# Arjun Mauji

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## Education

**BASc Mechanical Engineering |** Queen's University Apr 2027

- Recipient of Dean's Scholar: 2024-2025, Biggs-Ronald & Deanna Scholarship
- Relevant Coursework: Digital Systems for Mechatronics, Automatic Controls

## Technical Skills

- **Languages :** C, C++, Assembly, Python, Arduino IDE, Matlab
- **Hardware :** STM32, ESP32, Raspberry Pi, Arduino UNO, MPU6050 IMU
- **Dev Tools:** Jupyter Lab, Nano, VS Code, Arduino IDE

## Projects

**Transmission Belt Temperature Sensor |** Off-Road Car Design Team (BAJA) Current 2025

- Writing firmware in C on an STM32 to monitor transmission belt temperature using an IR sensor.

**Hardware Motion Analyzer |** Individual Sept - Current 2025

- Prototyped a wireless motion tracking system to test the feasibility of a low-cost biomechanics tool (< $90).
- Designed 2 wearable ESP32-based sensor modules with IMUs to measure hip flexion within ±5° accuracy.
- Wrote a custom C driver using ESP's I²C drivers to read and filter raw IMU data using the onboard DMP.
- Integrated OpenSim's Biomechanical C++ API to compute joint kinematics and visualize the hip flexion.

**QHDT Machine Vision Sensor System |** Team Design Course Jan – Apr 2024

- Built a Raspberry Pi object detection system to identify large hazards in a theoretical hyperloop tunnel.
- Tested both pre-trained & custom models in TensorFlow, comparing effectiveness for hazard detection.
- Created a real-time hazard monitoring interface in HTML/CSS to display live detection feedback.

**Automated Fluid Dispenser |** Team Design Course Sept – Dec 2023

- Engineered a low-cost prototype fluid dispenser (<$50), for hands-free medicine distribution in free clinics.
- Designed a custom 5-gear gearbox for precise control over the fluid dispensing and storage mechanisms.
- Developed a 60s control loop in Arduino C to automate all dispenser components at the press of a button.

## Work Experience

**Teaching Assistant|** Measurement in Mechatronics Course Sept 2025 – Current

- Co-supervising 10 mechatronics labs, each with 100+ students.
- Answering electronic measurement theory questions & troubleshooting lab circuits.

**Lifeguard |** City of Toronto Jul 2023 – Aug 2024

- Supervised 200+ swimming patrons alongside other lifeguards across different depths of water.
- Instructed 50+ students (ages 5–50) weekly in beginner to advanced swim programs.
- Created individualized lesson plans for 5 classes, improving student proficiency by 20% over 9 weeks.