

# Liam J. McKane

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## PROFESSIONAL EXPERIENCE

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### Quality Engineer II

Alarm.com | McLean, VA | July 2022 - Present

- Designed and implemented automated push notification latency testing using a Java-based test framework, REST APIs, and Android Debug Bridge (ADB), expanding validation coverage across all current and future video doorbell platforms.
- Led cross-functional validation for 1M+ deployed Skybell and VDB770 devices, identifying performance bottlenecks through thermal battery profiling, device integrity testing, and rapid response to dealer-reported issues.
- Optimized package alert and perimeter guard detection on the VDB770 platform through system-level debugging and targeted test automation, contributing to production-ready feature releases.
- Directed integration and QA validation of Sunflower Labs' autonomous security drone within the Alarm.com ecosystem, validating behavior across simulated and real-world environments while coordinating issue resolution with multiple engineering teams.
- Performed advanced UART-level debugging on next-generation video platforms, enabling root-level access to embedded Linux environments and MCU logs for performance analysis and automated benchmarking.
- Authored internal documentation for embedded debugging workflows and automation tooling, improving onboarding efficiency and accelerating ramp-up for new engineers.
- Act as a team resource for AI-assisted development workflows, automation tooling, and engineering productivity practices, helping engineers leverage LLM tools and scripting to accelerate debugging, testing, and internal tooling development.

### Software Engineer Intern

MicroStrategy | Tysons, VA | May 2021 - August 2021

- Developed a robust developer portal using HTML, CSS, JavaScript, and static site generators (Eleventy, Jekyll, DocFX), enhancing documentation and platform usability.
- Delivered new UI components and frontend features within Scrum sprints; participated in internal hackathons focused on data visualization and API integration.

### Instructor

Fairfax Collegiate | Herndon, VA | July 2019 - August 2019

- Taught JavaScript programming, robotics, algebra, and virtual reality to middle and high school students across two school locations.
- Served as head instructor for courses, managing lesson delivery and ensuring student engagement.
- Identified and corrected software issues in the JavaScript curriculum to improve instructional quality.

## LEADERSHIP AND ACADEMIC INVOLVEMENT

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### Executive Advisor & Co-Founder

HackOverflow, George Mason University | 2020 – Present

- Co-founded GMU's first hardware-focused hackathon, creating a platform for interdisciplinary innovation.
- As Website Lead, developed and maintained an official site using Jekyll and GitHub Pages.
- Set up organization-wide email infrastructure, including newsletter subscription and contact forms.
- As Registration & Merchandise Co-Lead, co-created participant registration forms and selected merchandise for marketing and usability.
- Remain active post-graduation as Executive Advisor, helping with asset transition, providing technical guidance, and serving as a recurring judge for HackOverflow and SpeedHacks.

## Graphic Designer

GMU Esports Club | 2019 – 2020

- Designed livestream overlays, promotional graphics, banners, and social media assets.

## PROJECTS

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### ML-Driven Trading System

- Built a modular Python-based ML trading system with LightGBM, XGBoost, and meta-labeling.
- Engineered advanced features including entropy analysis, structural break detection, and microstructural signals like VPIN and Kyle's Lambda.
- Used walk-forward testing and purged K-fold CV to validate performance in a high-frequency setting.
- Emphasized production-readiness through dynamic risk controls, audit pipelines, and latency-conscious design.

### Maritime Capture the Flag – Multi-Agent RL

- Designed hierarchical reinforcement learning agents for a simulated autonomous maritime competition using PPO and reward shaping.
- Developed agents capable of dynamic role-switching for flag capture, cooperative defense, and adversarial avoidance in multi-agent environments.

### RobotX Maritime Challenge

- Co-developed a UAV platform for autonomous object retrieval in dynamic maritime conditions.
- Engineered a self-leveling landing pad with Arduino and C++ to improve UAV recovery precision.

### Fall Detection and Home Monitoring System

- Created a real-time detection system using Python, OpenCV, and YOLOv3-tiny integrated with PIR sensors.
- Designed custom logic to reduce false positives and trigger alerts with automated lighting control.

### Autonomous UAV Development

- Collaborating on design and flight control of 3D-printed UAVs with autonomous navigation and obstacle avoidance.
- Implementing vision-based navigation and lightweight onboard ML models for embedded deployment.

## EDUCATION

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### M.S. Computer Science

Johns Hopkins University | Baltimore, MD | *January 2026 - Present*

### Bachelor of Science in Computer Engineering

*George Mason University | Fairfax, VA | August 2018 - May 2022*

**Notable Coursework:** Machine Learning for Embedded Systems, Mobile Robots, Computer Networking Protocols, FPGA Design with VHDL, Embedded Systems Hardware Interfaces, Digital System Design, Linear Electronics, Signals & Systems, Probability for Engineers, Operating Systems, Small Spacecraft Engineering.

**Honors:** Dean's List (Multiple Semesters)

## TECHNICAL SKILLS

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**Languages:** Python, C/C++, C#, Java, SQL, Bash, JavaScript, HTML/CSS, VHDL, Verilog, MATLAB

**Frameworks/Tools:** PyTorch, TensorFlow, Git, Docker, Postman, JMeter, Jira, Confluence, Bitbucket, Visual Studio, Wireshark, Wavefront

**Platforms:** Linux (Debian, Ubuntu), UNIX, Windows, macOS

**Specialties:** Embedded Linux debugging, Reinforcement Learning, Computer Vision, Multi-Agent Systems, Automation Scripting, Hardware/Software Integration