spring 2021
Approximately 80 students (undergrads & grads) and 1 TA.
Course website: https://www.traviswpeters.com/cs476-2021-spring/.

Operating Systems (CSCI 460), *Montana State University* — Fall 2020
Approximately 60 students (undergrads & grads) and 1 TA.
Teacher Rating (4.6/5.0); Course Rating (4.3/5.0)
Course website: https://www.traviswpeters.com/cs460-2020-fall/.

Computer Security (CSCI 476), *Montana State University* — Spring 2020
Approximately 80 students (undergrads & grads; majors & non-majors) and 1 TA.
Teacher Rating (4.9/5.0); Course Rating (4.6/5.0)
Course website: https://www.traviswpeters.com/cs476-2020-spring/.

Operating Systems (CSCI 460), *Montana State University* — Fall 2019
Approximately 35 students (undergrads & grads) and 1 TA.
Teacher Rating (4.8/5.0); Course Rating (4.7/5.0)
Course website: https://www.traviswpeters.com/cs460-2019-fall/.

Problem Solving via Object-Oriented Programming (COSC 10), *Dartmouth College* — Winter 2015
Approximately 120 students (majors & non-majors) and a course staff of 13 TAs.
Course website: https://www.traviswpeters.com/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://www.traviswpeters.com/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://www.traviswpeters.com/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://www.traviswpeters.com/classes/memory/.

Research Experience

Research Assistant, *Dartmouth College, Hanover, NH* January 2014 - August 2019
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 a related patent.

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 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

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.

Funding

- **DHS, Science and Technology Directorate**, $3,100,000 for 2020-2023. Co-PI
  Quasar: QUality Assurance for Software Analysis and Resilience. With Clemente Izurieta (PI), Brock LaMeres, Veronika Neeley, Mike Wittie, David Opitz, Elizabeth Shannahan, Ann Marie Reinhold; in collaboration with Idaho National Laboratory, University of Montana, and Hoplite Industries.
- **NSF, Division Of Research On Learning (DRL)**, $635,255 for 2020-2023. Co-PI
  Collaborative Research: Indian Education in Computing: a Montana Story. With Brittany Fasy (PI), Stacey Hancock.
- **MSU Library, Open Educational Resources (OER) Initiative**, $6,319 for 2021. Solo PI
  Adopting/Adapting Open Educational Resources for CSCI 476/594.
- **NSF, Division of Computing and Communication Foundations (CCF)**, $404,702 for 2020-2023. Mentor
  REU Site: Research Experiences in Cybersecurity Algorithms. With Clemente Izurieta (PI), Brendan Mumey.

Publications

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, Oct. 2019. Acceptance Rate 24%. DOI: 10.1145/3300061.3300120.

RC2. Timothy J. 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, June 2019. Acceptance Rate 23%. DOI: 10.1145/3307334.3326100.

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.

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.

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, Nov. 2016. Acceptance Rate 18%. DOI: 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.

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.

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, Oct. 2018. Acceptance Rate 50%. DOI: 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, Nov. 2016. DOI: 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**. Priority date 2016-11-21, Grant date 2019-08-06. Aug. 2019.

Technical Reports

TR1. Travis Peters. **Trustworthy Wireless Personal Area Networks**. TR2020-878. Dissertation. Hanover, NH: Dartmouth College, Computer Science, Mar. 2020.

TR2. Travis Peters. **A Survey of Trustworthy Computing on Mobile & Wearable Systems**. Technical Report TR2017-823. Dartmouth Computer Science, May 2017, pages 1–10.

TR3. 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. Madison Tandberg and Travis Peters. **Poster: Analyzing Application-Layer Security in Bluetooth Devices: Auditing for Encryption**. Aug. 2020.

UW2. Travis Peters, Srikanth Varadarajan, and Reshma Lal. **Poster: Security in IoT: What is IoT Security, Really?!**. Sept. 2016.

UW3. Travis Peters, Srikanth Varadarajan, Pradeep Pappachan, and Reshma Lal. **Poster & Demo: Protecting Bluetooth Input from Malware**. Sept. 2015.

UW4. Travis Peters, Srikanth Varadarajan, Pradeep Pappachan, and Reshma Lal. **Poster: Trusted I/O and Bluetooth Devices**. Aug. 2015.

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:** 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.

Professional & Academic Activities

Technical Review Committees

- 2020, Technical Program Committee Member for the Workshop on Sensing Systems and Applications Using Wrist Worn Smart Devices (WristSense'21), co-located with IEEE PerCom
- 2020, Reviewer for Transactions on Mobile Computing
- 2020, Technical Program Committee Member for the International Conference on Emerging Security Information, Systems and Technologies (SECURWARE)
- 2020, Reviewer for IEEE Communications Letters
- 2020, Technical Program Committee Member for the International Conference on Wireless and Mobile Communications (ICWMC)
- 2019, Technical Program Committee Member for the Workshop on Sensing Systems and Applications Using Wrist Worn Smart Devices (WristSense'20), co-located with IEEE PerCom

University, College, and Department Committees

- CS Graduate Recruiting Committee, Member 2019 - Present

Misc. Academic Activities

- Poster Judge, *Virtual Grace Hopper Celebration (vGHC20) ACM Graduate Research Competition* 2020
- Faculty Mentor, *Virtual Grace Hopper Celebration (vGHC20) Conference* 2020
- Instructor Volunteer, *Security Education (SEED) Workshop'20* 2020
- Project Mentor, *Research Experiences in Cybersecurity Algorithms* 2020
- Project Mentor, *#StudentsBuild4COVID19 hackathon* 2020

Research Students

Ph.D. Students

- Nick Stone, *Bluetooth Security* 2020 - Present
  - Benjamin Fellowship (2020-21)

M.S. Students

- Reese Pearsall, *Malware Analysis and Cybercrime* 2020 - Present

Undergraduate Students

- Wes Robbins — Spring 2021
  - Independent Study: *Adversarial Machine Learning*
- Seth Bassetti — Spring 2021
  - Independent Study: *Adversarial Machine Learning*
- Maddi Tandberg — 2020 - Present
  - REU: *Analyzing Application-Layer Security in Bluetooth Devices: Auditing for Encryption*
  - Undergraduate Scholars Program (USP) Award Recipient (2020-21)
- Benjamin Bushnell — Spring 2020
  - Independent Study: *Blockchain-based Crowdfunding Platforms*
  - Now a Software Developer @ U.S. Geological Survey (USGS)
- Benjamin Cathelineau (NCUR) — 2019 - 2020
  - NCUR: *Validating the Correctness of Linux Scheduling Policies*
  - Now an M.S. student @ ENSIMAG in the Information Systems Engineering program

Ph.D. Thesis Committees

- Gerard Shu Fuhnwi, *Anomaly Detection* — 2021 - Present
- Faqeer Rehman, *Software Quality Assurance and Machine Learning* — 2020 - Present
- Karishma Rahman, *Metamorphic Testing, Cybersecurity* — 2020 - Present

M.S. Thesis Committees

- Olivia Firth, *Education, Culturally-Responsive Computing* — 2020 - Present
- Andrew Johnson, *Binary Analysis, Software Quality Assurance* — 2020 - Present
- David Rice, *An Extensible Hierarchical Architecture for Analysis of Software Quality Assurance* — 2020

Awards & Honors

- **Ph.D. Funding Acknowledgements**, Department of Computer Science, Dartmouth College — 2014 - 2019
  My PhD research was conducted under the guidance of Dr. David Kotz, and was primarily funded by two large, multi-disciplinary NSF awards: Amulet (https://amulet-project.org/) and Trustworthy Health & Wellness (https://thaw.org/).
- **Best Teaching Assistant Award**, Department of Computer Science, Dartmouth College — 2015
  An award voted on by all CS faculty at Dartmouth.
- **Outstanding Graduate Student Teacher**, Dartmouth Center for the Advancement of Learning — 2015
  An award given annually through DCAL; nominated by students.
- **Graduate Student Teaching Award**, Dartmouth College — 2014
  An award given to only three graduate students across Dartmouth.
- **Dartmouth Fellowship**, Dartmouth College — 2013, 2014
  Computer Science fellowship.
- **Outstanding Winner, Frank Giordano Award**, Contest in Mathematical Modeling — 2012
  Less than 3% of teams (10 out of more than 3,600) are selected as Outstanding Winners of the contest.
- **Oscar Edwin Olson Scholarship**, Western Washington University — 2012
  Awarded for academic excellence in Computer Science.
- **Kaiser Borsari Scholarship and Giusti Scholarship**, Western Washington University — 2011
  Awarded for academic excellence in Computer Science.

Leadership & Volunteer Experience

- **Topo Athletic Ambassador**, Topo Athletic — 2018 - Present
- **Co-Webmaster**, Upper Valley Running Club — 2018 - 2019
- **Couch-to-5k Volunteer Coach**, Upper Valley Running Club — 2016 - 2019
- **Lead Sunday School Teacher**, Christ Redeemer Church — 2014 - 2019
- **Assistant Track Coach**, Hanover High School — 2016 - 2017
- **Free Geek Build Volunteer**, Free Geek (Portland, OR) — 2016
- **Organizer & Facilitator**, Graduate Student TA Orientation — 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 2011 - 2013
- **Vice President of Business & Operations**, Associated Students of WWU 2011 - 2012
  - **Chair**, AS Management Council & AS Facilities & Services Council
  - **Vice-Chair**, AS Board of Directors & AS Budget Committee
  - **Member**, Academic Honesty Board
- **Big Brother**, Big Brothers Big Sisters of Whatcom County 2010 - 2011
- **WWU Cross Country and Track & Field**, Western Washington University 2008 - 2012

References

Available upon request.