

Haoda Wang

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Education

Columbia University

PhD, Computer Science

Advisors: Asaf Cidon, Jason Nieh

New York, NY

Sep 2022 – Present

University of Southern California

BSc, Computer Engineering and Computer Science

Advisor: Jelena Mirkovic

Los Angeles, CA

Aug 2018 – May 2022

Computer Science Award for Outstanding Research, Discovery Scholar Distinction, Engineering Honors Scholar

Experience

Research.....

Columbia University

Research Assistant, Computer Science Department

New York, NY

Sep 2022 – Present

Sandia National Laboratories

R&D Intern

Formal verification of high-consequence compilers

Livermore, CA

May 2022 – Sep 2022

USC Information Sciences Institute

Research Assistant, Networking and Cybersecurity Division

Marina del Rey, CA

Aug 2018 – May 2022

Worked as a research assistant in the STEEL network security lab and the BASS systems security lab at USC-ISI

- o Created the prototype for **Leader**, an adaptive in-kernel defense to detect and mitigate low-rate denial of service attacks using Systemtap and C++ with a 99% accuracy rate in identifying attacks
- o Built and tested **dns-proxy**, a mitigation tool for NXDOMAIN flood attacks against DNS servers using DPDK with nearly no client-side performance impact and 1,000x faster attack traffic processing time than bind9.
- o Improved the hash detection accuracy of **Harm-DoS**, a tool to automatically replace hash functions vulnerable to algorithmic complexity attacks in ELF binaries using angr
- o Implemented a prototype for **SMELL-CPS**, a tool for extracting natural mathematical expressions from cyber-physical binaries
- o Constructed **Festoon**, a line-rate FPGA SmartNIC emulation software, as part of my senior thesis.

Harvard University

Research Assistant, School of Engineering and Applied Sciences

Worked as a research assistant in Prof. Minlan Yu's lab

- o Developed an intrusion detection system integrating FPGA and CPU technologies with Hyperscan and the Alveo U250 SmartNIC.

Cambridge, MA

May 2021 – Aug 2021

Sandia National Laboratories

R&D Intern, Scalable Modeling and Analysis Group

Implemented a custom kernel bypass solution for on-machine packet capture and analysis at 100Gbps speeds on commodity NICs to enhance testbed experiment analysis

Livermore, CA

May 2019 – Aug 2019

Software Development.....

NASA Jet Propulsion Laboratory

Engineering Intern, Robot Interfaces and Visualization Group

Worked on a Ground Data Systems team developing the **SSim** simulation software for Rover Planners

- o Maintained CI and testing infrastructure for simulation tools using Jenkins, GTest, and pytest
- o Enabled simulation software to run on big-endian architectures and integrated flight software modules supporting RIMFAX and IVP, increasing simulation fidelity
- o Created a bespoke fuzzer generating fully valid rover sequences that found multiple fatal bugs in Mars 2020 flight software

Pasadena, CA

Jan 2020 – May 2021

Teaching.....
Columbia University **New York, NY**
Teaching Assistant, Computer Science Department *Sep 2022 – Dec 2022*
Assisted students with Linux-based assignments for Columbia’s introductory Operating Systems class
University of Southern California **Los Angeles, CA**
Course Producer, Department of Electrical and Computer Engineering *Aug 2019 – Dec 2019*
Assisted students with Arduino-based labs and questions for USC’s EE109 class

Skills

Languages: C++, Python, Bash, x86 Assembly, Verilog, JavaScript
Libraries: DPDK, SPDK, angr, LLVM, MPI, SciPy, Bottle, Flask
Other: Linux, Docker, Git, AWS, Jenkins, KVM

Publications

Papers.....
H. Wang, C. Hauser, and L. Garcia, “Autocps: Control binary dataset generation for semantic reverse engineering,” *IEEE Workshop on the Internet of Safe Things*, 2022.
R. Tandon, H. Wang, N. Weideman, S. Arakelyan, G. Bartlett, C. Hauser, and J. Mirkovic, “Leader: Defense against exploit-based denial-of-service attacks on web servers,” under review.
N. Weideman, H. Wang, T. Kann, S. Zahabizadeh, W.-C. Wu, R. Tandon, C. Hauser, and J. Mirkovic, “Harm-dos: Hash algorithm replacement for mitigating denial-of-service vulnerabilities in binary executables,” under review.
Technical Reports.....
H. Wang, G. M. Baker, J. P. Kenny, and C. D. Ulmer, “An initial investigation of the design challenges associated with reliable 100gige packet capture,” Tech. Rep. SAND2019-10319, Sandia National Laboratories, 2019.
Posters.....
R. Tandon, H. Wang, N. Weideman, S. Arakelyan, C. Hauser, and J. Mirkovic, “Poster - leader: Low-rate denial-of-service attack defense,” *NDSS Symposium*, 2019.

Awards

DoD NDSEG Fellow: 2022
Goldwater Scholar: 2021
National Merit Scholar: 2018

Side Projects

some guy’s blog: Do anime profiles make you a better programmer? Does the LEGO space rocket actually fly? Can you write a tweet in LaTeX? And more funny words you might have seen featured on Ars Technica
spet: A turing-complete programming language based on Spotify playlists
lazy-lfm: Python scripts that show how bad your music taste is