Museok Seo

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Education

University of British Columbia September 2023 - 2028
Bachelor of Applied Science - BASc, Electrical Engineering *Vancouver, BC*

Skills

Electrical: PCB Design/Debugging, THT/SMD Soldering/Rework, Power Electronics, Wire Harnessing
Tools: Oscilloscope, Digital Multimeter, Bench Power Supply, Function Generator, JTAG/SWD Debugger
Software: Altium Designer, LTSpice, Multisim, Git, AutoCAD, STM32CubeIDE, Visual Studio, Excel, Solidworks
Programming: C, Python, MATLAB, Verilog, Simulink, ARM & 8051 Assembly
Communication: CAN, UART, SPI, I2C, USB

Experience

Hardware Engineer Co-op May. 2026 – Present
Sonic Incytes Medical Corp *Vancouver, B.C.*

- Designed a 4-layer PCB (Altium Designer) featuring an ESP32 Nano, analog signal conditioning, audio amplification, power regulation, and an I2C-driven LCD to validate 15+ cable subassembly variants across 600 units/month
- Measured AC ripple on the 12V input rail via oscilloscope to size decoupling capacitors, and used SPICE simulation to validate low-pass filter performance for PWM-based sine wave synthesis in the audio test circuitry
- Implemented an ISR-driven, non-blocking firmware in C for an ESP32-S3, featuring a state machine to automate cable test sequencing with pass/fail results displayed via I2C LCD
- Developed work instructions for debugging main controller boards via continuity testing and power rail voltage verification, standardizing procedures to satisfy QMS documentation requirements and audit readiness

Power & Signals Lead Sept. 2024 – Present
UBC Solar Car *Vancouver, B.C.*

- Led a 6-member electrical subteam to manage both the low and high-voltage systems for a solar-powered race car placing 6th out of 24 teams at the Formula Sun Grand Prix and qualifying for the American Solar Challenge
- Managed the LV system's custom CAN bus architecture, connecting the motor controller interface, telemetry via cellular and radio, and the dashboard to convert real-time driver inputs into vehicle control
- Led electrical integration tests with the BMS and firmware teams across 15 boards, validating CAN communication, motor response, and fault detection via telemetry featuring a mock 135V/20A battery pack and 2.0kW BLDC motor
- Maximized solar array output by analyzing shading profiles and I-V characteristics across 386 solar cells, achieving a minimum 1.1x MPPT boost ratio to generate $\sim$ 1.2kWh for the solar car's 135V battery pack
- Reduced project costs by $300 by designing a custom exterior lighting PCB to replace commercial solutions
- Executed PCB assembly, including precision surface-mount, through-hole, reflow soldering, and reworking

Projects

Driver Dashboard | *UBC Solar Car* Oct. 2025 - Jan. 2026

- Designed the Driver Dashboard PCB, the central control hub of the low-voltage system interfacing with the driver to manage drive states, motor control signals, CAN bus communication, and 446MHz UHF radios.
- Integrated a SPI-driven LCD to display real-time vehicle status including the speed, drive state, and battery faults
- Designed power regulation and protection circuitry, including buck converters and LDOs, reverse polarity protection, ESD protection, and fusing to power the backup camera, steering wheel PCB, exterior lights, and pedal sensors
- Implemented impedance-matched differential pair routing for CAN bus communication, isolation zones for audio signal integrity, and decoupling capacitor calculations to minimize power supply noise
- Collaborated with the mechanical and firmware teams to resolve enclosure constraints and define analog acceleration signal interfaces for the driver dashboard

Hardware Bring-up & Validation Firmware | *UBC Solar Car* Aug. 2025 - Sept. 2025

- Developed embedded validation firmware in C to validate MCU peripheral functionalities including CAN, UART, I2C, and SPI on custom STM32-based PCBs, flashed via J-Link/ST-Link for rapid hardware bring-up validation
- Configured CAN filter banks and TX/RX mailboxes to transmit diagnostic results, reporting faulty GPIO pins and unresponsive communication peripherals during board bring-up
- Automated short-circuit and open-connection detection routines to isolate faulty pins at the hardware level, reducing manual continuity checks and cutting board bring-up time by $\sim$ 30%