

Peter M. Chapman

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Education

Carnegie Mellon University - Pittsburgh, PA Currently Enrolled
Computer Science PhD Student
Carnegie Mellon University - Pittsburgh, PA 2015
MS in Computer Science
University of Virginia - Charlottesville, VA 2012
BA Double Major in Computer Science & Cognitive Science

Publications

Peter Chapman, Maverick Woo, and David Brumley. *Flexibly Managing SMT Solver Diversity for Concolic Execution with Elastic Query Backoff*. Under Submission.

Jonathan Burket, Peter Chapman, Tim Becker, Christopher Ganas, and David Brumley. *Automatically Creating Problem Instances for CTF Competitions*. 2015 USENIX Summit on Gaming, Games and Gamification in Security Education (3GSE '15), Washington, D.C. 11 August 2015.

Manuel Egele, Maverick Woo, Peter Chapman, and David Brumley. *Blanket Execution: Dynamic Similarity Testing for Program Binaries and Components*. 23rd USENIX Security Symposium (USENIX Sec. 2014), San Diego, CA. 20-22 August 2014. (6 Citations)

Peter Chapman, Jonathan Burket, and David Brumley. *picoCTF: A Game-Based Computer Security Competition for High School Students*. 2014 USENIX Summit on Gaming, Games and Gamification in Security Education (3GSE '14), San Diego, CA. 18 August 2014. (6 Citations)

Peter Chapman and David Evans. *Automated Black-Box Detection of Side-Channel Vulnerabilities in Web Applications*. 18th ACM Conference on Computer and Communications Security (CCS 2011), Chicago, IL. 17-21 October 2011. (22 Citations)

Yan Huang, Peter Chapman, and David Evans. *Privacy-Preserving Applications on Smartphones*. 6th USENIX Workshop on Hot Topics in Security (HotSec 2011), San Francisco. 9 August 2011. (46 Citations)

Presentations

picoCTF: A Game-Based Computer Security Competition for High School Students. Presented at 2014 USENIX Summit on Gaming, Games and Gamification in Security Education (3GSE '14), San Diego, CA. 18 August 2014.

picoCTF: Teaching 10,000 High School Students to Hack. Presented for Spectroscopy Society of Pittsburgh, Pittsburgh, PA. 15 January 2014.

What is a Hacker? Presented for ARCS Pittsburgh, Pittsburgh, PA. 12 November 2013.

Automated Black-Box Detection of Side-Channel Vulnerabilities in Web Applications. Presented at 18th ACM Conference on Computer and Communications Security (CCS 2011), Chicago, IL. 19 October 2011.

Privacy-Preserving Applications on Smartphones. Presented at 6th USENIX Workshop on Hot Topics in Security (HotSec 2011), San Francisco. 9 August 2011.

Patents

Yang, Jinlin, Haibin Xie, and Peter Chapman. *Mining for Statistical Enumerated Type*. Microsoft Corporation. Patent US9213743 B2. 14 December. 2012.

Yang, Jinlin, Jiakang Lu, and Peter Chapman. *Hierarchical String Clustering on Diagnostic Logs*. Microsoft Corporation. Pending US20140164376 A1. 6 December. 2012.

Service

Program Committee Member for 2016 Workshop on Advances in Security Education (ASE).
Program Committee Member for 2015 USENIX Summit on Gaming, Games and Gamification in Security Education (3GSE).
Reviewer for 2015 IEEE Symposium on Security and Privacy (IEEE S&P).
Reviewer for 2015 Network and Distributed System Security Symposium (NDSS).
Reviewer for 2015 USENIX Security Symposium (USENIX Sec.).
Reviewer for 2014 IEEE Symposium on Security and Privacy (IEEE S&P).
Reviewer for 2014 USENIX Annual Technical Conference (USENIX ATC).

Reviewer for 2013 ACM Conference on Computer and Communications Security (CCS).
Reviewer for 2013 IEEE Symposium on Security and Privacy (IEEE S&P).
Reviewer for 2012 IEEE Symposium on Security and Privacy (IEEE S&P).
Reviewer for 2011 Network and Distributed System Security Symposium (NDSS).
Reviewer for 2011 USENIX Security Symposium (USENIX Sec.).
Reviewer for 2010 Network and Distributed System Security Symposium (NDSS).

Honors

National Science Foundation Graduate Research Fellowship 2012.
Computing Research Association Outstanding Undergraduate Researcher 2012 Runner-Up.
Achievement Rewards for College Scientist (ARCS) Scholar for 2012–2015.
Distinguished Major with Highest Distinction from the University of Virginia in 2012.

Professional Experience

Microsoft Research Intern Microsoft Redmond 2015

Developed a prototype suite of PowerShell Cmdlets to bridge grammar-based fuzzing with the symbolic execution engine Sage. Collaborated with a Microsoft Azure product team to overcome the challenges of deploying state-of-the-art symbolic execution tools on complex server architectures in cloud infrastructure. Shared findings via an internal technical report.

Independent Contractor ForAllSecure 2014

Served as an independent contractor for the Pittsburgh startup ForAllSecure to host an in-person computer security competition for the United States service academies in fulfillment of a DARPA contract.

Course Manager Udacity 2012

Joined the education startup Udacity as the first course manager and assistant instructor. Worked with visiting professors on “CS101: Introduction to Computing” and “CS262: Programming Languages” to create educational content viewed by hundreds of thousands of students internationally and manage the communities surrounding the courses. Developed a prototype Android application to view course content.

Microsoft Research Intern Microsoft Redmond 2011

Worked within the Windows Azure System Monitoring and Diagnostics group to analyze the hundreds of terabytes of data streaming from thousand of compute nodes weekly. Built a personalized search suggestion engine in C# to help support technicians quickly diagnose system failures and improve internal application discoverability. Extended to a general-purpose data classification and clustering tool to develop data summarization tools, regression testing, and anomaly detection. Patents published and pending.

Academic Experience

Graduate Researcher: Carnegie Mellon University 2014–2016

Python Symbolic Execution

Developing a symbolic execution engine for Python with robust symbolic string support, building upon the native string interfaces of multiple SMT solvers. Researching strategies for calling a portfolio of parallel SMT solvers (CVC4, Z3, Z3str2) under varied theories with different timeouts. Preliminary results show that flexible timeouts are necessary to maximize code and defect coverage.

Technical Lead Carnegie Mellon University 2013

Designed, organized, and led picoCTF, the largest ever computer security competition for high school students. The event focused on presenting a graduated introduction to computer science and security while discouraging existing stereotypes through an accompanying story-based game. Approximately 2,000 teams participated with an average playing time of 12 hours. Developed the picoCTF Platform to serve AJAX requests from Python Flask, using MongoDB for persistence. Modified and integrated the HTML5 ImpactJS game into the JavaScript front-end.

Undergraduate Researcher: University of Virginia 2011

Mobile Secure Computation

Ported Yan Huang’s Secure Computation Framework to Android and co-authored a position paper arguing the applicability and feasibility of secure computation applications on mobile devices. Pre-

sented our ideas at the HotSec 2011 workshop and participated in a subsequent three-person panel on privacy and anonymity.

Undergraduate Researcher: University of Virginia 2010–2011
Web App Side-Channels

Developed a system to automatically traverse a web application, recording network transfers over repeated trials. Built an analysis framework in Java to detect encrypted network flows that reveal browser state using existing metrics and proposed the Fisher criterion as an alternative. Evaluated and quantified the effectiveness of defenses including HTTPOS. First author and presenter of the paper at ACM CCS 2011.