

Passionate student seeking to use tech to find advances in computer architecture, compilers and machine learning.

EDUCATION

University of Michigan – Rackham Graduate School

Ann Arbor, MI

PhD in Computer Science and ; GPA: 4.0/4.0

August 2024 - Present

Relevant Coursework: Parallel Computer Architecture, Advanced Topics in Computer Architecture, Advanced Scalable Systems

Cornell University – College of Engineering

Ithaca, NY

B.S. in Computer Science and Applied/Engineering Physics; GPA: 3.713/4.0

September 2020 - May 2024

Relevant Coursework: Compilers, Computer Architecture, Distributed Systems, Functional Programming, Algorithms, Operating Systems, Embedded Systems, Natural Language Processing, Machine Learning, H. Data Structures & OOP, Quantum Information Hardware & Computing, Classical & Quantum Mechanics, Electromagnetism, H. Discrete Math, Mathematical Physics

EXPERIENCE

Google

Mountain View, CA

SWE Intern (Python, C++, MLIR)

May 2023 - August 2023

- Added a performance pass to a compiler dashboard to profile and see the performance of different ML models running on a simulator
- Designed and implemented a Halide-like scheduling language for the Edge TPU ML Compiler for MLIR programs

Google

Sunnyvale, CA

SWE Intern (TypeScript, Python, C++, Java)

May 2023 - August 2023

- Performing feature exploration and fullstack engineering for Gmail's Help Me Write and other intelligence features.

Apple

Cupertino, CA

SWE Intern (Python)

January 2023 - May 2023

- Developed a tool for working with programs in CoreML's Model Intermediate Language.

Google

Sunnyvale, CA

STEP Intern (Java, TypeScript)

May 2022 - August 2022

- Added support for new ECMAScript 2022 features such as error causes, static class blocks, and class fields to closure-compiler using Java in a group of 4.

RESEARCH

CCCP (Compilers Creating Custom Processors) Lab

Ann Arbor, MI

University of Michigan

August 2024 - Present

- Working under Professor Scott Mahlke and collaborating with Los Alamos National Laboratory to make indirect memory accesses more efficient through compiler data layout optimizations, achieving a 1.28x speedup across 10 benchmarks

M3 Research Lab

Ithaca, NY

Cornell University

August 2023 - December 2023

- Wrote benchmarks with ML applications for use of testing a processing-in-memory processor compared to a normal CPU

Wilde Lab

Ithaca, NY

Cornell University

August 2022 - December 2022

- Studied the use of variational quantum algorithms for quantum ML, specifically the optimization algorithms compared to gradient descent

Zhang Lab

Ithaca, NY

Cornell University

May 2021 - December 2021

- Trained, designed, and accelerated convolutional neural networks for object detection and classification of a dataset of almost 20k images on FPGAs for applications for drones using Pytorch and Vivado HLS technology
- Investigated the use of color quantization optimizations to reduce the energy and runtime of the object detection model

McMahon Lab

Ithaca, NY

Cornell University

August 2020 - May 2021

- Developed and researched quantum variational PDE solving algorithms by testing ansatzes and optimization approaches for noisy intermediate scale quantum devices with 6-20 qubits using Cirq and PennyLane
- Investigated the read-in process in order to initialize a quantum state given classical initial conditions, specifically for the heat equation

TEACHING

Cornell University

Ithaca, NY

Teaching Assistant/Grader

January 2021 - May 2024

- Held lab hours, organized and led review sessions, answered questions, and graded homeworks and projects for 7 semesters and thousands of students taking these courses
- **ECE/ENGRD 2300: Digital Logic and Computer Organization** ↗ SP 2021
- **CS 4820: Introduction to Analysis of Algorithms** ↗ FA 2021, SP 2021, FA 2022, SP 2023, SP 2024
- **AEP/ENGRD 2550: Quantum Information Hardware** SP 2022
- **Principles of Large-Scale Machine Learning** ↗ FA 2023
- **ECE 4750/CS 4420: Computer Architecture** ↗ FA 2023
- **AEP 4300: Advanced Mathematical Physics** SP 2024

PROJECTS

Multicore Processor (*SystemVerilog*)

August-December 2022

- Implemented a four-core pipelined processor with a ring network and a blocking 2-way associative cache in order to run RISC-V assembly instructions with a variable multiplier

Xi Compiler (*OCaml, Java*)

January-May 2022

- Implemented a full compiler to x86-64 Assembly with optimizations for an imperative, statically typed language with support for records, arrays, and other control flow structures

RatHunt (*OCaml, PostgreSQL*)

September-December 2021

- Made a full-stack website that was able to host a puzzlehunt and supported team creation, answer checking and submission and also storing information in a PostgreSQL database

Bot Be Named (*Python*)

January 2022

- Added puzzlehunt management functions using the Google Sheets API and discord.py for a Discord bot used by 5 Discord servers

Stock Explorer (*Typescript, React, Express, Firebase, Node*)

April-May 2021

- Made a full-stack website that allows users to track and save stocks and simulate having their own portfolio

CritterWorld (*Java, JavaFX*)

October-December 2020

- Implemented a parser and interpreter for a critter language which was used to make a GUI world simulation accepting client-server requests

SKILLS

- **Languages/Frameworks:** Python, OCaml, Java, NumPy, Typescript, Node, Express, JSON, React, Matplotlib, Verilog, Flask, SQLite, NoSQL, Cirq, PennyLane, Scikit-Quant, PyTorch, C/C++, HTML, CSS, MLIR, LLVM
- **Tools:** Git, Google Apps, Microsoft Office, Autodesk Inventor, NI Multisim, Arduino, CAD, 3-D Printing, \LaTeX , Data Structures & Algorithms, Postman, Firebase, Compiler Implementation, Heroku, VTune