Qifa(Richard) WANG

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OBJECTIVE: An engineering graduate passionate about computer architecture design, SW/HW co-design, accelerated computing, HPC, quantum computing, software engineering and seeking related opportunities

EDUCATION

Computer Science & Engineering — *Master of Science in Engineering* AUG 2023 - DEC 2024
Rackham Graduate School, University of Michigan GPA: 4.00

Computer Science, minors in Math and Physics — *Bachelor of Science in Engineering* AUG 2020 - MAY 2023
College of Engineering, University of Michigan *Summa Cum Laude, Dean's List, University Honors*, GPA: 3.77

SKILLS

- **Coursework:** Computer Architecture, Parallel Computing, Compiler Design, Data Sturcture and Algorithms, Operating System, Machine Learning, Web Systems, Quantum Computing and Architecture
- **Programming languages:** C/C++, Python, Java, Verilog, SystemVerilog, CUDA, OpenMP, MPI, Javascript, TypeScript, Tcl
- **Frameworks and tools:** RISC-V, Qiskit, PyTorch, Tensorflow, React, REST, AWS, Docker, Vulkan, Synopsys(Design Compiler, VCS, Verdi), GNU, LLVM, NVCC

WORK EXPERIENCE

EECS 498: Quantum Computing — *Graduate Student Instructor* MAY 2023 - PRESENT
- Redesigned course materials and lectures with lead instructor. Improved project specifications and test suites. Prepared lab materials and taught two lab sections weekly with around 40 students. Held weekly office hours for 9 hours.

Candela Medical — *Business Analytics Intern* MAY 2022 - AUG 2022
- Evaluated, designed, and implemented internal information platform for information acquisition and sharing.

Werfen — *Software & Algorithm Development Intern* MAY 2021 - AUG 2021
- Drafted roadmaps and formalized criteria and limitations for Mercury Algorithm Prototype (MAP). Engineered pivotal elements such as backend modules, front-end web tool, and GUI.

TECHNICAL PROJECTS

Team Design — *R10K Out-of-Order Processor Redesign with RISC-V ISA* JAN 2024 - PRESENT
- Engineered advanced features like N-way superscalar, GShare-Best branch predictor, early tag broadcasting, and return address stack to reduce latency. Revamped memory hierarchy using prefetching, associative, multi-ported and non-blocking cache, along with victim caching strategies. Optimized dependent memory operations with a data-forwarding load-store queue.
- Designed, implemented and verified microarchitecture at RTL level for reservation stations, Icache, Dcache, and load-store queue. Successfully simulated and synthesized the processor and passed 100% of test suites. Performanced ranked top 25% among all.

Personal Project — *Batched Quantum Circuit Simulation on GPU* SEP 2023 - PRESENT
- Engineered a CUDA framework for efficient parallel simulation of multiple quantum circuits on GPU, focusing on tackling complexities of diverse quantum experiments and integration of dynamic shot-branching techniques.
- Performed extensive performance evaluations, achieving super-linear enhancements in both simulation efficiency and scalability, identifying potential bottleneck areas and proposing corresponding optimization strategies.

Team Design — *Compiler Optimization for CUDA Memory Coalescing (COALDA)* SEP 2023 - DEC 2023
- Boosted CUDA program efficiency by optimizing memory access patterns, targeting and restructuring uncoalesced memory accesses. Thorough static analysis and performance evaluations showed a notable reduction in L2 cache bandwidth usage.
- Established an NVCC-Clang compilation pipeline to make CUDA kernel available for IR-level optimization.

Team Design — *Linux-Based Operating System* JAN 2023 - MAY 2023
- Developed a custom thread library to simulate multi-cpu, multi-threaded execution using C/C++. Implemented a sophisticated kernel pager system for efficient management of applications' virtual memory, encompassing the creation, copying, destruction, and allocation of address spaces. Engineered robust, multi-threaded network file server for reliable data exchange. Designed a hierarchical file system with comprehensive access control and fine-grained locking mechanisms to secure file ownership and permissions.

PERSONAL

- Authorized to work for any employer in the US
- Ex-competitive student athlete fencing saber who also loves alpine skiing and playing tennis
- Founder of BeaverWorks engineering club with MIT Lincoln Lab and BAE & System as sponsors
- Multilingual: English, Mandarin, Cantonese, French