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TECHNICAL SKILLS

- **CAD Software:** Inventor, Fusion 360, NX, SolidWorks (CSWA), CATIA V5, CATIA 3DEXPERIENCE (3DX/V6)
- **Analysis & Simulation:** MATLAB, Simulink, ANSYS Mechanical, ANSYS Fluent
- **Electronics & Lab:** Altium Designer, Microcontrollers, Soldering, Wire Harnessing, Circuit Analysis & Debugging
- **Hands-On & Shop:** 3D Printing, Machine Shop Tools, Composite & Carbon Fiber Layup, Vehicle Assembly

WORK EXPERIENCE

Mechanical Design Intern – Power Electronics, Tesla, Inc.

Sep 2022 – Aug 2023

- Designed, prototyped, validated, and tested novel charging connector prototypes for Optimus' (Tesla humanoid robot) battery pack. Includes integrating the prototypes' structures, thermals, and electronics smoothly together using **CATIA V5, CATIA 3DX and Altium Designer**
- Iterated charging prototype designs by increasing power density and decreasing thermal losses through layout and component geometry redesigns. Reached executive approval of charging interface base design by end of work term
- Conducted thermal testing of enclosure/heat-sink of power conversion board used for wireless charging by mocking power dissipation of discrete components through powered resistors and DCDC buck-boost converters
- Utilized various manufacturing techniques like laser cutting, waterjetting, SLA & MJF 3D-printing and various lab equipment like oscilloscopes, voltage probes, current sensors, and DC power supplies for build and test phases

Test Technician Co-op, Curtiss-Wright – Indal Technologies

Sep 2020 – Apr 2021

- Executed functional testing of PCBs under varying thermal, vibrational, and signal conditions using bench equipment including oscilloscopes, multimeters, DC power supplies and wave function generators
- Conducted performance, functional and cycle testing of various hydraulic and pneumatic components

PROJECTS & LEADERSHIP

Powertrain – Technical Director, MAC Formula Electric (FSAE Electric)

Sep 2022 – Aug 2024

- Led a 20-member powertrain team across 4 technical leads and 1 management lead, while developing their leadership and technical skills through one-on-one mentorship and workshops
- Developed an engineering design framework and resource libraries for team-wide design process standardization, and specced workshop tooling and equipment upgrades to improve team capability

Powertrain Architecture of an FSAE Electric Vehicle

Sep 2023 – Apr 2024

- Architected the powertrain from the ground-up for MAC EV5 with powertrain-centered chassis design that minimized structural layup requirements, and defined system parameters (600 V, RWD in-hub, etc.) through FSAE rules analysis
- Redesigned battery pack's integrated mechanical and electrical layout through strategic board floor-planning, minimized wiring, and multifunctional components, enabling a densification that achieved 12 kg of weight reduction
- Split inverter/motor cooling loop from series to parallel loops powered by dual pumps that delivered 80 kPa at 10 lpm, and addressed inverter isolation issues through AC/DC connector separation and improved shielding strategy

Modeling and Testing of Powertrain Components

Sep 2021 – Apr 2022

- Modeled full battery pack assembly and inverter in SolidWorks, conducting FEA and modal analysis of enclosure geometries in ANSYS to validate structural integrity
- Characterized thermal performance of a single 18650 Li-ion cell at high C-rates using a power supply, programmable electronic load, and thermal imaging camera, confirming necessity for cooling and system level validation

EDUCATION

B.Eng., Mechanical Engineering Co-op (Minor in Business), McMaster University

Graduated: Jun 2024

M.A.Sc., Mechanical Engineering, McMaster University

Expected Graduation: Aug 2026

Relevant Courses: Advanced Heat Transfer, CFD, Rapid Prototyping, Power Converter Systems

- Designed a coldplate geometry for an 800 V SiC SMD parallel-bridge automotive traction inverter by conducting CFD simulations in ANSYS Fluent with k- ω SST turbulence modeling and GCI mesh convergence analysis
- Performed electrical verification and debugging of gate driver boards for the 800 V SiC SMD parallel-bridge automotive traction inverter, validating switching behavior using discrete passive components in place of devices to de-risk SiC MOSFET integration
- Engineered a 10,000 rpm dynamometer test stand for 375 kW back-to-back motors and inverter-under-test validation using first-principles analysis and ISO vibration standards
- Led development of cooling system design of the same dynamometer test stand considering maximum thermal heat loads and worst-case ambient boundary conditions.