CHRISTIAN HAYNES

Mechanical Engineering Graduate
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PROFESSIONAL SUMMARY

Mechanical Engineering graduate and Certified SolidWorks Professional (CSWP) with applied experience in mechanical design, CAD, prototyping, testing, root-cause analysis and equipment troubleshooting. Project experience includes electromechanical systems, engineering drawings, GD&T, tolerance analysis, BOMs, CFD/FEA and MATLAB/Arduino programming.

ENGINEERING EXPERIENCE

Sandy Lane Resort **May 2024 - Aug 2024**

Mechanical Engineering Intern

- Diagnosed faults across 20+ HVAC, pumping, piping and facility assets using field inspections, maintenance records and manufacturer documentation, contributing to an estimated 15% reduction in unplanned downtime.
- Performed vibration-based root-cause analysis with senior engineers on a centrifugal chiller; FFT and time-waveform data showed 2x running-speed and elevated axial vibration consistent with shaft misalignment and bearing wear, supporting laser realignment and bearing replacement.
- Used CMMS work-order data to track repair response and completion times, supporting maintenance changes associated with an approximately 20% reduction in average repair turnaround time.
- Followed LOTO and equipment-safety procedures; referenced CSA B52, O&M manuals, MEP risers and electrical single-line drawings during troubleshooting.

SELECTED ENGINEERING PROJECTS

6-DOF Robotic Manipulator & Custom Actuators **Mar 2026 - Present**

- Independent
- Designed and fabricated an FDM six-axis robotic arm with a 650 mm design reach, a 0.5 kg payload target and custom cycloidal actuators; demonstrated coordinated motion on the assembled arm.
- Designed and prototyped cycloidal and two-stage helical planetary gearboxes with nominal CAD ratios of 19:1 and 20:1, respectively; measured torque, backlash and speed in preliminary bench tests.
- Revised gearbox assemblies in SolidWorks to address torque-transfer, alignment and bearing-interface issues; developed engineering drawings with functional datums, ASME Y14.5 GD&T, tolerance analysis and BOMs for FDM and proposed CNC manufacturing.
- Derived DH parameters and developed MATLAB FK/IK, workspace and pose-validation workflows; implemented serial communication, homing and coordinated six-axis motion using an MKS TinyBee/Marlin controller.

Battery Pack Thermal Management Using CFD **Jan 2026 - Apr 2026**

University of Guelph

- Developed a 3D ANSYS Fluent model of a prismatic Li-ion battery pack with cell heat generation, natural convection and a 20 °C cold plate; refined a ~342,000-element mesh, verified mesh independence and predicted ~34-35 °C maximum temperature at 1C.

Haptic Navigation Belt

University of Guelph

- Developed and tested a six-zone ultrasonic/vibrotactile navigation aid; programmed Arduino Uno/C++ feedback logic, integrated FDM housings and electronics, maintained a BOM and contributed to design reviews and technical documentation.

EDUCATION

University of Guelph **Sep 2022 - May 2026**

B.Eng., Mechanical Engineering

- **GPA:** 78%
- **Achievements:** 4x Dean's Honour List
- **Coursework:** Machine Design, Manufacturing Processes, Mechatronics, Robotics, FEA, Mechanical Vibrations, Heat & Mass Transfer, Fluid Mechanics, Thermodynamics, Systems & Control

TECHNICAL SKILLS

- **CAD & Design**: SolidWorks (CSWP), AutoCAD, assembly modelling, engineering drawings, GD&T, tolerance stack-up, BOMs
- **Analysis**: ANSYS Fluent, ANSYS Mechanical, CFD, basic static FEA, thermal and vibration analysis
- **Programming & Controls**: MATLAB, Arduino/C++, FK/IK, motion control, serial communication, Marlin
- **Manufacturing & Systems**: FDM, design for CNC manufacturing, motors, bearings, gear reductions, HVAC/refrigeration, fault diagnosis

CERTIFICATIONS

- Certified SolidWorks Professional (CSWP) - Mechanical Design
- Lean Six Sigma Green Belt
- Guelph Engineering Leadership Certificate