



# Kyle Mackenzie

[lmackenziekyle@gmail.com](mailto:lmackenziekyle@gmail.com) | [github.com/lmackenziekyle](https://github.com/lmackenziekyle) | [linkedin.com/in/kyle-mackenzie-url](https://linkedin.com/in/kyle-mackenzie-url)

## TECHNICAL SKILLS

Software	Controls	Electrical	Mechanical
Python, C/C++	SOC Estimation	Fourier Analysis	CAD design
MATLAB, Simulink	Torque Vectoring	PCB design	Lathe & Mill
Linux	Thermal Modelling	Soldering	Waterjet & Laser Cutting

## EDUCATION

### University of British Columbia

Engineering Physics

Vancouver, BC

Sep. 2020 - May 2025 (Expected Graduation Date)

## RELEVANT EXPERIENCE

### Battery Controls Systems Co-op

Corvus Energy

September 2023 – Present

Richmond, BC

- Developed a thermal model in Simulink of the precharge circuit of a 1MWh energy storage system.
- Validated UKF (Unscented Kalman Filter) used in SOC (State of Charge) estimation algorithm.
- Collected battery cell cycling data for SIL (software in the loop) testing of SOC algorithm.
- Developed coulomb-counting algorithm to validate SOC algorithm and track SOH (state of health) of cells.
- Wrote automated test scripts in Python for the HIL (hardware in the loop) BMS test bench.
- Added wiring and sensors to extend functionality and test coverage of automated HIL test bench.

### Lead Drive Controls Firmware Developer

UBC Formula Electric

Sep. 2022 – Present

Vancouver, BC

- Researched vehicle control algorithms and designed a custom torque vectoring motor control algorithm, increasing cornering speed and decreasing lap times by 10%.
- Implemented torque vectoring algorithm in C code on an STM32 microcontroller.
- Led a team of Test Engineers to complete track setup, data collection, and safety marshalling during testing and validation of the torque vectoring algorithm's performance.

### Research Assistant

Cognitive Neuroscience of Schizophrenia Lab, BC Children's Hospital

May 2023 – Aug. 2023

Vancouver, BC

- Optimized a MATLAB implementation of CPCA, a regressive dimension-reduction algorithm, to handle GB of brain fMRI data, measuring brain activation and classifying functional brain networks.
- Developed MATLAB report generation script to display and analyze results of algorithm.

### Full-Stack Developer Co-op

ICBC

Jan. 2022 – Apr. 2022

Vancouver, BC

- Developed web form data entry automation scripts, saving the company 10h / month.
- Developed prototype for automation of web form data entry using python-based libraries alternatively to the previously used internal tool, proving development time could be reduced by 50%.

## TECHNICAL PROJECTS

### Uni-wheeled Robot Drive Controls | 5-person Capstone project - MATLAB, Simulink

Sept. 2023 – Present

- Derived equations of motion using Lagrangian mechanics to model the dynamics of a uni-wheeled robot.
- Developed 3D simulation environment to facilitate SIL (software in the loop) testing of control algorithms.

### Autonomous Wheeled Robot | 4 person project - C/C++, OnShape

May 2021 – Aug. 2021

- Designed the chassis, H-Bridge PCBs, and firmware for a wheeled robot to autonomously navigate a course to pick up items autonomously.
- Fabricated robot using sheet metal parts, laser-cut hardboard, and 3D-printed components.
- Assembled, soldered, and tested custom PCBs for power distribution and drive control.