

PRATIK M. KAMBLE

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PROFESSIONAL SUMMARY

Ph.D. student in Computer Science at Binghamton University researching computer systems security under Prof. Aravind Prakash. Current work focuses on WebAssembly binary analysis, code bloat, and attack-surface reduction; also exploring tag-guided forced execution and fuzzing for RISC-V. CTF team captain (top-20 worldwide, eCTF) and USENIX Security 2026 artifact evaluator.

EDUCATION

Binghamton University, SUNY, Thomas J. Watson College of Engineering and Applied Science

Binghamton, NY

Doctor of Philosophy in Computer Science

Aug 2025 - Expected May 2030

Research Area: Computer Systems Security

Cumulative GPA: 4.00/4.00 | Bing Security Lab, CTF Cybersecurity Club

University of Florida, Herbert Wertheim College of Engineering

Gainesville, FL

Master of Science in Computer Science

Aug 2021 - May 2023

Cumulative GPA: 3.80/4.00 | ELX Lab, Gator Hatchery, UF Off Campus Life

University of Pune, MIT College of Engineering

Pune, India

Bachelor of Engineering in Computer Engineering

Aug 2015 - May 2019

Cumulative GPA: 8.37/10.00 | Robocon

TECHNICAL SKILLS

Programming: C, C++, Java, SQL, Assembly, MATLAB

Security: Program Analysis, Binary Analysis, Reverse Engineering, Fuzzing, Software Debloating, Secure Protocol Design, Authenticated Encryption

Platforms & Architecture: Linux, Android, WebAssembly, RISC-V, Microservices

Frameworks & Tools: LLVM, GDB, Git, Docker, Kubernetes, Kafka, Spring Boot

RESEARCH EXPERIENCE

Binghamton University, Research Foundation for SUNY

Binghamton, NY

Research Assistant

Aug 2025 - Present

- Analyzed code bloat across a corpus of 8,000+ real-world WebAssembly binaries, including benchmark suites, widely used libraries, and a Linux kernel compiled to Wasm.
- Combined staged static reachability analysis with dynamic coverage measurement, revealing that 70–85% of functions remain unexecuted under typical workloads despite near-zero provably dead code under conservative static analysis.
- Performed analytical debloating simulation on optimized library binaries, demonstrating 4.9–11.6× reduction in CFI equivalence class sizes, elimination of up to 40.7% of sensitive WASI host imports via dead code, and removal of up to 81% of memory-store and 84% of call_indirect exploitation primitives.
- Investigating hardware-assisted forced execution for RISC-V binaries using metadata tags to guide exploration of code paths missed by conventional fuzzing, with integration of coverage profiling and lightweight recovery logic.

University of Florida, The Embodied Learning & Experience (ELX) Lab

Gainesville, FL

Research Assistant

Jan 2023 - May 2023

- Developed backend API and recommendation engine for an AI-powered web platform supporting student mental health through nature-based mindfulness interventions.
- Built Android application features for an augmented reality mobile assistant for everyday STEM learning.
- Contributed to two peer-reviewed publications: one in the Journal of Hospitality & Tourism Education (AI-supported wellbeing) and one at IEEE VR 2024 (AR-based situated learning).

PROFESSIONAL EXPERIENCE

Vibrent Health

Fairfax, VA

Software Engineer

June 2023 - May 2024

- Engineered a Kafka-based bulk message interface that improved delivery speed and reduced server load for a precision-health research platform serving NIH's All of Us Research Program and Children's National Hospital.
- Identified and resolved a critical architecture bug causing duplicate records, improving system stability across the platform.

Software Intern

June 2022 - Aug 2022

- Designed a GitHub API-based security vulnerability detection tool and built web applications using Spring Boot, REST APIs, and JPA/Hibernate.
- Supported deployment workflows with Docker, Kubernetes, and CI/CD for clients including NIH's All of Us Research Program

Vignet Inc.

Pune, India

Software Engineer

July 2019 - July 2021

- Built client-server applications using Java, Spring Framework, and Hibernate for a precision medicine research platform.
- Designed microservices for Fitbit data integration using Spring Boot and Apache Kafka, applying design patterns for reliability and scalability.

- Contributed to SQL-based user migration workflows, supporting third-party data integration into the existing platform.

PUBLICATIONS

- **P. M. Kamble**, "Life Logging: A Practicable Approach," 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA), Pune, India, 2018, pp. 1-4, doi: 10.1109/ICCUBEA.2018.8697516.
- Wang, Yao-Chin, Yue (Darcy) Lu, Sabine Grunwald, Sharon Lynn Chu, **Pratik Kamble**, and Jayavidhi Kumar. 2024. "An AI Approach to Support Student Mental Health: Case of Developing an AI-Powered Web-Platform with Nature-Based Mindfulness." *Journal of Hospitality & Tourism Education* 36 (3): 267–80. doi:10.1080/10963758.2024.2369128.
- A. Kulkarni, C. Albright, **P. Kamble** and S. L. Chu, "Investigating Situated Learning Theory Through an Augmented Reality Mobile Assistant for Everyday STEM Learning," 2024 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW), Orlando, FL, USA, 2024, pp. 955-956, doi: 10.1109/VRW62533.2024.00274.

PATENT

A System and a Method for Performing a User Activity Using an Electroencephalogram (EEG).

The Patent Office, Government of India | Patent Number: 540976 | Date of Grant: June 6, 2024 | Co-Inventor

- Developed during undergraduate research; presents a method for interpreting user activity from EEG signals.

PROFESSIONAL SERVICE

USENIX Security Symposium 2026

Artifact Evaluation Committee (AEC) Member

Jan 2026 - Present

- Evaluate submitted research artifacts for reproducibility and research quality as part of the conference artifact review process.

LEADERSHIP & SERVICE

Capture the Flag (CTF) Club

Binghamton, NY

Team Captain

Jan 2026 - Present

- Led team to top-20 worldwide placement in eCTF, designing and attacking secure embedded system and host-device communication protocols.
- Mentor students in embedded security techniques and organize collaborative training that bridges competition experience with systems-security research.

Gator Hatchery

Gainesville, FL

Consultant

Aug 2022 - May 2023

- Advised student entrepreneurs on planning and organizing technical aspects of early-stage ventures.

UF Off Campus Life

Gainesville, FL

Ambassador

Aug 2022 - May 2023

- Supported student community building through outreach and programming initiatives.