

Skills

Software Tools	Altium, EasyEDA, SolidWorks, OnShape, ArduPilot, MATLAB, Jupyter, L ^A T _E X
Prototyping Skills	Soldering, Electrical Testing, Crimping, Hand Tools
Languages	Python, TypeScript, JavaScript, C, Java, VHDL, Assembly
Libraries	Arduino, ROS, NumPy, Angular, Node.js, Vue, React

Technical Experience

Steering Software Integration Intern – [Tesla](#) **May 2023 – Aug 2023**

- Updated factory calibration routines to support new ECU interfaces, allowing new vehicles to be built
- Wrote automated hardware-in-the-loop tests to validate CAN interfaces using pytest
- Analyzed CAN signal traces using Vector CANape to verify correct operation between interconnected ECUs
- Wrote SQL queries to analyze aggregate data from the fleet
- Designed and wrote assembly instructions for a low voltage wiring harness prototype

Robotics Software Engineer Intern – [Neupeak](#) **Jul 2022 – Aug 2022**

- Built a web-based 3D visualization using THREE.js and live data from ROS to visualize the robot's pose in real time, allowing operators to see the state of the robot remotely
- Built a 3D viewer to review previous point clouds and robot actions, allowing developers to debug reported errors from the field in depth

Control Systems Intern – [Bioform](#) **May 2022 – Jun 2022**

- Designed and wired sensor circuits for industrial control systems, allowing signals to be read by a controller and data acquisition system
- Configured and tuned PID control for R&D production facility
- Specified and ordered wiring using component datasheets and application requirements
- Wrote an application using Python and Qt to collect experiment data and control the facility
- Processed and generated plots for data from dozens of experiments using MATLAB
- Successfully operated facility for a test run with the new control systems

Comms Sub-Team – [UBC Orbit Student Design Team](#) **Sep 2019 – Aug 2021**

- Used software-defined radio to test prototype satellite radio hardware, successfully verified that it was transmitting at the correct frequency using spectrum analyzer
- Worked on a Python-based serial test client to automate 24/7 reliability testing of radio hardware
- Tested client using an Arduino sending mock data back to the test client over serial

Nicholas Carr

Education

Engineering Physics – 5th Year – UBC

Sep 2019 – May 2024

Course selection includes automatic control, signals and systems, software construction, machine design, quantum mechanics, and partial differential equations

Exchange – Technical University of Denmark

Aug 2022 – Dec 2022

Took masters courses in robotics, ML & DSP, image analysis, and spacecraft design

Projects

Coaxial Ducted Indoor Delivery Drone – Capstone

Sep 2022 – Apr 2024

- Designed and fabricated a 3D-printed ducted airframe and thrust vectoring surfaces
- Selected and installed an autopilot module, rangefinder sensor, and propellers
- Designed and constructed a test stand to measure thrust and control torque through two load cells connected to an ESP32 microcontroller
- Demonstrated autonomous altitude control and flyability ([video](#))

Autonomous Parking Enforcement Competition

Sep 2021 – Dec 2021

- Wrote an autonomous robot controller in Python using ROS framework to drive around a track and read license plates from parked cars in Gazebo simulation
- Processed camera images using OpenCV
- Created a license plate character recognition model using Keras and TensorFlow
- Wrote PID line-following algorithm using image of road markings

Video Doorbell Project

Aug 2020

- Wrote Arduino firmware to stream video from an off the shelf ESP32 camera module
- Implemented MJPEG video streaming and MQTT telemetry and control
- Integrated camera into Home Assistant home automation platform

Hackathon Experience

Faucet Drip Detector – MasseyHacks V

Mar 2019

- Built an internet-connected device to detect faucet leaks
- Wrote Arduino firmware to read a water sensor and log drip events to a Node.js server
- Created a custom water sensor using water droplets as a conductive path
- Won third place and the Great Lakes category prize

Co-founder – Cursor

Sep 2017 – Jun 2019

- Helped Toronto-area youth learn to code through introductory workshops
- Co-lead a 3-hour React Native workshop for 20 attendees aged 12-16 Jul 2018
- Organized a 12-hour hackathon for 18 participants Feb 2019