Arjun Mauji

22cnr1@queensu.ca| 647-225-3264

Education

B.A.Sc. Mechanical and Materials Engineering, Queen's University   Apr 2027

- Specialization in Biomechanical, Dean's Scholar: 2024-2025
- Biggs-Ronald & Deanna Scholarship , Science 1958 Entrance Bursary

Projects

Hardware Gait Analyzer | Personal   July – Aug 2025

- Developed a prototype wireless gait analysis system using ESP32 microcontrollers and low-cost movement sensors to measure hip joint flexion/extension angles during a gait cycle
- Wrote Python scripts using multi-threaded data collection with WiFi communication to simultaneously capture sensor data from thigh and pelvis-mounted devices
- Engineered a pipeline linking sensor data to OpenSim's biomechanical modeling software for functional gait visualization, demonstrating feasibility of a low-cost biomechanical analysis tool

Continuously Variable Transmission (CVT)|BAJA SAE-Off Road Racing Car   Sept – Dec 2024

- Assisted in the re-modeling and manufacturing of the vehicle's primary CVT using SolidWorks CAD
- Reduced primary CVT component's machining time by over 40 minutes through weight reduction and a more efficient CAD model design
- Learned to compose G-code scripts with Mastercam to program and operate CNC machining tools, optimizing the manufacturing process while reducing material waste

QHDT Machine Vision Sensor System | Design Course APSC 103   Jan – Apr 2024

- Designed a small-scale object detection software, functioning on a standard microcontroller to detect small hazards such as rocks or pylons for a fictitious client's hyperloop tunnel
- Tested pre-trained models and custom datasets using Python & TensorFlow, with the latter focused on detecting more complex hazards like fire and cracks, enhancing the software's detection capabilities
- Added a UI using HTML & CSS to allow the client to easily view the object detection in real-time during hyperloop operation

Automated Fluid Dispenser | Design Course APSC 101   Sept – Dec 2023

- Engineered a prototype fluid dispenser for use in medical facilities with hands-free dispensing, using an IR sensor, pump, vials, turntable and a custom gearbox
- Modelled & 3D printed the main structure of the gearbox & fitted it with a 5-gear, 167:1 gear ratio, focusing on high torque for more precise vial rotations and alignment with dispensing nozzle
- Integrated all dispenser components using a control loop, running on an Arduino Uno using C code

Technical Skills

- **Software/Hardware Tools:** C, C++, Python, SolidWorks CAD, Arduino IDE, Matlab, Jupyter Lab

Work Experience

Teaching Assistant | Measurement in Mechatronics   Sept 2025 – Current

- Co-supervising 10+ mechatronics labs with 100+ students, answering electronic measurement theory questions and troubleshooting small sensor data acquisition circuits

Lifeguard | City of Toronto   Jul 2023 – Aug 2024

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- Supervised 200+ swimming crowds alongside other guards across different depths of water