Ziwei Li

Objective: Summer 2025 Internship | Phone: (470)-399-9002 | Email: aisonli41@gmail.com

Education

Georgia Institute of Technology | Atlanta, GA Aug 2023 – Dec 2025 (Expected)
Master of Science, Electrical Computer Engineering GPA: 3.50/4.00

Iowa State University, Ames, IA Jan 2019 - May 2021
Bachelor of Science, Computer Engineering, Minor in Cyber Security GPA: 3.72/4.00
Awarded International Student Scholarship, International Incentive Scholarship, Global Scholars Award, International Student Council Scholarship, Outstanding Student for Academic Merit and Accomplishment.

Skills

- **Programming**: C/C++ (4+yr), DSL, OpenGL, CUDA, PyTorch, Python, Java, Data Structures, Algorithm
- **Architecture**: HW Acceleration for ML, Network-On-Chip, CPU, GPU, ASIC, ISA, Dataflow, Pipelining, Cache and Memory Design
- **System**: Linux Kernel, OS Resource Abstraction/Management, Virtualizations, Synchronization (Locks, Barriers), Communication (MPI, RPC), Distributed/Parallel Systems, Embedded Systems, I/O Peripherals
- **Network and Security**: Topologies, LAN/WAN Routing, TCP/IP Protocols, Cryptographic, Kali Linux, Wireshark
- **Hardware**: VHDL, Verilog, Xilinx Development Tools, RTL, Cadence Virtuoso

Experiences

Graduate Research Assistant at Georgia Tech Synergy Lab Aug 2023 – Present
- Research work in distributed training strategies and collective communication simulations for ML.
- Challenged the efficiency of ECMP routing strategy used in spine-leaf data center for collective workloads by tracing workloads at peak time through NS3 simulations and showing more than 50% imbalances.
- Actively manage open-source code maintenance and Wiki page documentation.

Software Engineer Intern at Ambarella May 2024 – Aug 2024
- Identified bottlenecks and shortcomings of current data transmission module and device control interface.
- Proposed and redesigned entire Ethernet server/client application framework for efficiency and portability.
- Provided well-documented codes and tutorials and listed potential future tasks at the end of internship.

Software Engineer at Ambarella July 2021 – July 2023
- Led in integrating Radar algorithms with dedicated AI accelerators for various chips and platforms.
- Performed stability tests and documented end-to-end performance and memory profiling.
- Implemented controllable software interfaces in C for adjusting resource usage to meet both hardware requirements and timing constraints.
- Actively identified inefficient algorithms (sorting, recursive-vs-iterative, array-vs-linked) and proposed optimization plan to achieve various speedups.
- Refactored large code bases to enforce modularity and automated testing scripts to increase productivity.
- Collaborated with teams across the world and managed knowledge and information transfer.
- Assisted in servers/networks management and migration.

Projects

ML Distributed Training Simulator Integration (HW&SW Co-design for ML course at GT) Spring 2024

- Defined computation APIs for ML distributed training simulator (ASTRA-sim) with ability to support multi-fidelity computation backends and configurations.
- Analyzed and integrated existing computation simulators (Scale-sim, Dive) by preprocessing Chakra traces.
- Implemented additional support to simulate frequently used operators (CONV2D, GEMM, etc.) using roofline model.
- Validated simulation results for various workloads (e.g., ResNet-50) and improved the accuracy by more than 10% compared to the baseline.

Pipelined RISC Processor (Advanced Computer Architecture course at GT) Fall 2023

- Implemented principal functions units (register file, ALU, etc.) in VHDL and achieved single-cycle RISC operations.
- Resolved structural, data, and control hazards for pipelined processing architecture.
- Applied advanced mechanisms such as branch prediction to improve CPI performance.
- Validated results by performing software simulations on assembly level test cases.

Multi-player 3D Game Design (Advanced Programming Techniques course at GT) Fall 2023

- Designed and implemented physics engine for object movements and collisions.
- Integrated player controls through multi-threaded discrete events.
- Rendered 3D objects and applied texture using shaders in OpenGL.

MapReduce Infrastructure Implementation (Advanced Operating Systems course at GT) Fall 2023

- Provided controllable sharding sizes for input files and maintained a worker pool for tracking status.
- Managed master-worker communication within a cluster through gRPC calls.
- Achieved non-blocking I/O by periodic flushing and avoided blockable resource sharing among peers.
- Successfully detected and handled slow-worker or worker failure by redistributing MapReduce tasks.

Lead IoT Engineer (Internet of Things Cyber Defense Competition at ISU) Spring 2021

- Reverse-engineered device firmware through JTAG and Binwalk.
- Designed a virtual device image using Buildroot, deliberately exposing additional security flaws.
- Demonstrated attack and defense strategies against developed device images.

USB-powered Missile Launcher (Embedded Systems course at ISU) Spring 2021

- Configured, compiled, and booted open-source Embedded Linux kernel on the FPGA board.
- Accessed and controlled AXI-GPIO peripherals through direct memory mapping.
- Developed device driver and data transfer scheme, enabling control of missile launcher through FPGA programable logic.

Leadership

Member of Chinese Students and Scholars Association Jan 2019 – May 2021

- Assisted planning and organizing cultural festival events attended by over 500 community members.