Hanran Wu

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Summary

1st-year Masters CS major student looking for System/ML Software Engineer intern opportunities from May 2025 to August 2025

Education

Georgia Institute of Technology   Atlanta, GA
Master of Science in Computer Science, Specialized in Computing Systems   *Aug. 2024 – Dec. 2025 (Expected)*
- Major GPA: 4.00/4.00

Bachelor of Science in Computer Science, Minor in Robotics   *Aug. 2020 – May 2024*
- Major GPA: 4.00/4.00 (Cumulative: 3.95/4.00) - graduated with **highest honors**
- Teaching Assistant for Junior-level **CS 2200 Systems and Networks** (2022/05 - 2022/12), led recitations of 50 students

Courses

Operating System, Deep Learning, Computer Vision, Natural Language Processing, Machine Learning, Data Structures&Algorithms, Software Engineering, Robotics, Database Management, Compiler, Computer Architecture, Embedded Systems, Control Systems, Automata and Computation Complexity, Computer Graphics, Digital Design

Technical Skills

Languages(Proficient): Python, C++, C, GLSL, Java, SQL, SystemVerilog, MATLAB, VHDL, JavaScript, assembly, Rust
Technologies: Git, SQL Server, Linux, GDB, LLVM, GCC, QEMU, CMake, Docker, FPGA, RTOS, CI/CD, Azure, Kubernetes
Frameworks/Libraries: PyTorch, NumPy, Vulkan, OpenGL, OpenMPI, gRPC, Scikit-Learn, OpenCL, OpenCV, CUDA, Flask

Work Experience

GPU Architecture and Modeling Intern   Sep. 2024 - Present
Samsung Semiconductor   *San Jose, CA*
- Developing a CLI tool and Python package to export hardware-level GPU tracing data from Radeon GPU Profiler using **C++**, allowing **10x** efficiency improvement in data collection for entire GPU hardware organization by replacing manual copy-paste
- Working on neural-network-based denoising for Ray Tracing on mobile GPUs; creating compute shaders with **Vulkan**

Graduate Research Assistant - GPU Architecture & System Software   Jan. 2024 - Present
High Performance Architecture Lab @ Georgia Tech, advised by **Professor Hyesoon Kim**   *Atlanta, GA*
- Added virtual memory feature for the **RISC-V**-based Vortex General-Purpose GPU using **C++** and **SystemVerilog**
- Testing and benchmarking performance on cycle-level simulation with **OpenCL** kernel, and RTL simulation on **FPGA**
- Investigating **LLVM** and **RISC-V GCC** for memory model design and performance optimization

Software Engineer Intern - IT Supply Chain Management   May 2023 – Aug. 2023
CommScope Inc.   *Suwanee, GA*
- Spearheaded an Augmented-Reality operation assistance service for corporate assembly line operators in Goa, India that enabled designing visual instructions in millimeter-level precision from scratch, increased manufacturing efficiency by **35%**
- Implemented a Model-View-Controller(**MVC**)-based **Python** GUI application with **Object-Oriented Design** for user operations; used **pyodbc** to operate on a relational database designed with **Microsoft SQL Server** with stored procedures to manage user data and process user designs; verified operation completion using **OpenCV**
- **Dockerized** the service and diagnosed container network with **iproute2** tools; automated testing and deployment by implementing **CI/CD** pipeline with **GitLab**; wrote **Bash** scripts to simplify user access; increased testing and development efficiency by **40%**

Research Intern   Aug. 2022 – Present
Lab for Intelligent Decision and Autonomous Robots, advised by **Professor Ye Zhao**   *Atlanta, GA*
- Work accepted by **IEEE International Conference on Robotics and Automation (ICRA) 2024** for publication
- Researching on Deep Reinforcement Learning, visual models, environment sensing, and **CNN**/**Transformer**-based policy learning for legged locomotion; created training terrain, simulated behavior of RL algorithms including PPO using **MuJoCo** and **IsaacSim**
- Developed walking control functionalities for Digit, a humanoid robot, using **C++**, **ROS2**, **Linux**, and **Git**
- Created APIs that resolve conflicts in Digit legs control, encapsulated state parameters and transition logic, achieved **20%** increase in development efficiency; work **open-sourced** as part of *https://github.com/GTLIDAR/digit_controller*

Research Intern   Apr. 2022 – Dec. 2022
Software/Hardware Co-Design Lab at Georgia Tech, advised by **Professor Callie Hao**   *Atlanta, GA*
- Researched on Approximate Computing (AxC) and Quantization-Aware Training (QAT) for Graph Neural Networks (GNN); used **PyTorch**, **Scikit-Learn**, and **NumPy** to explore the optimum between energy consumption and prediction accuracy
- Reduced **30%** of energy consumption in inference tasks and maintained **99%** of accuracy on GNNs trained with INT8 and INT16 quantization; Work accepted as a poster by **Design Automation Conference (DAC) 2023**

Projects

Library for MapReduce Infrastructure | *C++11, gRPC, OpenMPI, parallel programming*   Nov. 2023
- Implemented MapReduce using C++11 on Linux filesystem, enabled fileshard and managing Worker (mapper and reducer) nodes
- Enforced barrier synchronization using **OpenMPI**, implemented asynchronous Master-Worker communication with **gRPC** calls

RoboNav, a remote-control robot car | https://github.com/mranduril/Robot_Control_System_RoboNav | *RTOS, Flask* Apr. 2023
- Assembled the car from parts, controlled the wheels, Sonar, and cameras using **ARM Mbed**, **Raspberry Pi**, and **OpenCV**
- Wrote control program on Mbed **RTOS** with C++, enabled remote control and camera access with Flask and JavaScript

Kernel Features Support for xv6 | *C, Linux, QEMU, GDB, Docker*   Sep. 2022 – Nov. 2022
- Created kernel threading library, Round-Robin and Priority schedulers for xv6, a Unix-like operating system
- Built Copy-on-Write forking and lazy zero-page allocation for xv6 with the support of **GDB** and **QEMU**, reduced average costs of memory allocation in fork() from **1000s-10000s** CPU cycles to **100s** CPU cycles
- Developed a file permission system and secured login functionality using SHA256 hashing and AES256 encryption
- Implemented system calls such as fork(), clone(), chmod(), and chown() to provide user space with kernel features

Publication

- F. Wu, Z. Gu, **H. Wu**, A. Wu, and Y. Zhao, "Infer and Adapt: Bipedal Locomotion Reward Learning from Demonstrations via Inverse Reinforcement Learning," in *IEEE International Conference on Robotics and Automation* (accepted for publication), 2024.