CONNOR JOHANSON

CONTACT

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EDUCATION

UNIVERSITY OF WATERLOO
2020 - 2025

- BASc in Mechatronics Engineering, Co-op - **Dean's Honours**

TECHNICAL SKILLS

Programming & Simulation

- Python
- C/C++
- MATLAB
- Simulink
- Java
- Git
- APIs
- Databases
- SolidWorks
- AutoCAD

Embedded & Hardware

- MCUs (ESP32, ARM Cortex, Arduino)
- Sensors & Actuators
- Bluetooth (BLE)
- CAN / LIN
- I2C / SPI
- Ethernet
- Motor Control

Control Systems

- PID
- State-Space
- Kalman/UKF
- System Identification
- Nonlinear & Multivariable Dynamics
- Youla Parametrization

Data & Signal Processing

- Signal Filtering
- Feature Extraction
- NumPy
- Pandas
- TensorFlow
- Keras
- Scikit-learn

RECOGNITIONS

- Graduated with Dean's Honours
- Term Distinction (multiple)
- UWaterloo President's Scholarship
- Capstone - Special Merit Award & Best Prototype Nomination
- Varsity Badminton Athlete - Most Improved & Rookie of the Year
- Canadian National University Badminton Championships - Gold (2024) & Silver (2025)

Passionate mechatronics engineer specializing in **sensor fusion**, **control systems**, and **embedded development**. Skilled in designing and integrating **hardware/software systems** to extract actionable insights from sensor data, with applications in **wearable technology**, **position tracking and control**, and **automation**. Recognized for **critical thinking**, **adaptability**, and **collaborative leadership**.

WORK EXPERIENCE

Antenna Positioner Design & Integration — May 2024 - Aug 2024
UWaterloo EmRG Lab — *Waterloo, ON*

- Developed a motorized dual-axis antenna positioner by integrating motors, drives, power electronics, and control hardware.
- Designed MATLAB-based control software achieving repeatable angular positioning within ±0.5°.
- Delivered cost-effective solution ($800) approaching the performance of $15,000 commercial alternatives, now actively used in lab.

Manufacturing Product & Test System Engineering Designer — Sep 2023 - Dec 2023
Ford Motor Company — *Waterloo, ON*

- Devised a validation procedure to analyze ECU manufacturing test stations, reducing assessment time significantly.
- Collaborated with engineers to troubleshoot functional hardware, RF signals, and software integration issues.

Research Support & Web Development — Jan 2023 - Apr 2023
UWaterloo VIP Lab — *Waterloo, ON*

- Developed automated research lab website (vip.uwaterloo.ca) and performed SAR data acquisition/analysis.

PROJECTS

Rally and Rehab - Award-Winning Capstone — Sep 2023 - Dec 2023
Wearable Motion-Tracking System — *ESP32, Bluetooth (BLE), IMUs, Python*

- Led team and developed a sleeve embedded with IMU sensors for racket sport biomechanical analysis.
- Implemented Bluetooth Low Energy communication and embedded software on ESP32-S3 for continuous data streaming.
- Applied Kalman filtering, feature extraction, and database integration to deliver real-time and historical performance dashboards.

Doppler-Based Vehicle Speed Estimation — Feb 2025 - Apr 2025
Signal Processing & ML — *Python, MATLAB, TensorFlow/Keras*

- Processed audio recordings of passing vehicles, generating mel spectrograms and identifying Doppler shifts.
- Trained CNN models for speed prediction with average error of 2.7 km/h.

Inverted Pendulum Ball-on-Beam Control — Sep 2024 - Dec 2024
Dynamic System Modeling & Control — *MATLAB, Simulink*

- Modelled nonlinear behaviour and applied discrete control techniques to create a cascaded digital control system.