

# MATTHEW ESPOSITO

Yorktown, VA

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## Education

### William & Mary

*BS in Computer Science & BA in Philosophy - Concentration in Ethics for Data & Computing*

**Expected May 2026**

*Williamsburg, VA*

- Awards: 2x W&M Cypher Hackathon Award, Cyber NCL team placed **2nd** (Spring '25), **6th** (Fall '24) nationwide

## Experience

### Memfault

**May 2025 – August 2025**

*Boston, MA*

*Software Engineering Intern*

- Added features to high volume backend processing pipeline in Python, retaining performance and correctness
- Extended Linux SDK to support [custom traces](#), allowing for more flexible error reporting, in Rust
- Created [Python library](#) to intercept unhandled exceptions and report them to Memfault platform, enabling plug-and-play error collection and observability for Python customers
- Implemented full unit and integration tests, extended BitBake recipes and QEMU test images to verify custom trace implementation
- Feature implementations in high-volume data ingestion pipeline

### Memfault

**May 2024 – August 2024**

*Boston, MA*

*Software Engineering Intern*

- Designed and implemented new feature to parse and report stack traces in Rust and Python
- Trained a machine learning model to categorize embedded hardware's stack traces and core dumps into common fault categories, achieving >95% accuracy and helping customers more rapidly fix problems.
- Identified and resolved CI/CD bottlenecks, reducing run times and cutting costs.
- Created tool to integrate CRM tools with Algolia APIs to measure engagement in high-potential target accounts.

### Geospatial Evaluation and Observation Lab

**January 2023 – Present**

*Williamsburg, VA*

*Software Developer, Team Lead*

- Productionized [ICEBREAKER](#) project, a wargaming evaluation tool backed by RAG-enabled LLM, with applications to political-military wargaming simulations
- Built SCOPE, a news info extraction/summarization tool with ML and LLMs.
- Led team and developed Kubernetes deployments and CI/CD pipelines.
- Implemented data ingestion pipeline for SCOPE, enabling real-time data processing and analysis via LLMs.

### Pex (Remote)

**December 2023 – April 2024**

*Software and Hardware Developer*

- Developed embedded IoT prototypes from inception to testing in 12 weeks
- Architected solutions with C++ embedded systems, sound protocols, and cellular modem development
- Wrote C++ library for integrating with SIM7600 cellular modem for sub-30ms latency HTTPS/MQTT communication

### Trilium.cc

**December 2021 – Present**

*Founder*

- Starting a Software-as-a-service business and Linux server management.
- Serving over 150 customers and maintaining 99.9% uptime while learning backend development.
- Automated system tasks including backups, updates, and new server deployments with Ansible.

## Projects

### ALPR Analysis | Rust, GIS, OSINT

**Dec 2025 – Present (maintenance)**

- Engineered a high-throughput data ingestion pipeline in Rust to process planetary-scale OpenStreetMap datasets (60GB+) for surveillance infrastructure analysis.
- Optimized performance using parallel processing and memory-efficient streaming parsers, enabling rapid analysis of global geospatial data.
- Designed a multi-stage heuristic inference engine to classify map nodes with high precision, leveraging vendor fingerprinting and contextual metadata.
- Built and deployed a Vue.js visualization dashboard to map surveillance density, transforming raw OSINT data into actionable insights.

### Redlib | Rust, Docker, CI/CD, Reverse Engineering

**Nov 2022 – Present**

- Maintainer of open-source Reddit frontend (2.5k+ stars, 1.7M+ container pulls/mo, 100k+ hits/day on large instances)
- Enabled public access for censorship-heavy regions, bulk academic research.
- Reverse-engineered Reddit mobile API for unthrottled data access for public benefit.
- Implemented peer-to-peer coordination protocol to handle instance blockages live, based on HyParView/PlumTree epidemic broadcast trees, as part of a project for my Cloud Computing class.
- Performant backend development for very high-traffic Redlib instances, with proper caching/compression/lazy loading, as well as best practices for lightweight webpages
- Code review, OSS leadership, mentoring contributors

**FocusGuardian** | Rust, Vue, C++, PocketBase, Tailwind

April 2024

- Full-stack web & mobile app with hardware prototype (C++/LVGL).
- Rust-based backend handling DNS-over-HTTPS requests according to user-set schedule, 10k+ req/s.
- Built in 24-hour solo hackathon; won Best Hardware Hack.
- Wrote [blog post](#) about experience.

**OccuMetrics** | C++, IoT, ESP32, Grafana, SQLite, ML

Sep 2023 – Dec 2023

- Campus occupancy prediction via BLE beacon counting IoT devices and serverless stack.
- 90+% accuracy in long-term trend forecasting using Prophet + time series ML.
- Writeup featured on [Hackaday](#) and cited in [MIT Engineering courses](#).

## Research

### Vulnerability Testing Report

Sep 2024 – Dec 2024

*Volunteer Cybersecurity Researcher*

Williamsburg, VA

- Performed a volunteer full security assessment of a local business's public mobile app; authored 22-page CVSS report.
- Discovered six serious security vulnerabilities, from advanced side channel methods to basic authentication failures
- Recommended remediations led to complete patching and mitigation.
- Disclosure coordinated; redacted report available on request.

## Relevant Coursework

- |                         |                         |                    |                            |
|-------------------------|-------------------------|--------------------|----------------------------|
| • Algorithms            | • Finite Automata       | • Cloud Computing  | • Ethics in Data Science   |
| • Computer Organization | • Operating Systems     | • Computer/Network | • Philosophy of Technology |
| • Software Development  | • Applied Cybersecurity | Security           | • Linear Algebra           |

## Leadership / Community Involvement

### Linux/FOSS Club

Sep 2023 – Present

*Founding Member, DevOps Lead*

Williamsburg, VA

- Promoting tech literacy and writing FOSS user guides.

### Speaker, “A Case for Rust” – W&M Cypher Hackathon

March 2023

*Sponsored by Rust Foundation*

Williamsburg, VA

- Delivered [technical talk](#) and workshop introducing Rust programming.

## Technical Skills

**Technical Areas:** Backend Development, IoT, Embedded Systems, Systems Programming, DevOps, Docker, Git, Nginx, Prometheus, Grafana

**Languages:** Rust, C, C++, C#, Python, Bash, JavaScript

**Interests:** Open Source, Linux, Rust