Nathan Samson

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Education

University of Maryland – Baltimore County — Baltimore, MD
Bachelor of Science in Computer Science, GPA: 3.621 — *Aug. 2023 – May 2027*

Publications

[1] C. Badolato, **N. Samson**, H. Hajj Hassan, C.-K. Huang, G. Bouloukakis, P. Pappachan, R. Yus. "PSMark: A Distributed IoT Benchmark for Publish/Subscribe Under Domain-Based Workloads." *IEEE International Conference on Pervasive Computing and Communications (PerCom)*, 2026. Artifact Certified. Paper.

[2] **N. Samson**. "Do Robot Safety Judges Confuse Success with Safety?" *Science of Physical AI Safety (SPAIS) Workshop, Conference on Robot Learning (CoRL)*, 2026. Accepted.

Professional Experience

Grassroots Analytics — Washington, DC
Junior Artificial Intelligence Engineer, Part-Time — *Aug. 2026 – Present*
Artificial Intelligence Engineer Intern — *Jan. 2026 – Aug. 2026*

- As Grassroots's first AI engineer, built a product the company sells to its clients: a news pipeline that pulls news and social feeds in parallel and ranks each article on five signals (keyword match, semantic similarity, recency, source reputation, relevance to the client).
- Built an LLM-powered chat agent that interprets staff requests and routes them to news search, message drafting, or content sync within the company's platform.
- Built article-import and saved-article tools that let staff pull coverage from any URL into a reusable research library feeding AI-drafted content.
- Building donor segmentation and propensity scoring tools over a 20M+ record dataset that combines demographic, ideological, and giving-history signals.

Software Engineer Intern — June 2025 – Aug. 2025
Capital One — *McLean, VA*

- Diagnosed a 15-minute AWS Lambda timeout silently breaking production API monitoring, then helped move the service to Fargate (containerized FastAPI, EventBridge scheduling, New Relic) so failures were caught before reaching customers.
- Extended the platform with DynamoDB logging, PagerDuty alerts, S3 HTML reports, and a results UI to speed up incident triage.

Software Engineer Intern — May 2024 – July 2024
OmniSyncAI — *Remote*

- Built the full company onboarding workflow from scratch (account setup, authentication, team invitations) in Node.js, React, and PostgreSQL, plus an AI engine that recommended teammates and configurations from needs captured at signup.

Research Experience

DAMS Lab – PI: Dr. Roberto Yus — Sep. 2023 – Present
Undergraduate Researcher, University of Maryland – Baltimore County — *Baltimore, MD*

- **PSMark [1]:** Co-developed a distributed IoT benchmark comparing MQTT and DDS across 12 workloads from 7 real datasets, with up to 5,400 senders across 2–8 machines. Repository.
- **First-author manuscript in preparation:** Audits of seven attribute-removal methods for learned representations. PCRL; Durable Guarantees.
- **MQTT Data Privacy (preparing submission to ACM SenSys 2027):** Co-developed a data-protection framework for IoT messaging that enforces consent-based data use and deletion requests across connected applications. Implemented enforcement in the Mosquitto broker and built distributed benchmarks to evaluate correctness and overhead. Broker; Benchmark.
- **FedPub (preparing submission to ACM SenSys 2027):** Developing a federated-learning framework that uses existing IoT messaging infrastructure and device-health signals to adapt training to unreliable networks. Implemented FL and client-selection strategies over MQTT and DDS, including FedCS baselines, and evaluated replayed sensor workloads under controlled latency and packet loss. Repository.
- **Robot safety judge audit [2]:** Built a preregistered harness that holds robot trajectories fixed while changing stated task outcomes; three multimodal judges shifted safety ratings by up to 0.62 points on a 1–5 scale. Repository.
- **SPACES (Learning Assistant, Feb. 2026 – Present):** Building step-by-step modules and hands-on IoT labs for a new smart-campus course funded by the Hrabowski Innovation Fund, covering message brokers, sensor integration, and data pipelines.

Technical Skills

Languages: Python, JavaScript, SQL, Go, C/C++, Java, Erlang
Web: React/Next.js, Node.js, FastAPI, PostgreSQL
AI: LLM Agents, Prompt Engineering, Claude/Gemini APIs, FAISS, PyTorch, TensorFlow, NLP
Infrastructure: Docker, Kubernetes, AWS (Lambda, Fargate), MQTT, DDS, Distributed Systems, New Relic
Awards: UMBC CSEE Research Day 2024 Best Poster | Nvidia Summer Bridge Program | Capital One Tech Summit