Josh Brice

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Education

Northwestern University Sep. 2021 – December 2026

B.S. in Computer Science (June 2025), ***M.S. in Computer Science*** *(December 2026)* *Evanston, IL*

- GPA: **4.0/4.0**
- **Relevant Coursework**: Data Structures and Algorithms, Compiler Construction, Embedded Systems, Operating Systems, Parallel Computing, Networking, Compiler Construction, Databases, Computer Architecture, Advanced C++
- **Thesis**: Low-Latency Evaluation of Userspace TCP/IP Stacks for HFT Workloads *(December 2026)*
  - Evaluated kernel TCP, userspace TCP stacks built on DPDK, and hardware-bypass APIs (Verbs, ef_vi) on AWS SR-IOV and Mellanox hardware using exchange-style traffic, profiling p50–p99.99 latency, jitter, queue depths, and cache behavior
  - Derived design principles for eliminating microsecond-scale tail spikes and stabilizing polling paths, producing an optimized userspace TCP architecture with reduced copy cost and predictable NIC-to-CPU data movement

Experience

Prescience Research Lab June 2025 – Present

Systems Engineer *Evanston, IL*

- Built a userspace test harness for a custom polled E1000 driver on CheriBSD/Morello, using mmap + ioctl to drive NIC TX/RX queues from user space
- Integrated CARAT-KOP with CapIO's device-memory paths to track DMA buffer lifetimes and propagate pointer-provenance metadata across mmap/ioctl boundaries, enabling detection of stale pointer use in driver-like workloads
- Cross-compiled and ported CARAT-KOP to **ARM64**/Morello, adapting Clang/LLVM instrumentation for AArch64 and validating correctness with <0.005 ms added NIC latency.

Ardevora Asset Management LLP June 2025 – Present

Quantitative Development Intern *London, England*

- Developed a production-ready data processing pipeline using Python, Azure Functions & Terraform to extract, chunk, and prepare financial documents for RAG systems, enabling semantic search across 650K+ broker reports and earnings transcripts
- Architected embedding pipeline integration with VoyageAI models and MongoDB/QDrant vector storage, enabling semantic similarity search across 5M+ document chunks with sub-2-second retrieval performance
- Created serverless cost-optimized cloud infrastructure reducing operational costs by 91% (from $2,650/month to $250/month)

Cisco June 2024 – Aug. 2024

Software Engineer Intern *San Jose, CA*

- Spearheaded integration of AI-driven intelligent API query orchestration into SEA (Secure Equipment Access), compatible with 10+ open-source models, enhancing secure, scalable backend data flows with 97% accuracy
- Built real-time Python monitoring systems for 36 APIs, surfacing key metric constraints (99.9% connection reliability, sub-50ms latency) and enabling automated anomaly detection across 500+ remote sessions

Deloitte June 2023 – Aug. 2023

Software Engineer Intern *Sydney, Australia*

- Led the development of Deloitte Australia's first ever legal AI model using Python, AWS, LangChain and Databricks, capable of automating legal analyst work with a peak accuracy of 98%, mapping risks to controls in 30% of total time

Projects

Low-Latency Lock-Free Data Engine: Designed a real-time binary data pipeline in C++20 using lock-free SPSC/MPSC ring buffers, sequence-based flow control, and a zero-allocation arena for deterministic memory behavior; achieved **2–4M msg/s** throughput with **sub-µs** update latency on x86-64 and ARMv8

In-Memory Database (Redis Clone): Engineered a high-performance Redis-compatible in-memory database in C++, optimizing data-structure layout, pipelined command execution, and zero-allocation request paths; achieved over **1M ops/sec** on GET/SET workloads with sub-millisecond p99 latency

Technical Skills

Languages: C++(17, 20, 26), C, C#, Python, JavaScript, Java, TypeScript, Rust, x86/ARM Assembly

Technologies: Linux, GCC, LLVM, Clang, Texas, Kafka, RabbitMQ, Airflow, SQL/NoSQL, .NET, Django, Express.js, React

Tools: Vim, Googletest, Git, Docker, Kubernetes, CMake, GDB/LLDB, Autotools, Perf, OpenTelemetry, Wireshark, Azure, AWS