

Yacoub Derradji

(437) 986-1071 | yderradj@uwo.ca | [linkedin.com/in/yacoubderradji](https://www.linkedin.com/in/yacoubderradji) | London, ON

EDUCATION

Western University

Sept. 2024 – Apr. 2029 (Expected)

BESc, Mechatronic Systems Engineering, Dual in AI Systems Engineering

London, ON

- Cumulative GPA: **3.8 (Dean's Honour List)**
- Coursework: Dynamics, Mechanics of Materials, Manufacturing Processes, Fluid Mechanics, Heat Transfer, Computational Methods, Algorithms & Data Structures, Software System Design
- In progress: Introduction to Machine Learning (DS 3000)

EXPERIENCE

Research Assistant

May 2026 – Present

Advanced Robotics & Mechatronics (ARM) Lab, Western University

London, ON

- Redesigned a miniaturized planetary-gear magnetorheological (MR) clutch used as a per-joint actuator in a fully actuated multi-finger robotic hand, where one motor drives multiple clutches
- Traced a torsional shaft fracture and an unmanufacturable keyway to a shared root cause; resolved both by upsizing the shaft (1 to 2 mm) and adopting a D-profile shaft/bore coupling
- Relocated the electromagnetic coil radially outward while preserving clutch torque, justified from the magnetic circuit (magnetomotive force $N \cdot I$ is independent of coil radius) and by keeping the steel section that carries the flux
- Produced the full SolidWorks manufacturing drawing set under ISO 2768-m, catching and correcting a bearing-seat fit error during design review
- Ran multi-vendor sourcing across five manufacturing platforms, securing approved quotes for primary parts

Planning and Controls Developer

Oct. 2025 – Dec. 2025

Western Engineering Autopilot (WEAP)

London, ON

- Reduced full-system ROS 2/Gazebo simulation startup time by $\sim 85\text{--}90\%$ (3 min $\rightarrow$ 30 s) by implementing a structured launch architecture for the planning and control subsystems
- Integrated planning and control packages through coordinated topic publishing and deterministic startup sequencing, enabling repeatable simulation testing
- Extended a Python control console with live velocity control and safe shutdown for simulation testing

Electrical Team Member

Sept. 2024 – Mar. 2025

Western Formula Racing (FSAE)

London, ON

- Created the tractive system schematic and the tractive system connector pinouts for the team's electric race car

LEADERSHIP & ACTIVITIES

Mechanical Lead, BotBrawl Combat Robot Team

Sept. 2026 – Present

WE First Club, Western University

London, ON

- Lead mechanical design for the club's BotBrawl combat robot

General Member

Sept. 2025 – Apr. 2026

WE First Club, Western University

London, ON

- Designed and built the neck mechanism for Baker Bot, the club's humanoid robot (see Projects); took part in the club's Ri3D build

Open House Volunteer

Oct. 2025

Faculty of Engineering, Western University

London, ON

- Spoke with prospective students and parents about the engineering program and student life

PROJECTS

- Humanoid Robot Neck (WE First Club)** | *2-DOF Parallel Linkage, Onshape* Summer 2026
- Designed a compact 2-DOF neck for a torso-up humanoid robot: two 40 kg servos drive ball-jointed pushrods against a fixed-length rear stabilizing link, producing pitch when driven together and roll when driven differentially
 - Owned concept, Onshape CAD (off-the-shelf rod ends and custom 3D-printed mounts), bench prototyping, and fabrication; iterated from a standalone test rig to the final head mount
 - Integrated the neck on the robot, tested pitch motion, and handed off to the software and torso subteams
- Tendon-Driven Robotic Gripper** | *Tendon Actuation, Prototyping, Grasping* Sept. 2025 – Present
- Built a 3-finger gripper prototype: adapted an open-source finger design for rubber-band and string tendons, and designed a 3-servo palm with one finger opposing two
- Off-Road RC Vehicle** | *SolidWorks, Mechanism Design, Embedded Control* Dec. 2025 – Apr. 2026
- Designed the full vehicle in SolidWorks (chassis, modular FWD/4WD drivetrain, steering, suspension) and built it from mostly 3D-printed parts under tight size and budget limits, with no kit
 - Integrated Arduino control with motor drivers and servo steering; revised suspension arm lengths and steering knuckles in a second design pass
- Research Paper Summarizer** | *Python, SQLite, Pydantic, LLM APIs* 2026
- Built a Python desktop tool that summarizes research papers with an LLM, using a provider-agnostic backend (Ollama or Anthropic API), Pydantic data models, and SQLite storage
- CityLaunch (SE 2251 Course Project)** | *Java, REST APIs, UML* Winter 2026
- Co-developed a Canadian city recommendation system for engineering graduates that combines data from five APIs (Adzuna, GitHub, Statistics Canada WDS, OpenCorporates, Numbeo)
 - Designed the full UML class, activity, and sequence diagrams for the system

SKILLS

Mechanical Design: SolidWorks (CSWA), Onshape, GD&T, ISO 2768 Drawings, DFM, Shaft/Coupling & Bearing Design, Gear Trains, 3D Printing & Slicing

Actuation & Mechanisms: MR-Fluid Clutch Actuators, Magnetic-Circuit Reasoning, Linkage Design, Tendon Actuation, Servo Control

Electrical & Embedded: Arduino, ESP32, Motor Drivers, PWM Control, Schematics & Connector Pinouts, Soldering

Robotics & Simulation: ROS 2, Gazebo, MATLAB, Simulink

Programming & Tools: Python, C/C++, Java, SQLite, Git/GitHub, VS Code, MS Excel

AWARDS & CERTIFICATIONS

Certified SolidWorks Associate (CSWA)
Dean's Honour List, Western University
3rd Place, Western Engineering Competition, Junior Division (Nov. 2025)
Top 3 of 72 Teams, Ivey Case Competition (Mar. 2025)
Other: Member, Muslim Students' Association; Full G Driver's Licence