

Alex Wang

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EDUCATION

University of Toronto | Bachelor of Electrical and Computer Engineering (EngSci)

GPA: 3.83

Accolades: Neil C.W. Wood. Scholarship (\$160,000 Full Ride), awarded to one student once every 4 years; Dean's List

EXPERIENCE

Formlabs | Electrical Engineering Intern | Boston, MA

05/2025 – Present

- Designed 2 motherboards: CM4 SOM, NXP MCU using RS 422, UART, SWD with eMMC, USB Host, Touchscreen
- Designed 3+ peripheral boards: developed custom low-cost quadrature encoder, validated through FEA and in-field
- Hi-pot, Ground bond, ESD, and EMC testing; DIN Rail block prototyping; Zero cross switching with SSRs on AC

FSAE at University of Toronto Formula Racing | Powertrain Lead | Toronto, ON

09/2023 – Present

LV & HV Electronics

Front Vehicle Controller PCB

Designed schematic & layout of 200+ component PCB: 1 of 3 main VCs on car (accelerator, brake, dash control, etc.)

- Power Electronics: 20W DC-DC buck converter at 86% efficiency, current sensor, reverse polarity, ESD protection
- 3 choked CANbus lines; Level-shifted 10 kHz digital signals; Mux, Buffer, RC low-pass of 16+ analog signals
- Custom 6-channel strain gauge circuit via multiplexer & differential amplifier circuit; SPI LCD; car shutdown relay

High-Voltage BMS PCB

Manufactured and tested 600+ component HV PCBA: pre-charge circuitry, BMS main, accumulator isolation relays

- LV-HV isolation barrier; Isolated differential I2C battery temperature and voltage sensing for 115 battery cells
- Hardware latched DPDT pulse capacitor circuit for safety critical faults; Optocoupled 600V high-voltage sensing
- Wrote and tested C++ scripts: simulating signals with waveform generator, probing with DMM and oscilloscope

Cell Engineering

- Thermal, electrical, and chemical characterization of high-performance pouch cells in industrial thermal chambers
- High-fidelity heat transfer models: 18650 cylindrical cells and pouch cells validated to 0.1 °C with real logged track data
- Analyzed effects of temperature and compression on capacity and internal resistance through cycle aging for cell selection
- Created 2RC equivalent circuit models through gradient descent optimization in Simulink with 100+ GB of test data

Electric Powertrain

- Developed CFD-based thermal simulation for accumulator in COMSOL, 0.3% error validated with track data
- Designed and manufactured custom battery management, compression, and cooling for high-voltage accumulator
- Manufactured high-voltage 600V accumulator: segment assembly, HV crimping, minimize contact resistance, cell balancing
- Integral role in HV bench testing, debugged 50+ CAN signals (IMD, custom BMS, and inverter) on BUSMASTER

ATOMS Laboratory | Project Supervisor & Intern | Toronto, ON

05/2024 – 04-2025

Ford Motor Company

- Led Mach E & F150 Lightning battery testing project: custom compression jig; analysis through EIS, HPPC, SoC-OCV
- Implemented inverse heat transfer method from cell surface temperature gradients to create FEA thermal model
- Optimized Simulink equivalent circuit model to be scaled to battery pack level for various chemistries LCO, NCM, LFP

FSAE

- Developed custom analysis method increasing measured resistance resolution by 160 times in quarter the runtime
- Analyzed effects of reversible heating to determine the most optimal SoC ranges to allow more power draw
- 4D gradient descent optimization for temperature, compression, SoC, and form factor to determine lowest DC-IR

FIRST Robotics | Team Captain & Mechanical Director | Vancouver, BC

05/2016 – 06/2023

- Led entirely-student run team: delegated tasks, organize meetings, resolve conflicts, coordinate logistics
- Created robot assembly of 600+ parts in SOLIDWORKS with 30+ custom machined, CNC, and 3D printed parts
- Designed 3D-printed gear to resist extreme wear of powertrain, 200 times cheaper than machined gear
- International 8th Robot Game; National Innovate Award; Design Award; Provincial Champions

PROJECTS

Self-landing Rocket | Electrical Technical Director | Toronto, ON

04/2024 – Present

- Developed Finite State Machine and critical driver libraries in C++ for self-landing thrust vector-controlled rocket
- Schematic & layout for flight computer PCB: sensor fusion with onboard sensor suite run on STM32 with RTOS
- Tuning PID controller with Simulink model, implementing custom Unscented Kalman Filter for state estimation

SKILLS: SOLIDWORKS, COMSOL, Ansys, Altium, Java, Python, C/C++, Verilog, Matlab, Simulink, RTOS, ROS 2, SLAM