ALEX LI

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RELEVANT SKILLS

- **Programming Languages:** Python, C/C++, Assembly, SQL, Java, JavaScript, SystemVerilog, HTML/CSS
- **Frameworks/Libraries:** Flask, Pytest, GoogleTest, Express, React, Next, PyTorch, NumPy, Matplotlib, pandas
- **Technologies:** Linux, Git, Make, SQLite, MariaDB, PostgreSQL, JDBC, PostgreSQL, FPGAs, ModelSim, GCP

EDUCATION

University of Washington, Seattle, Washington — Expected June 2027
B.S., Computer Science — GPA: 3.7

Relevant Coursework: Discrete Mathematics, Linear Algebra, Data Structures and Parallelism, Hardware/Software Interface, Systems Programming, Digital Circuit Design, Mathematical Methods for Quantitative Finance, Machine Learning, Distributed Systems, Data Management
Awards/Achievements: Best use of AI + Best Finance/Data Analytics Project at HackTech 2025, **1st Place** (Synergy Track) at DubHacks 2023, Dean's List (Academic year 2023-24)

RELEVANT EXPERIENCE

Chewy, Inc. | *Spring Boot, AWS (Lambda, DynamoDB, EventBridge, ECS, SNS, SQS)* — June 2025—August 2025
Software Engineering Intern

- Sponsored Ads Data Team

UW Sensor Systems Lab | *FPGAs, Verilog, GTKWave, Python, Serial Interfaces* — December 2024—Present
Undergraduate Research Assistant

- Develop low-level software to interface with FPGAs, optimizing hardware communication protocols for acoustic levitation systems.
- Write code to serialize and de-serialize phase angle data, synchronizing **100+** transducers for precise object control in acoustic levitation systems.
- Designed and implemented a custom **UART protocol from scratch** in Verilog, replacing I^2C to improve throughput, reduce latency, and enhance signal integrity on the system's **main control path**.

George Mason University | *PyTorch, NumPy, Matplotlib, pandas* — July 2022—August 2022
Deep Learning Research Intern

- Empirically investigated a novel machine learning optimizer, Sharpness Aware Minimization.
- Implemented and compared Sharpness-Aware Minimization and Stochastic Gradient Descent on CIFAR-10, evaluating performance differences in model generalization.
- Published abstract in George Mason's student research journal.

PROJECTS

Distributed Key-Value Store (Paxos-based, Sharded) | *Java, Paxos, Sharding*

- Authored comprehensive design document specifying system architecture, shard allocation, **consensus protocol design (Paxos)**, and fault tolerance guarantees under system failures.
- Implemented a **sharded, fault-tolerant key-value store** using the **Paxos consensus protocol** and ensured linearizability and consistency under simulated node failures and network partitions.
- Developed node logic for **leader election**, **log replication and consistency**, and **shard rebalancing**. Validated correctness against exhaustive adversarial distributed systems tests.

333gle | *C/C++, Networking, Multiprocessing*

- Built a HTTP server from scratch in C++ using **low-level sockets, process-based concurrency**, and **POSIX file I/O**.
- Handled concurrent static file serving and search queries via a custom-built query processor with minimal latency.
- Optimized query performance by implementing memory-safe data structures in C to index and cache file metadata.

FPGA Flappy Bird | *FPGA (DE1-Soc), SystemVerilog, ModelSim*

- Designed and prototyped a modular Flappy Bird game on FPGA using SystemVerilog, with components like **LFSRs, clock dividers, and D flip-flop-based logic**, each validated using targeted ModelSim testbenches.
- Integrated I/O peripherals including LED boards and 7-segment displays; mitigated metastability in user input with **two-stage flip-flop synchronizers**.