Adam Khalid

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Mechanical and mechatronics engineer: CAD, PCBs, firmware and test. Mechanical Engineering Advanced Diploma (Mohawk College), B.Tech Automotive Engineering (McMaster, 2025), CSWA certified, with hands-on experience across EV battery systems, automotive manufacturing, embedded electronics, and spacecraft structures, built through three industry internships, a university lab role and four student design teams and projects. Designs in SolidWorks, then builds, measures and tests the result. Learns by doing: joined a battery team with no electrical background and went on to own every electrical subsystem on a capstone robot.

CORE COMPETENCIES

- **Mechanical Design & CAD:** SolidWorks (CSWA certified), CATIA V5, AutoCAD; GD&T and tolerance stack-ups; fixture design, reverse engineering, drawings for in-house machining, 3D-printed prototyping; PDM (daily at Tigercat, Bild on a CubeSat team).
- **Embedded Electronics & Mechatronics:** ESP32 firmware (C/C++), PCB design (EasyEDA), DC-DC power architecture and fusing, sensor integration, soldering and crimping.
- **Analysis, Controls & Test:** vibration analysis (FFT, frequency response), PID control tuning, failure mode analysis, ANSYS/FEA, MATLAB/Simulink, statistical process control, lithium-ion cell characterization.
- **Manufacturing & Quality:** PLC & HMI (Allen-Bradley, Omron), time studies, floor layouts, SOPs, BOMs, NCRs, ECRs; FARO arm, micrometers, bore gauges; Microsoft Dynamics AX (ERP).
- **Team Coordination:** workplans and dependency tracking across a 30-person, three-subgroup hardware team; mentoring first-time engineers.

PROFESSIONAL EXPERIENCE

Mechanical Engineering Lab Assistant **Sep 2024 - Dec 2024**
McMaster University, Centre for Mechatronics and Hybrid Technologies *Hamilton, ON*

- Ran lithium-ion cell characterization experiments on R&D test equipment, then processed and interpreted the data in MATLAB to flag trends and anomalies.
- Documented test procedures and results so the work stayed repeatable; maintained lab equipment and safe work practices.

Mechanical Engineer Intern **May 2024 - Aug 2024**
Linamar (LPP) *Guelph, ON*

- Joined a ~200-unit field recall of McLaren-designed e-axles, working with a senior engineer and assembly technicians to disassemble, rebuild, and re-shim each unit after undersized transmission shims caused planetary gearset issues.
- Owned recall traceability, logging every component in Excel, performed the shim calculations, and ran multiple HMI-controlled rebuild stations.
- When a power outage knocked an HMI station offline mid-recall, worked with the facility's PLC technician to decode and troubleshoot the control logic.
- Authored SOPs for 15+ rebuild stations plus emergency response documentation; designed a fixture for a Honda Pilot gear-shaft operation, contributing to a 28-second downtime reduction.

Hardware Program Manager, Battery Workforce Challenge **Aug 2023 - Sep 2024**
Stellantis | U.S. Department of Energy (McMaster team) *Hamilton, ON*

- Built the 30-person hardware team's workplans from scratch across cell characterization, module design, and BMS hardware subgroups while final pack requirements remained undefined.

- Served as the central coordination point across all three subgroups, tracking dependencies and unblocking teams as design reviews converged on a Samsung lithium-ion pack configuration.
- Built a mentorship-centered team culture; the subgroup had the lowest member attrition on the team.
- Built a working expo demo from scratch with a teammate in a 3-hour window before judging; gained hands-on PCB, soldering, and crimping experience through the BMS subgroup.
- Year One: 4th overall and 1st in Canada of 12 universities; presented to judges from Stellantis, Argonne National Lab, and the DoE.

Structural Specialist, PRESET CubeSat Mission **Jun 2023 - Jun 2024**
McMaster Interdisciplinary Satellite Team | Canadian Space Agency *Hamilton, ON*

- Designed a one-time burn-wire deployment mechanism, including the resistor burn circuit board, for a ~1 m STACER boom carrying a tri-axial magnetometer.
- Ran failure mode analysis to confirm the mechanism would survive launch vibration and radiation and deploy only on command; acting on senior feedback, added a chamfer that fixed a wire-binding failure mode, then built and tested the prototype.
- Iterated through two formal CSA design reviews; prototype test results informed the team's move to a carbon-fiber composite mechanism. PRESET launched in 2025.

Manufacturing Engineer Intern **May 2023 - Aug 2023**
Linamar (Roctel) *Guelph, ON*

- Supported new Ford Lightning production lines with time studies and AutoCAD floor-layout rework, working with production, maintenance, and quality.
- Reverse-engineered a recurring-failure CNC tool holder into CAD models and manufacturing drawings for in-house machining, an estimated 60% reduction in replacement cost.
- Designed a 3D-printed fixture for a fan-mount assembly step and independently designed an SR&ED-eligible laser micrometer spring-lock mechanism for verifying shaft diameter on the line.

Quality Engineer Intern **Jan 2023 - Apr 2023**
Tigercat Industries *Paris, ON*

- Served as the floor-level quality contact at a heavy equipment assembly plant, reading GD&T drawings daily and investigating weld, fit, and dimensional issues on machines built from hand-welded components.
- Worked in PDM and Microsoft Dynamics AX daily, tracing each nonconformance to its part number, then verifying it against the SolidWorks model and drawing with micrometers, bore gauges, and a FARO arm.
- Managed repairs to closure with annotated drawings for rework welders, replacement components sourced from the Woodstock fabrication facility, non-conformance reports, and engineering change requests where the drawing was at fault; an estimated 15% reduction in recurring quality issues.
- Developed GD&T solutions and BOMs with cross-functional teams.
- Built a tolerance stack-up for a part at the senior engineer's request, calculating the thickness range from the drawing's tolerances and identifying the contributors to adjust; the findings went to the design engineer and became an engineering change request.
- On an early unit of the newly launched bulldozer, identified a blade component welded in the wrong orientation and helped plan the repair of the difficult overhang weld.

Mechanical Specialist, Science Module **Sep 2022 - Oct 2023**
McMaster Mars Rover Team *Hamilton, ON*

- Led the V2 rover's Science Module from concept through prototype, automating soil analysis for signs of life that the team previously did by hand.
- Developed the full sample-handling sequence: soil is collected, filtered and sifted, then deposited into pre-filled test tubes in a light-sealed chamber.

- Designed custom test tube lids opened by the sensor carriage itself as it travels on a lead screw rail over each tube to take readings.

ENGINEERING PROJECTS

KLEAVOR, Modular Utility Robot (Capstone) **Jan 2024 - Dec 2024**

Electrical Lead, 3-person team

- Owned all electrical subsystems: three fused DC-DC rails off one 30 Ah battery, ESP32 control firmware, and the team's first custom PCB in EasyEDA.
- Configured the purchased drive motor controllers for joystick tank steering, later controlled from the team's web app; integrated the electrical system onto the team's aluminum extrusion frame.
- Diagnosed a reverse-direction current transient burning out the drive buck converter and moved it onto a socket joint for seconds-long swaps; flagged a torque-transfer flaw in the wheel-to-shaft connection and designed, printed and tested a D-shaft hub alternative.
- Passed the full formal test plan: 406 m average range and 30 kg payload capacity.

Machine Health & Condition Monitoring System **Sep 2024 - Dec 2024**

Mechanical & Electrical Lead

- Built an ESP32 + ADXL345 accelerometer vibration monitor (1 kHz sampling) in a 3D-printed press-fit housing with magnetic mounts, for an industrial linear-axis testbed.
- Set 3-sigma RMS fault limits from a measured baseline, correct in all 14 physical test runs (7 healthy, 7 induced-fault); helped integrate the MATLAB analysis, which compared FFT spectra with bearing fault frequencies calculated from geometry.

EDUCATION

Bachelor of Technology, Automotive Engineering **2020 - 2025**

McMaster University *Hamilton, ON*

Mechanical Engineering Advanced Diploma & Business Management Certificate **2020 - 2025**

Mohawk College *Hamilton, ON*

Certified SolidWorks Associate (CSWA) **2023**

Dassault Systèmes

Relevant coursework: Mechanical Vibrations (FFT, forced response, absorbers); Machine Health (FFT vs. bearing fault frequencies); Control Theory (PID tuning on a DC servo, Simulink); Robotics (kinematics, FANUC).

LANGUAGES

English (native), Urdu (native), French (fluent).

HONORS AND AWARDS

- **1st in Canada, 4th overall (12 universities):** Battery Workforce Challenge, Year One.
- **Best Cell Characterization Analysis and Best Expo Presentation:** Battery Workforce Challenge, Year One.