Zhinan (Mike) Liu

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Summary

MSEE candidate specializing in systems and software engineering, with experience in C/C++, Python, and performance-critical systems. Background includes embedded firmware, scalable data pipelines, CI/CD automation, and hardware–software integration. Interested in building reliable, distributed systems in mission-critical environments.

Education

University of Washington – MS in Electrical Engineering Sep 2023 - Dec 2025

Relevant Coursework: Computer Architecture, Digital Systems Design with FPGAs, Data Structures & Algorithms, Embedded Software Design

University of Washington – BS in Biochemistry Sep 2016 - June 2020

Experience

Research Engineer**,** Harborview Medical Center– Seattle, WA Feb 2021 - April 2024

- Engineered and operated backend data processing services (Python, SQL) with CI/CD pipelines (Jenkins), automating large-scale dataset generation and saving ~20 staff hours/week.
- Designed modular, testable code frameworks to ensure reproducibility and scalability across large clinical datasets with >120,000 patients and > 540,000 clinical events
- Worked in Agile teams spanning clinicians, researchers, and engineers; contributed backend systems and datasets resulting in 11 peer-reviewed publications.
- Monitored and debugged production data workflows, resolving pipeline failures and data integrity issues in collaboration with cross-functional stakeholders.

Research Assistant, Lieber Lab – Seattle, WA August 2016 - August 2020

- Built high-throughput backend pipelines (Python, Jenkins) that processed 400GB/week of genomic data with parallelization, fault-tolerance, and reproducibility
- Automated CRISPR off-target analysis across 12,000+ genomic samples, supporting performance-critical research workflows
- Documented pipeline design and maintained version control in Git, improving collaboration and long-term reproducibility.

Projects

esp_simd: High-Level SIMD Library for ESP32-S3 https://github.com/zliu43/esp_simd

High-level C/C++ library wrapping Xtensa SIMD for vector ops on ESP32-S3; designed for safe alignment/saturation and drop-in use with esp-idf. Performance-critical systems project demonstrating low-level optimization, API design, and testing discipline

- Implemented with hand-written, branchless ASM with zero-overhead loops
- Ops: Basic math ops including add/sub/mul/dotp across int8/16/32 & float32; benchmarks show ~5-10x speedups vs. scalar for int types and ~3-5x speedup for float types
- CMake examples and unit tests; ready for integration, including with esp-idf functions

Tech: C/C++, Xtensa ASM, esp-idf, CMake

Skills

Programming Languages: C, C++, Python, SQL, Bash
Embedded Systems & Firmware: ESP32, STM32, FreeRTOS, UART, I2C, SPI, Assembly (RISC-V, ARM, Xtensa)
Software Engineering & Tools: CMake, GCC, Git, Docker, CI/CD (Jenkins), Unit Testing, Linux/Unix, Yocto, Microsoft Azure