Muxi Lyu

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Education

Johns Hopkins University, Baltimore, MD   08/2021- 12/2024

B.S. in Computer Science with a Double Major in Applied Mathematics and Statistics   *GPA: 3.91/4*

M.S.E in Computer Science (Advisor: Prof. Yinzhi Cao)

Coursework: Web Security, Operating Systems, Databases, Compilers & Interpreters, AI, Software System Design, Algorithms, Networks, Functional Programming

Research Interests

Web Security and Privacy, Mobile Security and Privacy, Machine Learning Security and Privacy

Publications

Zifeng Kang, **Muxi Lyu**, Zhengyu Liu, Jianjia Yu, Runqi Fan, Song Li, and Yinzhi Cao, Follow My Flow: Unveiling Client-Side Prototype Pollution Gadgets from One Million Real-World Websites, to appear in the Proceedings of the IEEE Symposium on Security and Privacy (Oakland), 2025.

Research Experience under SecLab JHU, Supervised by Prof. Yinzhi Cao

Follow My Flow: JavaScript Dynamic Analysis   September 2023 – May 2024

Client-Side Prototype Pollution Vulnerability Detection

- Investigated client-side prototype pollution gadgets in JavaScript, uncovering vulnerabilities across **one million websites**.
- Modified Chrome's V8 JavaScript engine to track data flow and enable dynamic runtime value injections.
- Designed a high-throughput MongoDB database to manage concurrent data processing for large-scale web crawling.
- Unveiled **133 zero-day vulnerabilities**, including critical ones in **Meta software and Vue**, leading to CVE assignment and a bug bounty.

DARPA AI Cyber Challenge (AIxCC), Team 42-b3yond-6ug   May 2024 – July 2024

Automated Java Fuzzing Pipeline Development

- Developed an automated fuzzing pipeline leveraging JQF and Zest for Java applications, improving testing efficiency.
- Integrated large language models (LLMs) into the fuzzing process to iteratively generate and refine structural input generators.
- Overcame challenges such as dependency rebuilding, complex input generation, and feedback-driven build failure resolution.
- Contributed to the team's recognition as one of the top seven winners, receiving a **$2 million award**.

Independent Research on Directed Grey-Box Fuzzing   July 2024 – Present

Enhancing Fuzzing for Web Applications

- Initiated an independent project combining ideas from previous research on vulnerability-guided flows and structured input generation.
- Developing a novel framework for Java fuzzing that addresses challenges in constraint solvers for closed-source APIs and cross-language communications.
- Utilizing machine learning techniques, such as graph neural networks, to prioritize seed scheduling based on bug-type knowledge.
- Collecting statistics on constraint usage in popular Java systems to identify patterns and improve input generation strategies.
- Designed the framework to target second-order vulnerabilities, advancing state-of-the-art fuzzing methodologies for web security.

Work Experience

JHU uCredit Dev Team — [Link]   May 2023 – Apr 2024
*Software Developer (**MERN stack** - MongoDB, Express.js, React, Node.js)*   *Baltimore, MD*
- Implemented website features for interactive degree auditing tailored to university students.
- Initiated the development of an advising chat-bot integrated with OpenAI and JHU information system.
- Utilized structured workflow and documenting skills to ensure the readability and scalability of the codebase.

JHU COLLAB, CAAMS Project Team   May 2022 – August 2023
*Full-Stack Software Developer (**PERN stack** - PostgreSQL, Express.js, React, Node.js)*   *Baltimore, MD*
- Developed a scalable hiring system for JHU students' career pursuits and professors' recruitment needs.
- Enhanced job-setup features with a streamlined process, improving user-friendliness compared to other systems.
- Demonstrated adaptability by successfully transitioning through various tech stacks.

Leadership

JHU HopHacks Organizer Team — [Link]   February 2022 – October 2024
Director   *Baltimore, MD*
- Led the planning and execution of the annual 36-hour hackathon, overseeing logistics, sponsorship, and event coordination for **300+ participants**.
- Collaborated with university departments and external sponsors to secure funding and resources.
- Managed a team of 15 organizers, delegating tasks related to marketing, outreach, and operations to ensure smooth execution of the event.
- Organized workshops and mentorship sessions for participants, providing opportunities to learn from industry professionals and enhance technical skills.

JHU Chinese Students and Scholars Association (CSSA)   May 2021 – May 2024
Vice President   *Baltimore, MD*
- Led an 8-member technology team in developing and maintaining software projects aimed at enhancing the campus experience for Chinese students.
- Organized and directed **four large-scale orientation programs**, welcoming and assisting over **1000 incoming students** from the Class of 2027.
- Facilitated conflict resolution and ensured smooth operations during high-attendance events, maintaining a positive and inclusive environment.

Teaching Experience

Course Assistant of Compilers and Interpreters   Fall 2024

Course Assistant of Operating Systems   Spring 2024

Course Assistant of Intermediate Programming (C, C++)   Fall 2022

Teaching Assistant of Probability   Fall 2022

Academic Honors

Honorable Mention in the NSF GRFP competition   2025

Michael J. Muuss Research Award ($3000 awarded from JHU CS)   2024

Graduation with Honors in Computer Science   2024

Dean's List   Fall 2021 - Spring 2024

Technical Skills

Languages: Java, Python, JavaScript/TypeScript, C++, C, HTML/CSS, Matlab, R, Rust, Swift, Ruby

Databases: MongoDB, PostgreSQL, MySQL, Firebase

Technologies/Tools: Git, Linux/Ubuntu Server, AWS, Docker, JupyterNotebook, Latex, CAD