

# MASON MILLER

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## Education

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### University of Michigan

Ann Arbor, MI

*Bachelor of Science in Computer Science*

*August 2022 - May 2026*

- **GPA:** 3.88/4.00 | **Awards:** James B. Angell Scholar, William J. Branstrom Prize, University Honors, Regent's Scholar
- **Relevant Courses:** Data Structures & Algorithms, Operating Systems, Computer Architecture, Web Systems, Computer Science Theory, Intro to Computer Architecture, Discrete Math, Probability Theory, Linear Algebra

## Technical Skills

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**Languages:** C, C++, Python3, ARM, RISC-V, SystemVerilog, Bash

**Technologies:** Linux, Vim, Git, GDB, LLDB, Mercurial, QEMU, perf, Valgrind, Make, CMake

## Experience

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### Apple CoreOS

Cupertino, CA

*Software Development Engineer Intern*

*May 2025 - Present*

- Developing storage device drivers for macOS.

### Qumulo

Seattle, WA

*Member of Technical Staff Intern*

*January 2025 - April 2025*

- Single-node cloud cluster infrastructure and performance, file system index object metrics, and DKV upgrade.

### Ordered Systems Lab

University of Michigan

*Research Assistant*

*May 2024 - December 2024*

- Wrote a program in C leveraging the liburing API to asynchronously read a file on Linux with io\_uring.
- Configured Meta's RocksDB on a Debian Linux VM using QEMU, integrating Meta's folly library for advanced C++20 features, including coroutines and asynchronous I/O. Evaluated seek and scan operations using RocksDB db\_bench.
- Conducted a comparative analysis of asynchronous I/O libraries, including liburing and libaio.

### Departmental Computing Organization

University of Michigan

*Computer Consultant*

*June 2022 - September 2022*

- Helped manage IT infrastructure for lab machines and two server rooms. Configured Windows 10/11, macOS, and Linux systems. Implemented network solutions using Active Directory and DNS. Provided technical support and maintained security across diverse environments. Developed skills in system administration and network management.

## Projects

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### Out-of-Order RISC-V Processor

- Architected a RISC-V processor using SystemVerilog featuring N-way superscalar out-of-order execution, early tag broadcast, early branch resolution, fast branch recovery, Gshare prediction, branch target buffer, non-blocking data cache, store-load forwarding, and instruction prefetching.
- Developed RTL and verification testbenches to validate system performance.

### Thread Library

- Developed a kernel-level C++ thread library on UNIX, managing CPU booting, thread life cycle, and scheduling for multiple CPUs. Implemented synchronization primitives like spin-locks, mutexes, and condition variables using advanced UNIX context management techniques.

### Virtual Memory Pager

- Designed and implemented a virtual memory pager supporting multiple processes with swap-backed and file-backed memory pages, akin to UNIX mmap. Handled process creation, page faults, memory management unit (MMU) bits, process forking, and destruction with copy-on-write optimization.

### Multi-threaded Network File Server

- Built a concurrent, crash-consistent network file server, supporting multiple users with nested files and directories. Ensured crash consistency using committing writes, and optimized concurrency with Boost threads and reader-writer locks. Implemented network communication using POSIX sockets for client-server interactions.

## Other

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**Interests:** Software Systems, Boulderling, Drum Set, Korean Language and Ensemble, Philosophy