Retter Ma (he/him)

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Education

University of British Columbia Expected Graduation: April 2029

Bachelor of Applied Science – Electrical Engineering (Biomedical Option) *Vancouver, BC*

- **Co-op Availability:** 4, 8 or 12 months beginning May 2027
- **Relevant Courses:** Circuit Analysis II (98%), Systems & Control, Electromechanical Energy Conversion (both in progress)
- **Power Coursework:** Three-phase power, rectifiers, power factor correction, DC and induction machines

Technical Skills

Software: C, Assembly, Python | **Tools**: KiCad, Altium, LTspice, MATLAB, Simulink | **Protocols**: I2C, SPI, UART
Hardware: Oscilloscope, Multimeter, Function Generator, Bench Power Supply, Hand Soldering, Wiring & Prototyping
Design: Schematic Capture, PCB Layout, Component Selection, Hardware Debugging & Validation, Test Planning, Motor Driver Circuits, Analog Filtering

Engineering Design Teams

UBC Bionics Sept 2026 – Present

Electrical Team, EMG *Vancouver, BC*

- Developing an ADS1292-based EMG PCB for GRASP 3.0 prosthetic arm, from schematic to layout in Altium Designer
- Designing the SPI interface between the ADS1292 and microcontroller, including chip-select and data-ready signalling
- Diagnosed instrumentation-amplifier saturation on the previous-generation EMG board by injecting test signals and probing stage-by-stage test points with an oscilloscope, informing the signal-chain redesign

Technical Projects

Heart Rate Monitor PCB | *Personal Project* June 2026 – Aug 2026

- Designed a 2-layer sensor PCB in KiCad, pairing a MAX30102 optical sensor with an ESP32-C3-WROOM-02 over I2C, with USB-C input, an AMS1117-3.3 LDO regulator, ground pours and local decoupling
- Prepared Gerber, BOM and CPL files for a JLCPCB assembled-board order, correcting a BOM export error (placeholder values in place of real component values) and the CPL format
- Brought up the assembled board by reworking a USB-C receptacle opening blocked by excess board material, then confirmed operation with firmware that read a pulse from the sensor

Autonomous Path-Following Robot | *Course Project, 5-Person Team* Mar 2026 – Apr 2026

- Assembled and bench-tested a discrete MOSFET H-bridge motor driver with optocoupler isolation between logic and motor power stages, enabling bidirectional DC motor control
- Built VL53L0X time-of-flight obstacle detection in C over I2C with a 6 cm automatic stop threshold, achieving collision-free operation across 5 consecutive test runs
- Implemented sensor bias compensation and turn thresholds in C, for 35 successful intersection maneuvers over 5 runs

Reflow Oven Controller | *Course Project, 5-Person Team* Feb 2026 – Mar 2026

- Controlled an AC heating load via PWM-driven SSR switching, sequenced by a 5-state FSM in 8051 assembly
- Validated the LM335 temperature sensor's real-time feedback, achieving ±3 °C accuracy across 25–240 °C against a Fluke 45 digital multimeter reference
- Verified fault shutdown behavior, confirming the system cut power to the SSR when the oven failed to reach 50 °C within 60 seconds or exceeded 240 °C

AC Phasor Voltmeter | *Course Project, 2-Person Team* Mar 2026

- Built a dual-channel AC measurement instrument on the EFM8LB12F64 in C, using the 14-bit ADC to measure frequency, DC offset, Vrms and phase difference of two signals
- Measured phase by timing the gap between the two signals' rising zero-crossings with Timer 0, using a hysteresis band around each signal's DC midpoint to avoid false triggers from noise
- Added fault handling (frequency-mismatch error with status LED, no-signal warning) and a debounced mode button cycling LCD screens, with UART output of readings

Work Experience

Hestia Kitchen & Bar April 2025 – Aug 2026

Server *Richmond, BC*

- Delivered composed, efficient service in a high-volume environment; onboarded and trained new staff

Volunteer Experience

Westbrook Community Centre Sept 2022 – June 2024

Academic Tutor *Vancouver, BC*

- Led weekly group tutoring for students aged 8–15, helping several raise math and science grades by a full letter