YUEWEN HOU

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OBJECTIVE

A self-motivated undergraduate student applying for the Quantum computing architecture, system, and compiler optimization Ph.D. program.

EDUCATION

Bachelor of Engineering in Computer Science, University of Michigan, Ann Arbor — Expected 2024
GPA:3.96/4.00

Minor in Mathematics

Bachelor of Science in Electrical Computer Engineering, Shanghai Jiao Tong University — Expected 2024

RESEARCH EXPERIENCE

University of Michigan,CSE, CAFQA Lab — Aug 2023 - Present
Advisor: Gokul Subramanian Ravi
Quantum Resource allocation & fidelity estimation

- Improve quantum cloud computer fidelity estimation and scheduling.
- Convert the quantum circuits into Clifford circuits to predict the circuit's fidelity on NISQ machines as a key metric to manage the source allocation.
- Maintain fairness and high efficiency for resource allocation for variational quantum algorithm workload with different resources including fidelity, circuit topology, and device noise.

University of Michigan CSE, ESEF lab — Feb 2023 - Present
Advisor: Baris Kasikci

Data center processor front end BTB and Branch Predictor Codesign

- Lead the project and find the bottleneck of state-of-art BTB design on modern data center workload with analysis on Reorder Buffer occupancy analysis, branch prediction accuracy and branch reuse distance, etc.
- Design novel branch target buffer coupled with selective victim buffer as well as branch direction predictor and implement the architecture design on ChampSim trace-based simulator.
- Gain a IPC(Instruction Per Cycle) incresement of 4% percent by greatly decrease processor's front stall.

Practical Upperbound analysis tool development for novel general cache system

- Innovating algorithm for solving the optimal general caching problem with variational size for non-blocking cache by reducing the problem to a min-flow problem and implementing with CPLEX linear solver.
- Implement the algorithm as well as a variant version on modern cache system workload and gain a hugh increase on minimizing the cache latency cost inlcuding micro operation cache and CDN(content distributed network).

University of Michigan, Nuclear Engineering & Radiological Sciences, NuRAM Lab — Apr 2023 - Aug 2023
Advisor: Brendan Kochunas
University of Michigan Unstructured Mesh Code

- Using numerical methods and parallel algorithms for high-fidelity computational reactor physics. Help to implement a C++ library to simulate the reactor in unstructured meshes by ray tracing.
- Implement ray tracing for poly mesh. Rewrite essential C++ standard library container and algorithm to support GPU programming

TEACHING EXPERIENCE

Teaching Assistant For Quantum Information Science and Engineering May 2023 - August 2023
Instructor: L Jay Guo

- Assisted in answering students' questions, enabling the instructor to complete the teaching plan on time.
- Teaching quantum computing on weekly discussion.

Teaching Assistant For Introduction to Engineering (Software engineering track) May 2022 - August 2022
Instructor: Manuel Charlemagne

- Instructed basic algorithm and functional programming on weekly labs.
- Design assignments for students based on course material, helping them to learn game development and advanced feature of Elm.

COURSE PROJECTS

Implementation of R10K style Out of Order CPU [EECS470 Computer Architecture]

Lead a group to build an fully synthesizable R10K style of 3-way superscalar Out-of-Order CPU using SystemVerilog with advanced feature of non-blocking cache, gshare branch predictor and multiport icache dcache.

Scalability of Neutral Atom Control Architecture [EECS598 Quantum Computer Architecture]

Architecting full stack neutral atom control architecture with xSFQ technology and delay-line memory to leverage the long coherence-time of neutral atom qubits and ability to maintain entanglement while being physically seperated in the spatial domain.

Memoria [ENGR100J Introduction to Engineering]

Build a well-documented high quality webpage based game using pure functional language Elm. Apply the agile development strategy during the full development process. (Github Repo)

SKILLS

Programming language	C/C++, SystemVerilog ,Rust ,Python, Prolog, Ocaml, Scheme, RISCV-Assembly
Software toolkit	Qiskit, Q# , IBM CPLEX, CUDA

COURSE WORK

Quantum foundation: Linear Algebra, Abstract Algebra, Differential Equation, Electromagnetism, Quantum Information Science

Computer Architecture and System: Computer Architecture, Compiler Construction, Web System, Operation System, Quantum Computer Architecture and System