JESSY AYALA

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EDUCATION

University of California, Irvine, Irvine, CA   *Sep 2022 - present*
Ph.D. Software Engineering   GPA: 3.99/4.0

New York University, Brooklyn, NY   *Aug 2019 - May 2022*
M.S. Cybersecurity   GPA: 3.90/4.0

University of California, San Diego, La Jolla, CA   *Jun 2018 - Jul 2019*
M.Ed. Education   GPA: 3.95/4.0

University of California, San Diego, La Jolla, CA   *Sep 2014 - Jun 2018*
B.S. Mathematics-Computer Science   GPA: 3.16/4.0

TECHNICAL SKILLS

Programming: Python, Bash, Java, C++, MATLAB, C, Javascript, OCaml, Haskell. ($l_1 > l_2$ proficiency)
Technologies: Familiarity with common application security testing approaches (SAST, DAST, IAST, etc.), penetration testing tools (Kali Linux), and recognized software assurance frameworks (OWASP, NIST).
CI/CD: Experience with code review, automated workflow integration, software requirement specification development, vulnerability management, and agile project management.
Other: Data analysis, web scraping, network analysis, mobile security, program analysis, applied machine learning, reverse engineering, CTF, automated testing, and network traffic detection rule writing.

WORK EXPERIENCE

National Security Intern   Richland, WA
Pacific Northwest National Laboratory   *June 2024 - Sept 2024*

· My focus was exploring metadata, current literature, and future research directions, for software-bill-of-materials (SBOMs) to identify challenges of the SBOM generation-to-management pipeline in practice.
· Laid out infrastructure, e.g., software requirements & server costs, to implement SBOM generation-to-management for a deployed internal cloud application written in JavaScript using npm tooling, Python, and Bash.

Security Wintern   New York, NY
Trail of Bits   *Dec 2023 - Jan 2024*

· Assisted with tooling experimentation that will help threat modeling engagements start with a baseline model of the client's production system which does not depend on any particular client representative's understanding.
· Combined large language models (i.e., `GPT-4`) with static analysis tooling (e.g., `semgrep`) and reconnaissance techniques (e.g., `DalFox`) to automate system attack surface mapping for threat modeling.

Global Security Intern (Purple Teaming-ish)   Livermore, CA
Lawrence Livermore National Laboratory   *May 2023 - Aug 2023*

· My focus was creating and deploying attacks on a contained network that are then mapped to the Enterprise MITRE ATT&CK framework. I also wrote queries, using `Splunk`, that can be used to detect such attacks.
· Built an in-house security matrix to promote repeatability and transparency (i.e., purple teaming lens).

Cybersecurity Intern → Associate Cybersecurity Engineer   La Jolla, CA
Insulet Corporation   *May 2020 - Oct 2022*

· My focus was mobile security testing for 96 company control requirements, in accordance with HIPAA, as a part of the product security team. Risk register management and cyber threat evaluation for multiple devices.

- Risk assessment/analysis, creating threat models (iOS and Android), reviewing quarterly penetration test reports, and weekly meetings with development teams to discuss vulnerability findings and mitigations.
- Regression testing lead and maintainer of security testing protocols to ensure holistic coverage.

Global Security Intern (OT Security) — Livermore, CA
Lawrence Livermore National Laboratory — *May 2022 - Aug 2022*

- Worked on the PySCES project, a Python-based tool used for modeling capabilities to rapidly assess the potential scope of impacts that a cyber attack can have on energy infrastructure based on publicly documented vulnerabilities and the ICS MITRE ATT&CK framework.
- Expanded functionality to simulate a variable amount of attacks on multiple devices, modified source code to avoid crashes and throw errors where applicable, and refactored source code to improve readability.

Software Engineering Intern — Cambridge, MA
Open Learning Exchange — *Mar 2020 - Dec 2020*

- Developed CLI modules for a Raspberry Pi with an open-source code base via web scraping, regular expressions, and working with Bluetooth services. Performed weekly code reviews alongside other interns.
- Integrated automated static analysis within the Travis pipeline that is triggered with every build update for the accompanying Android application and met with developers to discuss secure code practices. [Blog Post](#)

RESEARCH EXPERIENCE

Graduate Student Researcher — Irvine, CA
Software Aurora Lab, advised by Professor Joshua Garcia — *Aug 2022 - present*

Primary Project – Software Supply Chain Security in the Open-source Ecosystem
- **Role:** I am leading studies to investigate software supply chain security concerns in the open-source ecosystem.
- **Research Question(s):** What obstacles hinder the exposure of OSS vulnerabilities? What are gaps in OSS vulnerability disclosure? What is the current state of software vulnerability management, e.g., practices, in OSS projects? How can large language models be used for OSS vulnerability detection and repair?
- **Methods**: Building scrapers (e.g., using `Puppeteer`) to perform mass mining of information from GitHub projects, bug bounty reports, and security advisory databases. Performing data analysis (e.g., using `Jupyter`) and analyzing (i.e., using both quantitative and qualitative approaches) the usage of software vulnerability management features (e.g., security policies), and running static analysis on OSS source code at a large scale. Interviewing OSS project maintainers to investigate their perspectives on vulnerability review (e.g., challenges).
- **Outcomes:** [W1], [P1-P3], and [C2-C3] below. One paper under review, and one paper under preparation.

Project Two – Intent-Aware, Demand-Driven Targeted Execution for Android Applications
- **Role:** I am running experiments from related prior work and the proposed approach's artifact in order to compare output size and efficiency. In addition, I am helping with literature review and source code updates.
- **Research Question(s):** How can path-sensitive intent analysis be used to determine what's needed to control execution from its inter-component interface in Android applications? Furthermore, how can this approach be extended to improve fuzzing techniques on Android applications? (Collaboration with EPFL)
- **Methods**: Set up tools from prior work that are available as artifacts produced from their respective papers. Running experiments on APKs of interest to compare to the proposed framework of this project. Writing scripts to automate the process of collecting output from tools and formatting that output to produce metrics for comparison. Editing source code to enhance current static analysis for supporting native code analysis.
- **Outcomes:** One paper under review, one paper under preparation.

Project Three – Investigating the Accessibility of Software Meetings for Blind and Low Vision Professionals
- **Role:** I helped interview (semi-structured) blind employees who are a part of the software development lifecycle, conducting literature review, and performing coding/memo writing using the transcripts of interviews.

- **Research Question(s):** What does accessibility look like in various types of software development meetings for BLV software professionals? How do these professionals overcome such accessibility issues?
- **Methods**: Qualitative methods (e.g., interviewing, memo writing, coding). Help recruit through professional contacts, mailing lists such as `program-l` (online discussion group catered to programmers with visual disabilities), posting to online communities like Facebook groups, and snowball sampling (just over 25 participants).
- **Outcomes:** [C1] below.

Graduate Research Assistant   Brooklyn, NY
NYU mLab, advised by Professor Danny Y. Huang   *Jun 2021 - May 2022*

- **Role:** I led a study to assess the extent in which secure code review practices are utilized in open-source 3D printing projects using the contents of GitHub pull requests.
- **Research Question:** How secure are 3D printing open-source repositories?
- **Methods**: Used headless browser automation to determine 3D printing repositories on GitHub. Gathered pull request metadata (10,000+) from hundreds of repositories with Bash. Analyzed, visualized, and manipulated data with Python. Automated code analysis with `CodeQL` in all scraped pull requests for a given repository.
- **Outcomes:** Presented preliminary findings with Prof. Huang at the IEEE Workshop on Reliable and Resilient Digital Manufacturing 2021 and at the Hack3D Symposium 2022. Presentation

IN PROCEEDINGS

[C3] **Jessy Ayala**, Yu-Jye Tung, and Joshua Garcia. *A Mixed-Methods Study of Open-Source Software Maintainers On Vulnerability Management and Platform Security Features.* In Proceedings of the 2025 USENIX Security Symposium.

[C2] **Jessy Ayala**, Steven Ngo, and Joshua Garcia. *A Deep Dive Into How Open-Source Project Maintainers Review and Resolve Bug Bounty Reports.* In Proceedings of 2025 IEEE Symposium on Security & Privacy.

[P3] **Jessy Ayala**, Steven Ngo, and Joshua Garcia. *Towards Understanding the Underuse of Security Features in Open-Source Repositories.* In Proceedings of the 2024 USENIX Security Symposium.

[P2] **Jessy Ayala**, Yu-Jye Tung, and Joshua Garcia. *A Glimpse of Vulnerability Disclosure Behaviors and Practices Using GitHub Projects.* In Proceedings of the 2024 IEEE Symposium on Security & Privacy.

[C1] Yoonha Cha, Isabela Figueira, **Jessy Ayala**, Emory J. Edwards, Joshua Garcia, André van der Hoek, and Stacy Branham. *"Do You Want Me to Participate or Not?": Investigating the Accessibility of Software Development Meetings for Blind and Low Vision Professionals.* In Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems.

[P1] **Jessy Ayala** and Danny Huang. *Towards Quantifying Software Supply Chain Security Risks in Open-Source 3D Printer Repositories.* In Proceedings of the 2023 USENIX Security Symposium.

[W1] **Jessy Ayala** and Joshua Garcia. *An Empirical Study on Workflows and Security Policies in Popular GitHub Repositories.* In Proceedings of the ICSE 2023 Workshop on Software Vulnerability Management.

PRESENTATIONS

Poison Was the Cure: A Glimpse Into (Lack of) OSS Vulnerability Disclosures   Atlanta, GA
OpenSSF Secure Open Source Software Fusion 2024 - Talk   *Oct 2024*

Learning from the SBOM Generation-to-Management Pipeline   Richland, WA
Pacific Northwest National Laboratory Gold Experience Symposium - Tool Presentation   *Aug 2024*

Towards Understanding the Underuse of Plaform Security Features in OSS   Philadelphia, PA
USENIX'24 - Poster Presentation   *Aug 2024*

A Glimpse of Vulnerability Disclosure Behaviors & Practices Using GitHub San Francisco, CA
Oakland S&P'24 - Poster Presentation   *May 2024*

How Far Are We & What Are We Doing to Secure the Software Supply Chain?   Irvine, CA
Cyber@UCI - Talk   Apr 2024

A Journey of Insights from Empirically Exploring Security Concerns in OSS   Irvine, CA
UC Irvine Informatics Graduate Student Association - Talk   Jan 2024

Towards Quantifying Software Supply Chain Security Risks in OSS Repos   Anaheim, CA
USENIX'23 - Poster Presentation   Aug 2023

Uncovering the Use/Misuse of Security Policies in Popular Open-source Repos   Anaheim, CA
USENIX'23 - Lightning Talk   Aug 2023

An Empirical Study on Workflows & Security Policies in Popular Repos   Melbourne, AU
ICSE'23 International Workshop on Software Vulnerability Management - Paper Presentation   May 2023

Exploring Socio-technical Security Concerns in Critical Python Repositories   Austin, TX
PyTexas 2023 - Talk   Apr 2023

Hackers, Misinformation, and Risk Mitigation   La Jolla, CA
UCSD Comienza con un Sueño Conference - Workshop Presentation   Mar 2023

PySCES: Python Simulator for Cyber Event Scenarios   Virtual
Lawrence Livermore National Laboratory Summer SLAM! - Tool Presentation   Aug 2022

Software Supply Chain Security Risks in Open-source 3D Printing Repos   Virtual
Hack3D Symposium: Security for Digital Manufacturing - Abstract Presentation   Jul 2022

Security Risks in the Software/Industry Supply Chain   San Diego, CA
Lightning Talks on Supply Chain Risk - Co-organizer and Speaker   Mar 2022

Orchestrating Mobile Application Security Testing   Virtual
World Congress on Internet Security - Paper Presentation   Dec 2021

Security Threats and Countermeasures in Wireless IoT   Virtual
Wireless Congress: Systems and Applications - Short Paper Presentation   Nov 2021

Toward Characterizing Behaviors of Open-source Contributors for Manufacturing Software to Identify Security Risks   Virtual
IEEE Workshop on Reliable and Resilient Digital Manufacturing - Preliminary Findings   Sep 2021

Using A Layered Approach For Graphical-Based Passwords   Virtual
6th International eConference on Cyber & Digital Forensics - Extended Abstract Presentation   Jun 2021

Empowering Students through Personalized Mathematics   San Diego, CA
GSDMC 2020: Bringing Focus into Equity - Workshop Presentation   Feb 2020

TEACHING EXPERIENCE

Graduate Teaching Assistant   Irvine, CA
University of California, Irvine   Sep 2023 - present

· Holding weekly office hours, grading assignments, answering student questions through forums, and discussing student concerns with the professor. Courses: Information Retrieval.

Lecturer   Raleigh, NC (Remote)
North Carolina State University   Aug 2022 - present

· Holding weekly lectures and office hours, grading assignments, answering questions via forums, and creating a project-based curriculum. Course: Data Science for Cybersecurity (DSC 235).

Associate Instructor   Irvine, CA
University of California, Irvine   Jun 2023 - Sep 2023; Jun 2024 - Sep 2024

· Holding weekly lectures and lab hours, grading assignments, answering questions via forums, and creating material to match the expected curriculum. Course: Intermediate Programming with Python (ICS 33).

Graduate Teaching Assistant
New York University

Brooklyn, NY
May 2021 - Dec 2021

· Held weekly office hours, graded assignments, answered student questions through forums, and discussed student concerns with the professor. Courses: Operating Systems and Application Security.

Secondary Math Teacher
San Diego Unified School District

San Diego, CA
Aug 2018 - Jun 2021

· Worked directly with hundreds of students who primarily come from underrepresented backgrounds.
· Developed equitable assessment items with colleagues, attended math education conferences, participated in district-wide lesson studies, and advocated for computer science to be a part of curriculum.

Graduate Instructional Assistant
University of California, San Diego

La Jolla, CA
Sep 2018 - Jun 2019

· Held bi-weekly office hours, graded assignments, proctored exams, and discussed student concerns with the professor. Course: American Higher Education and the Collegiate Experience course.

ACADEMIC SERVICE

Paper Reviewer: IEEE Access, OWASP'22 Global AppSec Europe, OWASP'22 Global AppSec APAC, OWASP'22 Global AppSec San Francisco, MSR'23 Junior PC, IEEE ICSE'25 Shadow PC, ACM TOSEM.

Artifact Evaluator: ACM EuroSys'23 (two rounds), IEEE S&P WOOT'23, USENIX ATC'23 (two rounds), IEEE ICSE'24, USENIX Security'24 (two rounds), ACM PLDI'24, ACM CCS'24 (two rounds), NDSS'25 (two rounds).

Volunteer: OWASP's 20th Anniversary Celebration, IEEE Mitigating Societal Harms in a Social Media World, IEEE Space and Satellite Symposium 2021, CyberForce'21 Competition Judge, SCORED Workshop at ACM CCS'22, IEEE ICSE'23.

UNIVERSITY AND COMMUNITY SERVICE

. **IEEE Cybersecurity Special Interest Group - Vice Chair**
IEEE Computer Society (Region 6)

San Diego, CA
Sep 2021 - present

. **Math ANEX - Secondary Math Problem Analyst**
Virtual

Virtual
Sep 2020 - Sep 2021

. **TRIO Student Support Services - Tutor and Mentor**
University of California, San Diego

La Jolla, CA
Sep 2015 - Jun 2018

. **Office for Students with Disabilities - Note Taker**
University of California, San Diego

La Jolla, CA
Jan 2016 - Dec 2017

HONORS AND AWARDS

GEM Fellow (co-sponsored by Lawrence Livermore National Lab and UC Irvine)	*2022 - present*
University of California, Irvine - Eugene-Cota Robles Fellow	*2022 - present*
University of California, Irvine - Rose Hills Foundation Science & Engineering Fellow	*2024 - 2025*
University of California, Irvine - Rosalva Gallardo Valencia Graduate Award Recipient	*2023*
University of California, Irvine - Competitive Edge Summer Research Fellow	*2022*
New York University - Bridgewater Associates Scholar	*2020 - 2022*
New York University - Tandon Cyber Fellow	*2019 - 2022*
Veracode - OWASP A6 Community Secure Coding Challenge Winner	*2021*
Insulet Corporation - You Make the Difference Award for Q2	*2021*
San Diego Unified School District - San Diego Enhanced Mathematics Fellow	*2020 - 2021*
San Diego Unified School District - Leader of Innovation	*2019 - 2020*
University of California, San Diego - Education Studies Fellow	*2018 - 2019*
University of California, San Diego - Chancellor's Associates Scholar	*2014 - 2018*