

Peter A. H. Peterson

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| CONTACT INFORMATION | Dr. Peter A. H. Peterson 329 Heller Hall 1114 Kirby Drive Duluth, MN 55812 | <i>Phone:</i> (218) 726-7988 <i>Email:</i> pahp@d.umn.edu <i>Web:</i> http://www.d.umn.edu/~pahp/ |
| RESEARCH INTERESTS | I perform research to improve the security and energy efficiency of operating systems. I also research computer security education and curriculum development. My current systems research combines non-lossy compression, heuristic models and classic operating systems concepts to create a transparent adaptive compression facility capable of automatically saving time, space and energy. My current security research includes Adaptive Compression systems that provide benefits while minimizing information leakage. Previous security projects focus on improving confidentiality in operating systems through information flow control and encryption. My ongoing security education work centers on the development of concept inventories for computer security, through the CATS project and through the Security Misconceptions Project. I also create hands-on, publicly available computer security labs, simple but effective security competitions, and investigating security misconceptions. I also work with vintage computers to preserve them and educate the public about them. | |
| EDUCATION | Ph.D. Computer Science University of California, Los Angeles | Fall 2013 Los Angeles, California |
| | Committee: Peter L. Reiher (advisor), Todd Millstein (co-advisor), Junghoo “John” Cho, William J. Kaiser, D. Stott Parker Major field: <i>Software Systems</i> Minor fields: <i>Databases</i> and <i>Artificial Intelligence</i> Thesis Topic: <i>Datacomp: Locally Independent Adaptive Compression for Real-World Systems</i> | |
| | M.Sc. Computer Science University of California, Los Angeles | Winter 2009 Los Angeles, California |
| | Committee: Peter L. Reiher (advisor), Junghoo “John” Cho, Todd Millstein Comprehensive: <i>Security Exercise Design Using DETER</i> | |
| | Bachelor of Music Education (BME) North Park University | May 1999 Chicago, Illinois |
| ACADEMIC APPOINTMENTS | Assistant Professor of Computer Science Swenson College of Science and Engineering, University of Minnesota Duluth | January 2015 — Duluth, Minnesota |
| PROFESSIONAL EXPERIENCE | Research Scientist University of Southern California Information Sciences Institute | May 2014–December 2014 Marina Del Rey, California |
| | Research Assistant University of California, Los Angeles | July 2007–Fall 2013 Los Angeles, California |
| | Director of Information Technology The Yucaipa Companies | October 2005–June 2006 West Hollywood, California |
| | PC Coordinator North Park University | July 1999–June 2005 Chicago, Illinois |
| TEACHING EXPERIENCE | Instructor, Computer Security (CS 4821) University of Minnesota Duluth | Most semesters since Spring 2015 Duluth, Minnesota |

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| Instructor, Advanced Computer Security (CS 8821) University of Minnesota Duluth | Yearly since 2015 Duluth, Minnesota |
| Instructor, Operating Systems (CS 5631) University of Minnesota Duluth | Yearly since 2016 Duluth, Minnesota |
| Co-instructor, Embedded Systems Security University of California, Los Angeles | Fall 2011 Los Angeles, California |
| Teaching Assistant, Graduate Computer Security University of California, Los Angeles | Spring 2008, 2010 & 2011 Los Angeles, California |
| Teaching Assistant, Undergraduate Computer Security University of California, Los Angeles | Winter 2008 & Fall 2010 Los Angeles, California |
| Teaching Assistant, Computer Organization University of California, Los Angeles | Fall 2007 Los Angeles, California |
| Instructor, Computer Networking North Park University | Spring 2003 Chicago, Illinois |

REFEREED
PUBLICATIONS

CONFERENCES AND WORKSHOPS

1. B. Paulsen, C. Sung, P. A. H. Peterson, and C. Wang. “Debreach: Mitigating Compression Side Channels via Static Analysis and Transformation” *Proceedings of the IEEE/ACM International Conference on Automated Software Engineering (ASE 2019)*, November 2019. (to appear)
2. S. Offenberger, G. L. Herman, P. A. H. Peterson, A. T. Sherman, E. Golaszewski, T. Scheponik, and L. Oliva. “Initial validation of the Cybersecurity Concept Inventory: Pilot testing and expert review”. *Proceedings of Frontiers in Education (FIE)*, October 2019.
3. T. Scheponik, E. Golaszewski, G. Herman, S. Offenberger, L. Oliva, P. A. H. Peterson, and A. T. Sherman. “Investigating crowdsourcing to generate distractors for multiple-choice assessments.” *Proceedings of the National Cyber Summit (NCS)*, June 2019.
4. O. Egbue, D. Naidu and P. Peterson. “The Role of Microgrids in Enhancing Macrogrid Resilience.” *Proceedings of the International Conference on Smart Grid and Clean Energy Technologies (ICSGCE)*, October 2016.
5. P. A. H. Peterson and P. Reiher. “Datacomp: Locally Independent Adaptive Compression for Real-World Systems”. *2016 IEEE 36th International Conference on Distributed Computing Systems (ICDCS)*, June 2016 (Acceptance rate: 17%).
6. J. Mirkovic and P. A. H. Peterson. “Class Capture-the-Flag Exercises”. *USENIX Summit on Gaming, Games and Gamification in Security Education (3GSE)*, August 2014.
7. M. Gray, P. A. H. Peterson and P. Reiher. “Scaling Down Off-The-Shelf Data Compression: Backwards-Compatible Fine-Grain Mixing”. In *Proceedings of the IEEE International Conference on Distributed Computing Systems (ICDCS)*, June 2012 (Acceptance rate: 14%).
8. C. Fleming, P. A. H. Peterson, E. Kline and P. Reiher. “Data Tethers: Preventing Information Leakage by Enforcing Environmental Data Access Policies”. In *Proceedings of the IEEE International Conference on Communications (ICC)*, June 2012 (Acceptance rate: 37%).
9. A. Fujimoto, P. A. H. Peterson and P. Reiher. “Investigating the Energy Costs of Full Disk Encryption”. In the *Workshop on Energy Consumption and Reliability of Storage Systems (ERSS)*, part of the *2012 International Green Computing Conference (IGCC)*, June 2012.
10. J. Mirkovic, M. Ryan, J. Hickey, K. Sklower, P. Reiher, P. A. H. Peterson, B. H. Kang, M. C. Chuah, D. Massey and G. Ragusa. “Teaching Security With Network Testbeds”. In the *Proceedings of the ACM SIGCOMM Workshop on Education*, August, 2011.

11. P. A. H. Peterson, D. Singh, W. Kaiser and P. Reiher. “Investigating Energy and Security Trade-offs in the Classroom With the Atom LEAP Testbed”. In the *4th USENIX Workshop on Cyber Security Experimentation and Test (CSET)*, August 2011.
12. P. A. H. Peterson. “Cryptkeeper: Improving Security with Encrypted RAM”. In *Proceedings of the IEEE Conference on Technologies for Homeland Security (HST)*, November 2010.
13. P. A. H. Peterson and P. Reiher. “Security Exercises for the Online Classroom with DETER”. In the *3rd USENIX Workshop on Cyber Security Experimentation and Test (CSET)*, August 2010.

INVITED BOOK CHAPTERS

1. P. A. H. Peterson and C. Lee. (E. Downs, editor) “Dark Side of Media & Technology: A 21st Century Guide to Media and Technological Literacy”. Chapter: “Leaks are Forever: Information Security and Cybercrime” Peter Lang, publisher. 2019.

JOURNALS

1. A. T. Sherman, L. Oliva, E. Golaszewski, D. Phatak, T. Scheponik, G. L. Herman, D. S. Choi, S. E. Offenberger, P. A. H. Peterson, J. Dykstra, G. V. Bard, A. Chattopadhyay, F. Sharevski, R. Verma, R. Vrecenar. “The CATS Hackathon: Creating and Refining Test Items for Cybersecurity Concept Inventories” *IEEE Security & Privacy*, November 2019. (to appear)
2. A. T. Sherman, P. A. H. Peterson, E. Golaszewski, E. LaFemina, E. Goldschen, M. Khan, L. Mundy, M. Rather, B. Solis, W. Tete, E. Valdez, B. Weber, D. Doyle, C. O’Brien, L. Oliva, J. Roundy, and J. Suess. “Project-Based Learning Inspires Cybersecurity Students: A Scholarship-for-Service Research Study” *IEEE Security & Privacy*, May 2019.

PRESENTATIONS

1. “Datacomp: Locally Independent Adaptive Compression for Real-World Systems”. *2016 IEEE 36th International Conference on Distributed Computing Systems (ICDCS)*, June 2016.
2. “Class Capture-the-Flag Exercises”. *USENIX Summit on Gaming, Games and Gamification in Security Education (3GSE)*, August 2014.
3. “Investigating the Energy Costs of Full Disk Encryption”. Presented at the *2nd Workshop on Energy Consumption and Reliability of Storage Systems (ERSS)*, San Jose, CA, June 2012.
4. “Scaling Down Off-The-Shelf Data Compression: Backwards-Compatible Fine-Grain Mixing”. Presented at the *32nd Annual IEEE International Conference on Distributed Computing Systems (ICDCS)*, Macau, China, June 2012.
5. “Investigating Energy and Security Trade-offs in the Classroom With the Atom LEAP Testbed”. Presented at the *4th USENIX Workshop on Cyber Security Experimentation and Test (CSET)*, San Francisco, CA, August 2011.
6. “Cryptkeeper: Improving Security with Encrypted RAM”. Presented at the *12th Annual IEEE Conference on Technologies for Homeland Security Technologies (HST)*, Waltham, MA, November 2010.
7. “Security Exercises for the Online Classroom with DETER”. Presented at the *3rd USENIX Workshop on Cyber Security Experimentation and Test (CSET)*, Washington, D.C., August 2010.

DEMONSTRATIONS

1. “UMDCYL and Little Python: Teaching Coding by Playing Games”. Work-in-progress demonstration without paper at the *2018 Midwest Instructional Computing Symposium (MICS)*, Duluth, MN, April 2018.
2. “Do This and Nothing More: Teaching Adversarial Thinking Without Security”. Work-in-progress demonstration without paper at the *2018 Midwest Instructional Computing Symposium (MICS)*, Duluth, MN, April 2018.

**Other
Publications**

PERIODICALS

1. Peter A. H. Peterson. "CSET'18: The 11th USENIX Workshop on Cyber Security Experimentation and Test". *USENIX Association's ;login;*, Winter 2018.

WHITE PAPERS

D. Singh, P. A. H. Peterson, P. Reiher and W. Kaiser. "The Atom LEAP Platform For Energy-Efficient Embedded Computing: Architecture, Operation, and System Implementation", December 2010. Available at <http://lasr.cs.ucla.edu/~pedro/docs/leap-aosl.pdf>

EDUCATIONAL
MATERIALS

Computer Security Exercises

Multiple hands-on, exploratory security exercises that simulate real-world environments and problems using widely-used open source software and DETERLab, a large, free-to-use public security and education testbed. Still under active development and maintenance, these exercises have been used at over 18 institutions of higher learning in the U.S. and abroad.

Lessons from LARS

A YouTube video channel containing short, student-contributed tutorials on important software tools with the intent to help newbies with the learning curve in their classes.

<https://www.youtube.com/playlist?list=PLHnc49MScQBBimi-1UZ2HBxDauJYIYAWF>

PDP-12 Restoration Project

I am currently the primary manager of an effort to restore a Digital Equipment Corporation PDP-12 (1969-1972), one of perhaps only five operational units left in the world, to use for education, outreach, and research. We host a blog and a YouTube channel documenting the project.

Blog: <https://umdpdp12.blogspot.com/>

YouTube: <https://www.youtube.com/playlist?list=PLHnc49MScQBBI1VIirpZ1Zjdh91U5Q6-6>

SERVICE
& OUTREACH

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| Reviewer Special Interest Group in Computer Science Education (SIGCSE) | 2020 |
| Reviewer National Cyber Summit | 2019 |
| TPC Co-Chair USENIX Workshop on Cybersecurity Experimentation and Test (CSET) | 2019 |
| TPC Co-Chair USENIX Workshop on Cybersecurity Experimentation and Test (CSET) | 2018 |
| Member Swenson College of Science and Engineering Executive Committee | Spring 2018 |
| Member UMD Computer Science Tenure-track Search Committee | 2017-2018 |
| Campus Representative USENIX Association – the Advanced Computing Systems Association | 2016 — |
| TPC Member International Workshop on Quality of Service (IWQoS) | 2016–2018 |

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| Editor / Publisher UMD Information Security News https://groups.google.com/a/d.umn.edu/forum/#!forum/infosec-news | 2016 — |
| Organizer and Commissioner UMD Cybergames Youth League (UMDCYL) https://umdcyl.d.umn.edu/ | 2016 — |
| Member Encouraging Women in CS Committee | 2015 — |
| Member UMD Computer Science Masters Admission Committee | 2015 — |
| Volunteer UMD SCSE Campus Preview | 2015 — |
| Volunteer Presenter UMD SCSE Science Day (The 2017-2018 Science Day will be in 2018) | 2015 — |
| Poster TPC Member International Workshop on Quality of Service (IWQoS) | 2015 |
| Reviewer UCLA Computer Science Doctoral Admission Committee | 2014-2016 |

AWARDS &
NOMINATIONS

- UMD Swenson College of Science and Engineering (SCSE) Young Teacher Award Spring, 2019
- Student-nominated for Outstanding Faculty of the Year February, 2018

GRANTS

- NSF #1821788 SaTC: EDU: RUI: Enabling a New Generation of Experts by Finding and Fixing Students' Persistent Misconceptions (\$315,984) September, 2018
- Chancellor's Faculty Small Grant November, 2017
- Student Success & Retention Small Grant December 2016
- Chancellor's Small Grant November, 2015
- Public Engagement Grant June, 2015

PROFESSIONAL
MEMBERSHIPS

- ACM, ACM SIGCSE (Special Interest Group for Computer Science Education)
- IEEE, IEEE Computer Society
- USENIX (Campus Representative)