Robert J. Walls

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Research Interests

Systems security and privacy, digital forensics and online crime, large-scale Internet measurement

Professional Experience

Worcester Polytechnic Institute   **Worcester, MA**

Assistant Professor   *Aug 2016–Present*

Pennsylvania State University   **University Park, PA**

Postdoctoral Scholar   *May 2014–May 2016*

Systems and Internet Infrastructure Security Laboratory

○ Focused on large-scale security analysis of the Internet systems.
○ Collaborated with the Army Research Laboratory to develop a science of security.
○ Mentored graduate and undergraduate students resulting in multiple publications.

University of Massachusetts Amherst   **Amherst, MA**

Graduate Research Assistant   *Sept. 2009–May 2014*

UMass Center for Forensics

○ Research in digital forensics with an emphasis on flash memory and
   network-based investigations.

University of Texas at Arlington   **Arlington, TX**

Graduate Research Assistant   *Jan. 2008–Aug. 2009*

Information Security Laboratory

○ Investigated covert timing channels in network flows.

Education

University of Massachusetts Amherst   **Amherst, MA**

Doctor of Philosophy, Computer Science   *Sept. 2014*

○ Advisor: Brian Levine
○ Thesis title: Inference-based Forensics for Extracting Information from Diverse Sources
○ Admitted to Ph.D. Candidacy with Distinction
○ Given Outstanding Synthesis Project Award

University of Texas at Arlington   **Arlington, TX**

Master of Science, Computer Science   *Aug. 2009*

○ Advisor: Matthew Wright
○ Thesis title: Liquid: A detection-resistant covert timing channel based on IPD shaping
○ Given CSE Outstanding Master's Thesis Award

University of Texas at Arlington   **Arlington, TX**

Bachelor of Science, Computer Science   *Aug. 2007*

Teaching Experience

Worcester Polytechnic Institute   **Worcester, MA**
Instructor, Operating Systems   *Spring 2017*

Worcester Polytechnic Institute   **Worcester, MA**
Instructor, Software Security   *Fall 2016*

Pennsylvania State University   **University Park, PA**
Instructor, Computer and Network Security   *Fall 2014*

University of Massachusetts Amherst   **Amherst, MA**
Instructor, A Hands-on Introduction to UNIX   *Fall 2012*

Honors and Awards

Runner-up for Best Paper Award, STIDS Conference.	*2014*
Runner-up for Best Paper Award, World Wide Web Conference (WWW).	*2013*
Outstanding Synthesis Project Award, University of Massachusetts Amherst.	*2012*
Yahoo! Key Scientific Challenges Program Award.	*2011*
Admitted to Ph.D. Candidacy with Distinction, University of Massachusetts Amherst.	*2011*
CSE Outstanding Master's Thesis award, University of Texas at Arlington.	*2009*
Honors College Scholarship, University of Texas at Arlington.	*2004–07*

Publications

[P21] C. Lever, R. Walls, Y. Nadji, D. Dagon, P. McDaniel, M. Antonakakis. *Dawn of the Dead Domain: Measuring the Exploitation of Residual Trust in Domains.* IEEE Security and Privacy, 2017.

[P20] N. Lageman, E. Kilmer, R. Walls, P. McDaniel. *BinDNN: Resilient Function Matching Using Deep Learning* International Conference on Security and Privacy in Communication Networks (SECURECOMM), 2016. IEEE Symposium on Security and Privacy, 2016. (Acceptance rate: 32/137; 24%).

[P19] Z. Celik, N. Hu, Y. Li, N. Papernot, P. McDaniel, J. Rowe, R. Walls, K. Levitt, N. Bartolini, T. La Porta, and R. Chadha. *Mapping Sample Scenarios to Operational Models.* International Conference for Military Communications (MILCOM), 2016.

[P18] C. Lever, R. Walls, Y. Nadji, D. Dagon, P. McDaniel, M. Antonakakis. *Domain-Z: 28 Registrations Later.* IEEE Symposium on Security and Privacy, 2016. (Acceptance rate: 55/400; 14%).

[P17] R. Walls, E. Kilmer, N. Lageman, P. McDaniel. *Measuring the Impact and Perception of Acceptable Advertisements.* Internet Measurement Conference (IMC), 2015. (Acceptance rate: 44/169; 26%).

[P16] R. Walls, Y. Brun, M. Liberatore, B. Levine. *Discovering Specification Violations in Networked Software Systems.* IEEE International Symposium on Software Reliability Engineering, 2015. (Acceptance rate: 55/172; 32%).

[P15] N. Papernot, P. McDaniel, R. Walls. *Enforcing Agile Access Control Policies in Relational Databases using Views.* International Conference for Military Communications (MILCOM), 2015.

[P14] B. Celik, R. Walls, P. McDaniel, A. Swami. *Malware Traffic Detection using Tamper Resistant Features.* International Conference for Military Communications (MILCOM), 2015.

[P13] A. Oltramari, L. Cranor, R. Walls, P. McDaniel. *Computational Ontology of Network Operations.* International Conference for Military Communications (MILCOM), 2015.

[P12] P. McDaniel, R. Walls. *Estimating Attack Intent and Mission Impact from Detection Signals.* Workshop on Cyber Attack Detection, Forensics and Attribution for Assessment of Mission Impact, 2015.

[P11] S. Varma, R. Walls, B. Lynn, B. Levine. *Efficient Smart Phone Forensics Based on Relevance Feedback.* ACM Workshop on Security and Privacy in Smartphones and Mobile Devices (SPSM), 2014. (Acceptance rate: 11/29; 38%).

[P10] A. Oltramari, L. Cranor, R. Walls, P. McDaniel. *Building an Ontology of Cyber Security.* Intl. Conference on Semantic Technologies for Intelligence, Defense, and Security (STIDS), 2014. *Runner-up for Best Paper.*

[P9] P. McDaniel, T. Jaeger, T. La Porta, N. Papernot, R. Walls, A. Kott, L. Marvel, A. Swami, P. Mohapatra, S. Krishnamurthy, I. Neamtiu. *Security and Science of Agility.* ACM Workshop on Moving Target Defense (MTD), 2014.

[P8] R. Walls. *Inference-based Forensics for Extracting Information from Diverse Sources.* Ph.D. thesis, August 2014.

[P7] R. Hurley, S. Prusty, H. Soroush, R. Walls, J. Albrecht, E. Cecchet, B. Levine, M. Liberatore, B. Lynn. *Measurement and Analysis of Child Pornography Trafficking on P2P Networks.* World Wide Web Conference (WWW), 2013. Student authors listed in alphabetical order. (Acceptance rate: 122/831; 15%). *Nominated for Best Paper award.*

[P6] R. Walls, S. Clark, B. Levine. *Functional Privacy or Why Cookies are Better with Milk.* USENIX Workshop on Hot Topics in Security, 2012. (Acceptance rate: 11/39; 28%)

[P5] R. Walls, E. Learned-Miller, B. Levine. *Forensic Triage for Mobile Phones with DEC0DE.* USENIX Security, 2011. (Acceptance rate: 35/204; 17%). *Given Outstanding Synthesis Project award.*

[P4] R. Walls, B. Levine, M. Liberatore, C. Shields. *Effective Digital Forensics Research is Investigator-Centric.* USENIX Workshop on Hot Topics in Security, 2011. (Acceptance rate: 11/56; 20%)

[P3] R. Walls, K. Kothari, M. Wright. *Liquid: A Detection-Resistant Covert Timing Channel Based on IPD Shaping.* Computer Networks Journal, 2011.

	J. Tuttle, R. Walls, E. Learned-Miller, B. Levine. *Reverse Engineering for Mobile Systems Forensics with Ares.* ACM CCS Workshop on Insider Threats, October 2010. (Acceptance rate: 7/12; 58%)
[P2]	

[P1]	R. Walls. *Liquid: A Detection-Resistant Covert Timing Channel Based on IPD Shaping.* Master's thesis, August 2009. *Given CSE Outstanding Master's Thesis award.*

Professional Service

Organizer..

New England Security Day	*2016*

Program Committee Member..

International Workshop on Behavioral Implications of Contextual Analytics	*2016*
IEEE International Conference on Network Protocols	*2016*
Workshop on Cyber Security Experimentation and Test	*2015*

Conference and Journal Reviewer..

External Reviewer for IEEE European Symposium on Security and Privacy	*2015*
External Reviewer for IEEE/ACM International Conference on Automated Software Engineering	*2014*
Reviewer for IEEE Transactions on Information Forensics & Security	*2013*
Reviewer for IEEE Internet Computing	*2012*
Reviewer for IEEE Transactions on Multimedia	*2012*
External Reviewer for Digital Forensics Research Conference	*2012*
External Reviewer for Network and Distributed System Security Symposium	*2011*
External Reviewer for IEEE Symposium on Security and Privacy	*2011*
External Reviewer for IEEE/ACM Transactions on Networking	*2010*

Talks

Measuring the Impact and Perception of Acceptable Advertisements. Internet Measurement Conference, Keio University.	*Fall 2015*
Discovering Specification Violations in Networked Software Systems. ISSRE, National Institute of Standards and Technology.	*Fall 2015*
Efficient Smart Phone Forensics Based on Relevance Feedback. Workshop of Security and Privacy in Smartphones and Mobile Devices, Scottsdale, Arizona.	*Fall 2014*
Forensic Triage for Mobile Phones. Systems Reading Group, Brown University.	*Fall 2013*
Forensic Triage for Mobile Phones. Computer Science Colloquium, The Pennsylvania State University.	*Fall 2013*
Measurement and Analysis of Child Pornography Trafficking on P2P Networks. International World Wide Web Conference, Rio de Janeiro, Brazil.	*Spring 2013*
Function Privacy or Why Cookies are Better with Milk.	*Fall 2012*

Workshop on Hot Topics in Security, Bellevue, Washington.

Forensic Triage for Mobile Phones with DEC0DE.   *Fall 2011*
 USENIX Security Symposium, San Francisco, California.

Effective Digital Forensics Research is Investigator-Centric.   *Fall 2011*
 Workshop on Hot Topics in Security, San Francisco, California.

Reverse Engineering for Mobile Systems Forensics with Ares.   *Fall 2010*
 Workshop on Insider Threats, Chicago, Illinois,

The Privacy and Forensics of Mobile Devices.   *Summer 2010*
 Research Experience for Undergraduates program, University of Massachusetts Amherst.