
Experience

Mar 2022 — **R&D Engineer, Chan-Zuckerberg Biohub**

Present *We are creating a low-cost imaging cytometer for malaria diagnosis, which images fresh blood and finds malaria parasites with my object detection model (YOGO, manuscript in-progress)*

- Designed and developed YOGO, an object detection model with a limit of detection of 0.00038% parasitemia. Reached 1680 FPS on an A100 GPU for (772, 1032) px images
- Created a convolutional neural network to predict distance and direction from focal center for the cytometer's autofocus. Successfully deployed to collect over 10 TB of data from Uganda
- Organized, pre-processed, and analyzed the 10 TB of clinical data. This included writing many tools (Python + Bash) to manage and analyze the data which our team uses daily
- Architected and optimized software for the microscope. Key contributions included creating a multiprocessing manager to efficiently move data between processes for heavy calculations, reducing execution times from 16.3 ms to 4.8 ms

Jun 2020 — **R&D Engineering Intern, Chan-Zuckerberg Biohub**

Dec 2021 ○ Rewrote the entire codebase for the Opentrons OT2 (an open-source liquid handling robot) in 6 months to allow more complex protocols and to simplify the software

- Developed an ADC driver for a luminometer detecting COVID-19 antigens, deployed in Bangladesh. <https://doi.org/10.1101/2023.05.18.23290120>.

May 2019 — **Engineering Intern, Wildlife Computers**

Aug 2019 ○ Designed a PCB to protect digital lines from interference

- Wrote embedded C++ for automatic PCB component verification

Jan 2018 — **Data Science Co-op, Control Mobile**

Apr 2018 ○ Improved 300+ SQL queries, achieving a mean 65% reduction in data retrieval time

- Worked on bug fixes, code development, and refactoring

Other

Engineering Physics Autonomous Robot Competition

- Engineered an autonomous robot over 8 weeks, capable of navigating an obstacle course and collecting objects. <https://axel-jacobson.github.io/ENPHRobot/>

- Wrote control software for subsystems and Goertzel filter for frequency detection

Small Fun Projects

- Huffman compressor in C, trading bot in Rust for Manifold Markets, FIXME-roulette in Rust

Education

Graduated **B.ASc Engineering Physics, University of British Columbia**

Dec 2021

Winter 2019 **Exchange Semester, Denmark Technical University**

- Won the DTU OS Course Competition with the fastest reverse hash server
- Developed an LSTM-based Deep Q-Network for a machine learning course