

# Daming Dominic Chen

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## Research Interests

Heterogeneous architectures, operating systems, embedded systems, computer security, program analysis, formal verification.

## Education

<b>Carnegie Mellon University</b> <i>Computer Science (Ph.D.)</i>	<b>Pittsburgh, PA</b> <i>Aug. 2014 - Present</i>
<b>Carnegie Mellon University</b> <i>Computer Science (M.S.)</i>	<b>Pittsburgh, PA</b> <i>Aug. 2016</i>
<b>Arizona State University</b> <i>Computer Science (B.S.), Mathematics (B.A.)</i>	<b>Tempe, AZ</b> <i>Aug. 2010 - May 2014</i>

## Employment

<b>Carnegie Mellon University</b> <i>Graduate Research Assistant</i>	<b>Pittsburgh, PA</b> <i>Aug. 2014 - Present</i>
<ul style="list-style-type: none"><li>– Currently developing efficient and reliable heterogeneous architectures, advised by Phil Gibbons and Todd Mowry.</li><li>– Implemented Z3-based solver backend and floating-point symbolic execution support for Clang Static Analyzer.</li><li>– Designed, built, and evaluated FIRMADYNE, a system for large-scale emulation and analysis of Linux-based firmware.</li></ul>	
<b>Google, Chrome</b> <i>Software Engineering Intern</i>	<b>Mountain View, CA</b> <i>May 2016 - Aug. 2016</i>
<ul style="list-style-type: none"><li>– Implemented control flow integrity in the WebAssembly compiler toolchain: binaryen, emscripten, and Clang/LLVM.</li><li>– Performed automated testing, and fixed correctness/security bugs in the WebAssembly toolchain and V8 JS engine.</li></ul>	
<b>Google, ChromeOS Firmware</b> <i>Software Engineering Intern</i>	<b>Mountain View, CA</b> <i>May 2014 - Aug. 2014</i>
<ul style="list-style-type: none"><li>– Developed closed-case debug functionality for Chromebook Pixel (2015) over USB Type-C connector.</li><li>– Implemented protocols for SPI flash, USB mass storage, and FTDI MPSSE (JTAG) peripherals on STM32.</li></ul>	
<b>Arizona State University, Laboratory of Security Engineering for Future Computing</b> <i>Undergraduate Research Intern</i>	<b>Tempe, AZ</b> <i>Aug. 2012 - May 2014</i>
<ul style="list-style-type: none"><li>– Developed project analyzing the security of processor microcode as undergraduate honors thesis.</li><li>– Designed and implemented automated webpage malware detection and filtering system.</li></ul>	
<b>NASA Jet Propulsion Laboratory, In-Situ Instruments for Extreme Environments Program</b> <i>Year-Round Research Intern</i>	<b>Pasadena, CA</b> <i>Dec. 2013 - May 2014</i>
<b>Arizona State University, Extreme Environments Robotics and Instrumentation Laboratory</b> <i>ASU/NASA Space Grant Research Intern</i>	<b>Tempe, AZ</b> <i>Aug. 2011 - May 2014</i>
<ul style="list-style-type: none"><li>– Developed proposal and technical platform for ICESat-2 EPO Mission Hexacopter Engineering Challenge.</li><li>– Designed control software and embedded hardware for Antarctic Micro Subglacial Lake Exploration Device.</li></ul>	
<b>Imperial College London, Security Research Group</b> <i>Undergraduate Research Opportunities Programme Placement</i>	<b>London, UK</b> <i>May 2013 - Aug. 2013</i>
<ul style="list-style-type: none"><li>– Created teaching module for modeling and verification of network security protocols using AVISPA.</li><li>– Helped port Klee symbolic verification tool and set up Buildbot continuous integration system.</li></ul>	
<b>Sandia National Laboratories, Center for Cyber Defenders</b> <i>Summer Technical Intern</i>	<b>Albuquerque, NM</b> <i>May 2012 - Aug. 2012</i>
<ul style="list-style-type: none"><li>– Implemented debug framework for Android platform on ARM capable of kernel and system-level analysis.</li><li>– Developed and pentested secure Linux-based voting machine platform for pilot secure design competition.</li></ul>	
<b>Arizona State University</b> <i>Undergraduate Research Assistant, Operating Systems Laboratory</i>	<b>Tempe, AZ</b> <i>Aug. 2010 - May 2012</i>
<ul style="list-style-type: none"><li>– Designed peer-to-peer message-passing framework for TinyOS-based wireless sensor network.</li></ul>	

## Publications

Daming D. Chen, Manuel Egele, Maverick Woo, and David Brumley. **Towards Automated Dynamic Analysis for Linux-based Embedded Firmware**. Network and Distributed System Security Symposium (NDSS). San Diego, CA, February 2016.

Alberto E. Behar, Daming D. Chen, Colin Ho, Emily McBryan, Christian Walter, Joseph Horen, Scott Foster, Tyler Foster, Andrew Warren, Sai H. Vemprala, James M. Crowell. **The Micro Subglacial Lake Exploration Device**. Underwater Technology 33.1, July 2015.

## Posters

Daming D. Chen, Michael Huth. **Developing teaching material for formal modeling of security protocols**. 6th International Conference on Trust & Trustworthy Computing (TRUST). London, UK, June 2013.

William D. Atkins, Yevgeniy Vorobeychik, Adam Anderson, Daming D. Chen, Michael Z. Lee, Robert M. Adair, Alan Berryhill, Owen Redwood. **FIREAXE: The DHS Secure Design Competition Pilot**. 28th Annual Computer Security Applications Conference (ACSAC). Orlando, FL, December 2012.

Meddage S. Fernando, Pushkar M. Mulay, Michael A. Cartwright, Daming D. Chen, Amiya Bhattacharya, Partha Dasgupta. **Demo: Spanning an Underlay over a Host WPAN Cluster**. 9th ACM/USENIX International Conference on Mobile Systems, Applications, and Services (MobiSys). Washington, DC, May 2011.

## Other

Yevgeniy Vorobeychik, Michael Z. Lee, Adam Anderson, Robert M. Adair, William D. Atkins, Alan Berryhill, Daming D. Chen, Ben Cook, Jeremy Erckson, Steve Hurd, Ron Olsberg, Lyndon Pierson, Owen Redwood. **FIREAXE: The DHS Secure Design Competition Pilot**. 8th Annual Cyber Security and Information Intelligence Research Workshop (CSIIRW). Oak Ridge, TN, January 2013.

## Teaching

**15-745: Optimizing Compilers for Modern Architectures** Spring 2016  
*Carnegie Mellon University, Teaching Assistant*

**18-487: Introduction to Computer and Network Security and Applied Cryptography** Fall 2015  
*Carnegie Mellon University, Teaching Assistant*

## Service

PhD Admissions Committee 2016  
*Computer Science Department, Carnegie Mellon University*

Student Program Committee 2016  
*Symposium on Security & Privacy, IEEE*

## Awards

National Defense Science & Engineering Fellowship Apr. 2015  
National Physical Science Consortium Fellowship (declined) Apr. 2014  
Flinn Scholarship May 2010  
National Merit Scholarship May 2010  
Robert C. Byrd Scholarship May 2010  
National AP Scholar May 2010

## Skills

**Programming Languages:** Assembly (x86, ARM), C, C++, L<sup>A</sup>T<sub>E</sub>X, Python  
**Applications:** Buildbot, Buildroot, EAGLE, Git, LTSpice, Subversion, Visual Studio  
**Operating Systems:** Linux, Windows  
**Languages:** English (Fluent), Chinese (Proficient), Spanish (Conversational)  
**Vulnerabilities Discovered:** Dropbox, United Airlines, Intel, Netgear, D-Link  
**Amateur Radio:** KG7NSS (General)