Eric (Ding) Ding

971-348-7909 | ericding@cs.cornell.edu | ericdinging.github.io

Education

Cornell University — Ithaca, NY, United States
Ph.D., Computer Science, Direction: Systems and Networking — *Aug. 2024 – Present*

University of Michigan — Ann Arbor, MI, United States
B.S.E., Computer Science, Summa Cum Laude, GPA: 3.96, Dual Degree Program — *Aug. 2022 – Apr. 2024*

Shanghai Jiao Tong University — Shanghai, China
B.S.E., Electrical and Computer Engineering, Outstanding Graduate, GPA: 3.76, top 10% — *Sep. 2020 – Aug. 2024*

Research Experience

Graduate Student Researcher — Ithaca, New York
Cornell University — *Aug. 2024 – Present*

- Developing a control layer for programmable optical interconnect fabric to improve large language model (LLM) training speed and fault tolerance.

Machine Learning System Research Assistant — Ann Arbor, MI, United States
SymbioticLab, University of Michigan — *May 2023 – Apr. 2024*

- Developed *Propius*, a Federated Learning (FL) resource management system, based on a microservice architecture.
- Built and deployed a distributed FL evaluation framework in GPU clusters, supporting multi-job parallel training.
- Implemented *Venn*, an advanced scheduling policy, in *Propius* that improves the average FL job completion time by up to 1.88x compared to random allocation.
- Contributed to open-source project *FedScale*, the largest benchmark for FL, in adaptive FL optimizer implementation.

Embedded System Research Assistant — Ann Arbor, MI, United States
The Fan Lab, University of Michigan — *May 2023 – Sep. 2023*

- Developed *WASP*, a wireless wearable device, capable of monitoring sweat for early disease detection.
- Designed a reliable communication protocol that operates atop I2C and Bluetooth Low Energy protocols, ensuring high-fidelity data communication between two in-device microcontrollers and a terminal microcontroller.

Machine Learning Theory Research Assistant — Shanghai, China
John Hopcroft Center, Shanghai Jiao Tong University — *Sep. 2021 – Mar. 2022*

- Studied, implemented, and theoretically analyzed Non-Contrastive Self-Supervised Learning (SSL) algorithms.
- Conducted experiments, and compared the performances of Non-Contrastive SSL and traditional Supervised Learning, showing the robustness of SSL methods on imbalanced datasets with long-tail distribution.

Work Experience

Artificial Intelligence Internship — Shanghai, China
Bosch — *May 2024 – Aug. 2024*

- Designed and implemented a multi-agent system using LangGraph, OpenAI endpoints, and Neo4J graph database for retrieval augmented generation and domain-specific task reasoning.
- Deployed the system on Microsoft Azure for internal use, achieving an estimated 30% reduction in man-hour.

Publication

- **Eric Ding**, Rachee Singh, PipSwitch: A Circuit Switch Using Programmable Integrated Photonics, Optical Fiber Communication (OFC) Conference, 2025
- Jiachen Liu, Fan Lai, **Ding Ding**, Yiwen Zhang, Mosharaf Chowdhury, Venn: Resource Management Across Federated Learning Jobs, arXiv (arXiv:2312.08298)
- Anjali Devi Sivakumar, Ruchi Sharma, Chandrakalavathi Thota, **Ding Ding**, Xudong Fan, WASP: Wearable Analytical Skin Probe for Dynamic Monitoring of Transepidermal Water Loss, ACS Sensors 2023.

Volunteering and Activities

Computer Science Peer Tutor Ann Arbor, MI, United States
Renew CS Program, School of Information, University of Michigan *Feb. 2024 - May. 2024*

- Providing weekly group and individual tutoring sessions for EECS 280 Programming and Data Structures.

Electrical Engineer Shanghai, China
Shanghai Jiao Tong University Racing Team *Mar. 2021 - Aug. 2022*

- Designed a carbon fiber dashboard using Catia, integrated ignition and fire extinguisher switches with the dashboard.
- Configured low-voltage electrical system wiring, and updated wire connectors for new electronic control units (ECU).
- Helped our team to win national second prize of 2021 Formula Student Combustion China.

Projects

A Fully Synthesizable Out-of-Order RISC-V Processor | *SystemVerilog, Verdi*

- Designed an out-of-order processor with features including: RISC-V R10k style register renaming scheme, N-way superscalar, load/store queue, tournament branch predictor, and non-blocking cache.
- Wrote the processor and a complete set of testcases in SystemVerilog, used Verdi platform for debugging and verification.

CNN Convolution Optimization | *CUDA, Slurm*

- Optimized forward convolution layer computation in CUDA, adopting parallel programming techniques, such as memory coalescing, shared memory multiplication and loop unrolling.
- Achieved a processing time of 0.079 seconds for large batches (10K $33 \times 33 \times 12$ images with 24 filters).

Simplified Operating System Kernel | *C++*

- Developed a CPU scheduler and a thread library, supporting thread allocation, interruption, and synchronization primitives, such as mutex and conditional variables.
- Developed a pager which manages processes' virtual address spaces, and swap-backed and file-backed pages across physical memory and disk. Built a multi-threaded network file server in UNIX file system hierarchy.

Distributed Search Engine | *Python, React, AWS*

- Developed a fault-tolerant distributed system running MapReduce framework. Created segmented inverted indexes of web pages through a MapReduce pipeline that is compatible with Hadoop Streaming.
- Implemented a distributed backend index service, capable of generating customized search results via PageRank and TF-IDF integration, and a scalable frontend search server.

Grants and Awards

- Graduate School Fellowship, Cornell University, Feb. 2024
- James B. Angell Scholar, University of Michigan, Feb. 2024
- University Honors, University of Michigan, Dec. 2023, Apr. 2023, Dec. 2022
- Dean's List, University of Michigan, Dec. 2023, Apr. 2023, Dec. 2022
- Tang Junyuan JI Scholarship Nominee, Aug. 2022
- Shanghai Jiao Tong University Merit Student Award, Nov. 2021

Technical Skills

Languages: C++, Python, C, SystemVerilog, Go, RISC-V, Matlab, Javascript, Bash, SQL, R
Frameworks: PyTorch, CUDA, Tensorflow, React, gRPC, Hadoop, LangGraph
Developer Tools: Git, Docker, Kubernetes, Redis, Neo4J, Cloudflare, AWS, Azure, LaTeX, VSCode, Arduino, STM32CubeIDE, Wireshark
Simulation and Modeling: Verdi, Catia, Matlab, Mathematica, LabVIEW, Pspice, Proteus, Vivado