

Sukhman Herr

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EDUCATION

University of British Columbia

Bachelor of Applied Science, Electrical Engineering

Kelowna, BC

Expected Graduation, April 2027

PROJECTS

Custom BLDC Motor & DSP-Based Control System

TMS320F28377D (TI C2000), Embedded C, Power Electronics

Jan 2026 – Mar 2026

- Designed and hand-wound a 9-pole BLDC motor with a 6-magnet (3 pole-pair) rotor, evaluating startup torque, rotor inertia, and thermal current limits.
- Implemented open-loop SPWM firmware on a TI TMS320F28377D dual-core DSP, generating real-time three-phase inverter gate signals (debugged via isolated JTAG in Code Composer Studio).
- Diagnosed a stall/oscillation-under-load fault to a pole-pair mismatch in the open-loop frequency calculation (firmware assumed 4 pole-pairs vs. the motor's 3); corrected the constant to restore stable rotation.
- Resolved failures across three inverter hardware revisions (ESC thresholds, MOSFET shorts, coil overheating) and defined a transition path to Hall feedback, SVPWM, and closed-loop FOC.

PPG Heart Rate Detection Circuit & PCB

KiCad, LTSpice, BJT Circuit Design

Jan 2026 – Mar 2026

- Designed a BJT monostable multivibrator, edge differentiator, and LED driver circuit targeting 180 BPM detection
- Conditioned low-amplitude PPG signals using analog amplification and filtering to improve signal-to-noise ratio prior to timing detection.
- Validated timing accuracy within ± 10 ms via LTSpice simulation and oscilloscope measurement
- Laid out and manufactured a PCB through JLCPCB, validated with oscilloscope against simulation

Embedded Systems & Microcontroller Development

ARM Cortex-M4 | C/C++, Real-Time Peripherals

Sept 2025 – Dec 2025

- Replaced blocking delays with interrupt-driven state machines and non-blocking timing logic to improve system responsiveness.
- Integrated 6+ peripherals (ultrasonic sensor, accelerometer, LCD, buzzer) over I²C, SPI, UART, and Bluetooth.
- Validated timing, signal integrity, and I/O behavior using oscilloscope and serial instrumentation.

WORK EXPERIENCE

H.B. Bro's Vineyards

Embedded Systems Engineering Intern

Penticton, BC

Nov 2025 – Feb 2026

- Owned design of a multi-node ESP32 frost-monitoring network, ESP-NOW low-power nodes with SHT40 temperature/humidity sensing reporting to a base station for aggregation and cloud upload.
- Built the telemetry pipeline into InfluxDB Cloud with Grafana dashboards for real-time monitoring and alerting across the vineyard.
- Defined a versioned sensor packet schema (temperature, humidity, dew point, battery) enabling backward-compatible OTA updates and preventing field-device bricking.
- Integrated cellular fallback for sites without WiFi with watchdog recovery and per-node calibration; scoping a productization path from dev-board prototype to custom PCB toward a certified commercial product.

TECHNICAL SKILLS

Programming & Firmware: C, C++, Embedded C, Verilog, ARM Assembly, Python, MATLAB, CUDA

Embedded & Hardware Systems: ARM Cortex-M, TI C2000 DSP, ESP32, Real-Time Systems, Interrupts, Timers, GPIO, I²C, SPI, UART, Bluetooth, OTA

Analog & Power: 3-Phase Inverters, SPWM, Motor Control, Op-Amp & BJT Circuit Design, Voltage Regulation, PCB Design (KiCad), LTSpice

Tools & Workflow: Code Composer Studio, KiCad, LTSpice, SolidWorks, JLCPCB, Oscilloscope, Function Generator, Git, Linux

CERTIFICATIONS

NVIDIA Deep Learning Institute — Fundamentals of Accelerated Computing with CUDA C/C++ (2026). CUDA kernel development, CPU-GPU memory transfer, profiling with nvprof.