

MARCELA S. MELARA

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RESEARCH INTERESTS

Trustworthy distributed systems, software supply chain, OS security, transparency systems

PROFESSIONAL EXPERIENCE

Research Scientist, Security & Privacy Research Oct 2019–present
Intel Labs

- Lead research on novel techniques for supply chain security, integrity and trust.

Graduate Research Intern June 2018–Feb 2019
Intel Labs

- Designed a memory isolation scheme for cloud applications using hardware-based techniques.

OS Security Engineering Intern, CoreOS Team Summer 2014 & 2015
Apple Inc.

- Evaluated deployment of key transparency as part of a large-scale system.
- Improved sandboxing technology in core operating system.

Technical Intern November 2010–April 2011
Seneca7 Race Committee

- Designed and implemented a web-based program for real-time tracking of relay race runners.

EDUCATION

Princeton University, Princeton, NJ
Ph.D., Computer Science September 2019
Dissertation: *Intra-Process Least Privilege and Isolation for Emerging Applications*
Advisor: Michael J. Freedman

M.S.E., Computer Science June 2014
Thesis: *CONIKS: Preserving Secure Communication with Untrusted Identity Providers*

Hobart and William Smith Colleges (HWS), Geneva, NY
B.S., summa cum laude, Computer Science May 2012
Honors Thesis: *ELARA: Environmental Liaison and Automated Recycling Assistant*
Second Major in French and Francophone Studies. Minor in Physics.

PUBLICATIONS AND PRESENTATIONS

Conference Papers & Journal Articles

“A Viewpoint on Software Supply Chain Security: Are We Getting Lost in Translation?” M. S. Melara and S. Torres Arias. *IEEE Security & Privacy*, Vol. 21, Issue 6. Nov 2023.

“Hardware-Enforced Integrity and Provenance for Distributed Code Deployments.” M. S. Melara and M. Bowman. *NIST Workshop on Enhancing Software Supply Chain Security*. June 2021.

“CONIKS: Bringing Key Transparency to End Users.” M. S. Melara, A. Blankstein, J. Bonneau, E. Felten, M. Freedman. *USENIX Security Symposium*. August 2015.

Caspar Bowden PET Award, 2017.

“Shining the Floodlights on Mobile Web Tracking — A Privacy Survey.” C. Eubank, M. Melara, D. Perez Botero, A. Narayanan. *W2SP*, 2013.

“Vireos: an Integrated, Bottom-Up Educational Operating Systems Project with FPGA support.” M. Corliss, M. Melara. *ACM SIGCSE*, 2011.

Conference Talks

“Auditing the CI/CD Platform: Reproducible Builds vs. Hardware-Attested Build Environments, Which is Right for You?” M. S. Melara, C. Kimes. *To appear ACM SCORED '24*. Oct 2024.

“TPMs, Merkle Trees and TEEs: Enhancing SLSA with Hardware-Assisted Build Environment Verification.” M. Melara, C. Kimes. *Open Source Summit NA*. Apr 2024.

“Panel Discussion: Improving Supply Chain Integrity with OpenSSF Technologies.” A. Le Hors, M. Lieberman, J. White, M. Melara, I. Hepworth. *Open Source Summit NA*. Apr 2024.

“Panel Discussion: DEI for the OpenSSF Community.” M. McElaney, J. Kjell, J. White, C. Voong, M. Melara. *SOSS Community Day NA*. Apr 2024.

“All things in-toto! Supply chain attestations, policies, and adoption stories, oh my!” M. Melara, S. Torres Arias. *KubeCon & CloudNativeCon NA*. Nov 2023.

“Using FPGAs to Create a Complete Computer System for the Classroom.” M. Melara. *NYCWIC 2011*.

Invited Talks

“Securing the Software Supply Chain: An In-Depth Exploration of SLSA.” M. Lieberman, M. Melara, J. Lock, L. Capadan. *OpenSSF Tech Talk*. Oct 2023.

“Building Trust with Attestation.” M. Melara, V. Scarlata. *Open at Intel Podcast*. May 2023.

“Software Supply Chains.” M. Melara, B. Domingues. *Open at Intel Podcast*. Mar 2023.

“EnclaveDom: Privilege Separation for Large-TCB Applications in Trusted Execution Environments.” M. Melara. *Microsoft Research Cryptography & Privacy Colloquium*. Sep 2020.

Blog Posts

“Building Trust in AI: An End-to-End Approach for the Machine Learning Model Lifecycle.” M. Spoczynski, M. Melara, S. Szyller. *Intel Community Tech Innovation Blog*. December 2024.

“The Opportunity for DEI Participation in the Security Industry (And OpenSSF).” C. Voong, J. White, J. Kjell, M. Melara, M. McElaney. *OpenSSF Blog*. May 2024.

“Why Making Johnny’s Key Management Transparent is So Challenging.” M. Melara. *Freedom to Tinker*. March 2016.

“There’s Something Wrong With This Picture. . .” M. Melara. Guest blogger, *Grand Central Blog*. November 2010.

“Busy Moms Need Energy.” M. Melara. Guest blogger, *Grand Central Blog*. October 2010.

Posters

“Protecting the IoT Against Data Leaks through Intra-Process Access Control.” M. Melara. *Stony Brook University, National Security Institute Security & Privacy Day 2017*.

“Building an Automatic and Scalable Tool for Improving Environmental Recycling: ELARA.” M. Melara. *HWS Summer Research Symposium 2011*.

“Using FPGAs to Create a Complete Computer System for the Classroom.” M. Melara. *HWS Summer Research Symposium 2010*.

Manuscripts

“SoK: A Defense-Oriented Evaluation of Software Supply Chain Security.” E. Ishgair, M. S. Melara and S. Torres Arias. *ArXiv Preprint*. May 2024.

“Enabling Security-Oriented Orchestration of Microservices.” M. S. Melara and M. Bowman. *ArXiv Preprint*. May 2021.

“EnclaveDom: Privilege Separation for Large-TCB Applications in Trusted Execution Environments.” M. S. Melara, M. J. Freedman, and M. Bowman. *ArXiv Preprint*. July 2019.

“Pyronia: Redesigning Least Privilege and Isolation for the Age of IoT.” M. S. Melara, D. Liu, and M. J. Freedman. *ArXiv Preprint*. March 2019.

MENTORING

PhD Advising

Eman Abu Ishgair (*Purdue University*). Co-advised with Santiago Torres Arias

Interns Mentored, Intel Labs

Eman Abu Ishgair (*Purdue University*), Summer 2024
Project: “Private SBOM Exchange”

Undergraduate Students Mentored

Jessica May. CRA-W Collaborative Research Experiences for Undergraduates, Summer 2017
Project: “Stormship: Smart Tool for Revealing Malicious Scripts Hidden in Plain Sites”. Co-advised with Nick Feamster

Huy Quoc Vu. Google Summer of Code, Summer 2016
Project: “CONIKS for Tor Messenger”. Co-mentored with Arlo Breault (*The Tor Project*)

Michael Rochlin. Princeton University Junior Independent Work, Spring 2015
Project: “Coniks 2.0: Publicly Verifiable Keystore with Key Changing and Verifying Capabilities”. Co-advised with Ed Felten

Intel-Princeton REU

Lois Omotara, Summer 2023
 Priya Naphade, Summer 2022

Científico Latino Graduate School Mentoring Initiative

Jessica Williams, Fall 2023
 Brittany Gomez, Fall 2020

TEACHING

Graduate Teaching Fellow Summer 2017–Winter 2018
 Princeton University, McGraw Center for Teaching and Learning

- Provided instructional consultation for TAs via classroom observations.
- Led the annual Assistant in Instruction Orientation for new Computer Science TAs.

Assistant in Instruction

Princeton University

- COS 461: Computer Networks Spring 2014
 Instructor: Prof. Michael Freedman
- COS 318: Operating Systems Fall 2013
 Instructors: Prof. Kai Li, Dr. Andrew Bavier

Physics Teaching Fellow

Fall 2011–Spring 2012

Hobart and William Smith Colleges, Center for Teaching and Learning

- Held walk-in evening office hours for students taking Physics courses of any level.

Evening Teaching Assistant

Fall 2010–Spring 2011

Hobart and William Smith Colleges, Dept. of Mathematics and Computer Science

- Held walk-in evening office hours for students taking introductory Computer Science courses.

Teaching Assistant

Hobart and William Smith Colleges, Dept. of Mathematics and Computer Science

- CPSC 124: Introduction to Programming Fall 2011, Spring 2012
 Instructors: Prof. David Eck, Prof. Carol Critchlow, respectively
- MATH 131: Calculus II Fall 2009
 Instructor: Prof. Kevin Mitchell

HONORS AND AWARDS

USENIX Security Noteworthy Reviewer Award August 2023

Caspar Bowden Award for Outstanding Research in Privacy Enhancing Technologies July 2017

Siebel Scholars Class of 2014 July 2013

Princeton University President's Fellowship Fall 2012–Spring 2013

Phi Beta Kappa May 2012

Honors in Computer Science April 2012

Marcela S. Melara	Intel Labs
HWS Dept. of Mathematics and Computer Science John S. Klein Prize	April 2012
Roderic '52 and Patricia '53 Ross Endowed Centennial Scholarship	Fall 2011–Spring 2012
Hai Timiai Women's Senior Honors Society	April 2011
HWS Dept. of Mathematics and Computer Science William Ross Proctor Prize	April 2010
Phi Beta Kappa Book Award	April 2010
First Year Academic Achievement Award	April 2009
William Smith College Dean's List	Fall 2008–Spring 2012

SERVICE ACTIVITIES

Technical Advisory Council , Open Source Security Foundation (OpenSSF)	2024–present
Co-Chair , OpenSSF Diversity, Equity and Inclusion Working Group (DEI WG)	2024–present
Workshop Organizer , ACM Workshop on Software Supply Chain Offensive Research and Ecosystem Defenses (SCORED)	2022–present
Specification Maintainer , CNCF in-toto Attestation Framework	2023–present
Specification Maintainer , OpenSSF Security Levels for Software Artifacts (SLSA)	2024–present
Program Committee , Linux Foundation SigstoreCon: Supply Chain Day	2024
Program Committee , Linux Foundation SOSS Community Day EU	2024
Program Committee , ACM EuroSec	2024
External Reviewer , Proceedings on Privacy Enhancing Technologies (PoPETS)	2018
External Reviewer , International World Wide Web Conference (WWW)	2015
Regional Lead , NJ, Siebel Scholars	Fall 2014–Spring 2016
Hiring Committee , HWS Dept. of Physics Faculty	Spring 2012
Hiring Committee , HWS Dept. of French and Francophone Studies Faculty	Spring 2012

RELEVANT SKILLS

Programming Languages: Proficient: Go, Python, C/C++, Java; Familiar: C#, PHP, JavaScript, MySQL, Verilog

Natural Languages: Fluent: English, Spanish, German; Conversational: French; Basic: Japanese