

Software: KiCAD, LTSpice, Cadence Virtuoso, LayoutEditor, Quartus Prime

Languages: Python, C++, SQL, Verilog, VHDL, MATLAB, Go, RISC-V

Libraries: Numpy, Pandas, PyTorch, Boost, FastAPI, Flask, CUDA

Education

UNIVERSITY OF WATERLOO – B.A.SC ELECTRICAL ENGINEERING '23

- Key Courses: Electronic devices, semiconductor physics, analog/digital integrated circuits, analog/digital/multivariable control systems
- Select Awards and Certifications: Baylis Medical Capstone Design Award, QNFCF and G2N Cleanroom Certifications

Experience

SOFTWARE ENGINEER - AUTONOMOUS VEHICLES

University of Waterloo

Jan 2023 - Apr 2023 | Waterloo, ON, CA

- Fault analysis of autonomous vehicles (AVs), causality and failure modes of AVs explored, literature reviews conducted
- Causal inference and counterfactual reasoning applied to identify root cause failures
- Created a dashboard using **Flask/Dash** to allow for data exploration and identification of novel failure modes

SOFTWARE ENGINEER - FIRMWARE

Groq Inc.

Jan 2022 - Apr 2022 | Mountain View, CA, USA

- Defined algorithm for resource allocation over memory and processing units of tensors on Groq's TPU
- Developed **Python** and **C++** firmware API to improve streaming of instructions and data
- Used **PyBind11** for interoperability between C++ and Python firmware during codebase migration

ELECTRICAL ENGINEERING RESEARCH ASSISTANT - DISPLAY SEMICONDUCTORS

University of Waterloo

Sept 2022 - Apr 2023 | Waterloo, ON, CA

- Designed custom PCBs in **KiCAD** for driving small μ LED active/passive matrix displays using **STM32** microcontroller and accompanying circuitry
- Developed research plan for packaging μ LEDs onto TFT backplane using indium electroplating
- Designed characterization setups for μ LEDs in **Fusion360** and **Arduino** interfaced with **Python**
- Validated flip-chip diebonding results with thermal and electrical simulations in **MATLAB**
- Designed and validated new μ LED layouts to improve mechanical and electrical performance

SOFTWARE ENGINEER - DIGITAL COMPRESSION

Huawei Technologies

May 2020 - Aug 2020 | Waterloo, ON, CA

- Designed and analyzed non-cryptographic hash (NCHF) with linear algebra, SAT and self-designed **GF(2)** matrix solver to verify properties
- Benchmarked the optimized SIMD hashing function against existing NCHFs (**Rust**, **C++**)
- Implemented novel border detection algorithm in **Go** using **probabilistic data structures** to maximize performance with Go-routines

ELECTRICAL ENGINEER - COMPLIANCE

Enphase Energy

Aug 2023 - Present | Fremont/Petaluma, CA, USA

- Designed and implemented automated compliance testing for PV inverters to IEEE and UL standards
- Created business analytics and equipment management application, improving test equipment utilization by **20%** (**Ignition Perspective**, **Python**)

SOFTWARE ENGINEER - MACHINE LEARNING

MappedIn

Sept 2019 - Dec 2019 | Waterloo, ON, CA

- Designed pipelines for data cleaning and analysis; integrated new **SQL** data warehouse
- Increased prediction accuracy from **40%** to **80%** on existing **LSTM** models with feature engineering, hyperparameter optimization, and automated data cleaning (**Python**, **SQL**)
- Created **Embeddings** + **SVM** + **Random Forest** ensemble models to replace existing LSTM models, reducing inference costs **2x** while maintaining prediction accuracy

Projectspre

PIPELINED RISC-V CORE

- Designed 5-stage pipelined **RISC-V** 32-bit core in **Verilog** using only synthesizable constructs
- Core synthesized on **FPGA** and successfully ran branching and recursive algorithms. Testbenches used to ensure cycle accuracy

BEAMFORMING HEARING AID SYSTEM

- Designed 4-channel microphone array PCB with active analog bandpass filtering, differential amplification, and multichannel **ADC** over **SPI** to Raspberry Pi (**KiCAD**)
- Created **Flask** server on R-Pi to compress and transfer audio data to **Pytorch** neural network for further digital filtering and beamforming
- Adapted and trained Pytorch quantized voice isolation model to minimize latency while maintaining desired audio quality
- Used **multiprocessing**, **asyncio**, and **websockets** to maximize system throughput, providing continuous audio output