

John Rathgeber

xxx-xxx-xxxx | johndrathgeber@gmail.com | johnrathgeber.com | linkedin.com/in/john-rathgeber | github.com/johnrathgeber

EDUCATION

Brown University

Expected Graduation: May 2027

Sc.B. Computer Science and Mathematics, A.B. Music

Providence, RI

- **GPA:** 3.9
- **Coursework:** Operating Systems, Distributed Systems, Networks, Data Structures and Algorithms, Compilers, Computer Vision, Honors Statistics, Real Analysis, Differential Geometry, Abstract Algebra
- **Teaching Assistant:** Compilers, Discrete Structures and Probability

EXPERIENCE

Amazon Web Services

Jun. 2026 – Aug. 2026

Software Development Engineer Intern

Seattle, WA

- Built a first-of-its-kind shared **team memory system** for **Amazon Quick** (AI assistant), enabling teams to collectively teach their AI and have that knowledge surfaced to all members via **hybrid semantic search**.
- Implemented the pipeline end-to-end: embeddings and retrieval via **AWS Bedrock**, **DynamoDB** team membership with server-side authorization, and Bayesian **confidence tracking** to rank memories by real usage.
- Built an **LLM optimizer** that **autonomously detects team-relevant knowledge** from natural conversation and proposes it for human review, eliminating the need for users to manually identify what to share.
- Delivered **sub-50ms retrieval latency** across concurrent team namespaces, **<5% false-positive rate** on implicit knowledge detection, and **instant cross-user propagation** via managed AWS services with **zero sync delay**.

Electronic Theatre Controls

May 2025 – Aug. 2025

Software Engineer Intern

Middleton, WI

- Developed a system to **manage configs** across **1000+** networked devices in real time using **Python** and **Typescript**, enabling **live view/edit** through **REST APIs** and **MQTT**-based message exchange.
- Built a **multithreaded backend service** with custom **PostgreSQL** integration to support **IP multicast-based entity discovery**, used to maintain consistent state across distributed UIs with **<50ms sync delay**.

Wisconsin Department of Transportation

May 2024 – Aug. 2024

Computer Vision Intern

Madison, WI

- Developed a **Python** pipeline to **estimate 3D GPS positions** of traffic signs from **3M+** vehicle-mounted images, automating a previously manual process and **reducing processing time from 3 months to 5 days**.
- Used **YOLOv5** and **DepthAnything** to detect signs and estimate depth maps, and applied **linear algebra** and **spherical geometry** to estimate accurate coordinates and enable statewide sign mapping for the first time.

PROJECTS

Distributed Search Engine | Javascript, Bash, AWS (EC2)

Jan. 2026 – May 2026

- Architected a scalable **distributed search engine** deployed on **AWS EC2** nodes, indexing **96K+ documents**.
- Built a custom **MapReduce** framework, using **HTTP RPCs** and **consistent hashing** across AWS nodes.
- Achieved **505.8 queries/sec throughput** with **1.96ms latency** on distributed AWS EC2 infrastructure.

IMO Problem Formalization | Lean, Number Theory, Competitive Math

Sep. 2025 – Dec. 2025

- **Formalized** Problem 3 from the 1998 **International Mathematical Olympiad (IMO)** using the **Lean 4** theorem prover, translating informal mathematical writing into **machine-checkable logic**.
- **Published** verified code to the official *Compfiles* library, establishing the canonical proof for the problem.

Custom I/O Caching Library | C, Strace, GDB

Jan. 2024 – May 2024

- Built a custom **C-based I/O caching library** to wrap read, write, and seek operations, reducing system call frequency and cutting disk access latency by **100x–1000x** through **buffered memory caching**.
- Engineered cache eviction, alignment, and correctness for edge cases, meeting **<5x** stdio performance targets.

TECHNICAL SKILLS

Languages: Python, C/C++, Java, JavaScript, TypeScript, Go, SQL, Bash, OCaml, Lean

Libraries/Frameworks: Node.js, React, Pytest, PyTorch, Tensorflow, Tailwind, Flask

Tools: VS Code, Claude Code, Cursor, Git, AWS, Docker, Kubernetes, MongoDB, Postman, Firebase, Jira