

# NATHAN SAMSON

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## EDUCATION

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**University of Maryland - Baltimore County**  
*Bachelor's, Computer Science*

**August 2023 – May 2027**  
*GPA: 3.8*

## PROFESSIONAL EXPERIENCE

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### Grassroot Analytics

*Artificial Intelligence Developer Intern*

**DC, USA**

*January 2026 – May 2026*

- Building an event-driven news segmentation pipeline integrating the Clipbook media intelligence API to automatically trigger donor outreach campaigns in response to real-time news events.
- Designing and implementing data ingestion workflows to pull, normalize, and process text content from multiple news APIs, enabling rapid deployment of targeted campaigns aligned with breaking stories.
- Working with a proprietary dataset of 20M+ American donors to build analyst-facing tools for demographic and ideological segmentation, improving audience targeting and campaign performance.

### Capital One

*Software Engineer Intern (TEIP)*

**Mclean, VA, USA**

*June 2025 – August 2025*

- Built a serverless synthetic monitoring solution leveraging Python, AWS Lambda, and Fargate to execute automated health checks across production services, supporting both cron-based and API-triggered validation workflows.
- Architected containerized FastAPI applications with Docker, implemented comprehensive APM using New Relic, and streamlined deployment processes through AWS CLI automation and Serverless Framework configurations.
- Extended the platform with PagerDuty alerts, S3 HTML reports, and a results UI to speed incident triage and historical analysis

### OmniSyncAI

*Software Engineer Intern*

**Remote**

*May 2024 - July 2024*

- Engineered user-friendly CRM account setup using Node.js, React, and PostgreSQL, reducing onboarding time and increasing team invitations through AI-powered recommendations
- Built backend API endpoints to handle user authentication, team management, and account provisioning workflows
- Implemented data models and database schemas in PostgreSQL to support multi-tenant CRM functionality

## RESEARCH EXPERIENCE

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### DAMS Lab - PI: Dr. Roberto Yus

*Undergrad researcher*

**Baltimore, MD, USA**

*September 2023 - Present*

- **PSMark**: Co-authored distributed pub/sub benchmarking framework in Erlang implementing 12 IoT workloads from 7 real-world datasets. Tested up to 5,400 concurrent publishers at 5,900 msgs/sec across 2-8 distributed nodes. Accepted to IEEE Peercom 2026. [Link to repo](#). [Link to paper](#)
- **MQTT Data Privacy**: Co-authored privacy-preserving MQTT extension enabling GDPR compliance through purpose-based access control. Modified Eclipse Mosquitto (60K LOC) with ~3K lines of C to enforce data subject rights at the protocol level, achieving <2% CPU overhead across 541 IoT sensors. [Link for broker](#). [Link for benchmark](#). [Link to Paper](#)
- **MQTT Data Privacy**: Benchmarked 5 purpose-management approaches while maintaining sub-second latency. Submitted to ACM SenSys 2026.
- **SMART Campus**: Built occupancy prediction system using HDBSCAN clustering for real-time LiDAR point cloud processing and SARIMAX time-series forecasting. Engineered MQTT data pipelines into InfluxDB, built React dashboard for visualization.

## PERSONAL PROJECT

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### Formally Verified Code Generation - [Link to project](#)

- LLM code generator using Claude Sonnet 4 API with Dafny formal verification, achieving 92% first-try success on LeetCode Easy-Medium problems with mathematically proven correctness
- Architected a container-native microservice stack (FastAPI, PostgreSQL, React) that hot-swaps API versions without downtime and scales horizontally via Docker Compose.

## SKILLS

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Languages: Python, Go, C/C++, JavaScript, Java, Erlang, SQL

ML/AI: TensorFlow, PyTorch CLIP, FAISS, NLP, Prompt Engineering, Claude/Gemini APIs

Infrastructure: Docker, Kubernetes, AWS (Lambda, Fargate), FastAPI, Node.js, React/Next.js, PostgreSQL

IoT/Systems: MQTT, DDS, Edge Computing, Distributed Systems, New Relic

## ACHIEVEMENTS

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- Nvidia Summer Bridge Program Participant
- Capital One Tech Summit Participant
- UMBC CSEE Research Day 2024 Best poster Award