ZIANG TIAN

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My Website

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EDUCATION

Wuhan University September 2021-June 2025 (Expected)
Undergraduate student in Computer Science

- GPA: 3.94/4 Rank: 3/129 Average course score: 93.28
- TOEFL: 111 (Listening: 30 Reading: 29 Speaking: 24 Writing: 28)
- National Scholarship (top 0.2% nationwide) in 2022
- National Scholarship (top 0.2% nationwide) in 2023

RESEARCH EXPERIENCE

Reducing encryption-related memory traffic in AES-CTR memory systems April 2024 - November 2024
Collaborator/Advisor: Yuezhi Che (Wuhan University, Postdoc), Haoran Geng (Univeristy of Notre Dame, Ph.D. candidate), Dazhao Cheng (Wuhan University, Professor), Xiaobo Sharon Hu (University of Notre Dame, Professor)

- Conducted a comprehensive analysis of the challenges in existing secure memory systems across various configurations, highlighting re-encryption as a non-trivial bottleneck.
- Led the proposal of OREO, a dynamic security metadata mapping scheme that enables dynamic and local re-mapping to reduce memory traffic.
- Implemented OREO with comparative studies in the ChampSim simulator.
- Full paper under review for ISCA 25'.

Locality-centric caching optimization for AES-CTR memory systems March 2024 - August 2024
Collaborator/Advisor: Yuezhi Che (Wuhan University, Postdoc), Haoran Geng (Univeristy of Notre Dame, Ph.D. candidate), Dazhao Cheng (Wuhan University, Professor), Xiaobo Sharon Hu (University of Notre Dame, Professor)

- Completed supporting experiments to substantiate research motivations with Intel Pintool.
- Implemented comparative studies for benchmarking in Gem5 simulator.
- Full paper entered rebuttal in HPCA 25'. Now under review for ISCA 25'.

Survey of memory optimization for model training October 2023 - December 2023
Advisor: Dazhao Cheng (Wuhan University, Professor) [Slides (In Chinese)]

- Read and presented 13 papers from 2016-2021 on model training memory optimization.
- Categorized different works according to their optimization methods.

- Read and researched on the source code of Pytorch concerning data dispatching.

PROJECTS

Implementation of the Raft Distributed Systems August 2024 - September 2024
Go [Code]

- Completed labs (a raft implementation without snapshot support) for MIT 6.5840: Distributed Systems, a graduate level course. Code and passed test results are provided.
- Implemented the Raft paper in Golang, in particular leader election and log replication, with full support for persistence and fault-tolerance.
- Gained experience in developing and debugging distributed systems.

A 5-level Pipelined RISC-V Processor May 2023 - July 2023
Verilog, C [Code]

- Implemented a 5-level pipelined CPU on an Artix-7 FPGA board (Nexys A7) in Verilog in Vivado.
- Resolved data hazard and control hazard with forwarding and stalling.
- Implemented a sudoku game on the CPU (with no OS support).

Functionalities and Optimizations in xv6 OS September 2023 - October 2023
C [Code 1] [Code 2]

- Completed all 10 labs for MIT 6.S081: Operating Systems. Code and passed test results are provided.
- Researched on source codes of the xv6 OS, and implemented a series of fundamental operating system functionalities/optimizations, including copy-on-write, user-level threading, a hash-partitioned block cache for locking contention reduction, an E1000 network driver, etc. Code is available in the branches here.
- Implemented a buddy allocator for the xv6 operating system using a self-devised light-weight bit-map tree. Code is available here.

TEACHING

Teaching assistant for Introduction to Quantum Computing (Spring 2024, 115 course-takers)

- Built a course website using Docusaurus, live at https://nercms-mmap.github.io/WHUQC/.
- Tutored students with lab assignments on rudimentary quantum circuits simulation.
- Coordinated students of diverse backgrounds to successfully complete collaborative presentations.
- Graded homework and lab reports.

SKILLS

Programming Languages	Python, Cpp, Go, C, Javascript, Verilog
Tools	Gem5 Simulator, ChampSim Simulator
Others	Latex