Ryan Lee

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Highlights of Qualifications

- Skilled in Inventor/SolidWorks CAD, 3D printing, **electrical measurement**, and software automation for integrated mechatronics
- Proficient in **C, C++,** MATLAB, Python, Perl, Verilog HDL, P4, Git, and SQL, as well as operating in Linux/Unix environments

Projects

Haptic Glove Controlled Robotic Arm

- Designed a prosthetic robotic arm replicating glove movements using **wireless radio communication**
- Integrated results of **analog potentiometer** and sensor readings to **PWM** signals used in controlling servo motors for actuation
- Modelled and prototyped using CAD, incorporated using fasteners, bearings, pulleys, and mechanical tolerances

Mars 2020 Perseverance Rover Model

- Programmed DC and **servo motors**, controllers, and camera for real time radio communication and traversal of rough terrain
- Utilized CAD, band saw, and drill press for manufacturing and assembly of aluminum profile based chassis

Automated Equatorial Mount for **Astrophotography**

- Conceptualized and built EQ mount for camera tracking of stars in night sky using stepper motor and 8:1 pulley gear ratio

Platform Ball Balancing PID

- Implemented a PID controller for 2-DOF ball balancer using resistive touch screen for input and **L298N motor drive** for control
- Tuned and researched **PID** parameters through iterative testing with signal processing filters to achieve precise ball stability

Sequential Logic Digital Design Project

- Developed a finite state machine to display digits in sequence using **logic gates**, flip flops, clocks, and 7 segment display
- Employed NI Multisim to efficiently design, create, test, and visualize the circuit data using built-in timing diagrams

STM32 Microcontroller Projects

- Created a fan controller where thermometer triggered fan at high temperatures using **A/D conversion, OpAmps**, and filters
- Investigated **I2C** serial communication protocol using external EEPROM chip and real-time clock to store data

FPGA Processor Design

- Created a processor using **FPGA** board to emulate motor controller through Verilog and ARM Assembly ASIP instruction set

Work Experience

Graphics Memory Hub Testing and Verification Engineering Intern **May 2023 – July 2024**

Advanced Micro Devices Inc. (AMD), Markham ON

- Managed 70+ regressions for 6+ IP teams through triaging test results, achieving 99%+ coverage on several **register** designs
- Improved efficiency of regression verification process by 50% through scripting data displays, coverage reports, and run logs
- Collaborated with teams to analyze timing diagrams, verify **RTL** design, and write Verilog HDL to adhere to design verification

Education

Bachelor of Mechatronics Engineering, Co-op **September 2020 – April 2025**

McMaster University **GPA: 3.71**

- Studying to develop a strong understanding of high-level robotics courses including **Control Theory**, **Analog and Digital Circuits**, Embedded Systems, Robotics, **Electronics and Instrumentation**, **Signal Processing**, and Predictive Controls

Leadership Activities

McMaster Baja Racing Team **September 2022 - Present**

- Manufactured and assembled off road racing vehicles with a focus on data acquisition, incorporating electronics into design
- Monitored mechanical properties using a fleet of sensors, including **Hall Effect** latching sensors for CVT and wheel RPM, a GPS module for tracking, and **magnetic field strength** sensors for suspension angle travel
- Optimized driver steering capabilities by 20% through acquiring torque/angle data with **strain gauges** and design feedback
- Programmed and tuned engine dynamometer to provide detailed reports of horsepower and torque at various RPMs
- Enhanced **PCB reliability** and debug process by incorporating **test points**, redundant signal paths, and visual fault indicators

McMaster **Rocketry** Team **September 2020 – May 2022**

- Worked with the ground controls to develop a functional team website for data visualization and calculations
- Leveraged LoRa and Arduino devices to develop a versatile transceiver and receiver system for telemetry over 3 kilometers