Mason Miller

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Education

University of Michigan **Ann Arbor, MI**

Bachelor of Science in Computer Science *August 2022 - May 2026*

- **GPA:** 3.87/4.00 | **Awards:** James B. Angell Scholar, William J. Branstrom Prize, University Honors, Regent's Scholar
- **Relevant Courses:** Data Structures & Algorithms, Operating Systems, Web Systems, Intro to Computer Architecture, Computer Science Theory, Discrete Math, Statistics, Probability Theory, Linear Algebra, Multi-variable Calculus

Experience

Ordered Systems Lab **University of Michigan**

Research Assistant *May 2024 - Present*

- Conducting in-depth research and development on the Linux Kernel and io_uring under the guidance of Professor Ryan Huang, aiming to enhance asynchronous I/O operations for improved performance and efficiency in system-level programming.

The Boyle Lab **Michigan Medicine**

Research Assistant *May 2023 - September 2023*

- Integrated the NCBI C++ Toolkit into a custom application, enabling the identification of specific DNA sequences within large datasets. Developed computational methods to leverage Cas9-targeted nanopore sequencing, improving the efficiency of capturing MEIs in genetic samples.

Departmental Computing Organization **University of Michigan**

Computer Consultant II *June 2022 - May 2023*

- Installed, configured, and troubleshooted Windows, MacOS, and Linux (RedHat & Ubuntu) operating systems, ensuring optimal performance across 100+ machines. Managed network configurations using Active Directory and DNS, maintaining security and connectivity in EECS server rooms.

Projects

Thread Library

- Developed a kernel-level C++ thread library on Unix, managing CPU booting, thread lifecycle, and scheduling for 50+ 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.

MapReduce Framework

- Developed a fault-tolerant MapReduce framework for distributed processing across a cluster, utilizing threads, processes, and socket-based networking. Enhanced system reliability and efficiency in processing large datasets.

Instagram Clone

- Developed a full-stack web application with React for the frontend, implementing features like authentication, post interactions, and user accounts. Built REST APIs using Flask, processing requests with dynamic data from an SQLite database. Deployed the application on AWS EC2, utilizing Gunicorn and Nginx for scalable and efficient hosting.

Technical Skills

Proficient: C, C++, Python **Familiar**: SQL, HTML, CSS, JavaScript, R, Julia

Technologies: io_uring, x86, Linux, QEMU, Vim, Git, gdb, Multi-threading, Sockets, CMake, Hadoop, React, Flask

Interests: Software Systems, Linux Kernel Development, Calisthenics, Rock Climbing, Korean Language & Music