Josh Westlake

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A dedicated and results-driven 3rd Year Mechatronics and Robotics Engineering student at Queen's University passionate about innovative robotics technology.

Education

BASc, Queen's University

- Bachelor of Applied Science - Mechatronics and Robotics Engineering
- Anticipated graduation in Spring 2027

Achievements

Dean's Scholar Distinction
GPA: 3.74

Technical Skills

- **Languages:** C/C++, Java, Python, MATLAB, Assembly, VHDL, HTML+CSS, Ladder Logic, Structured Text
- **Development Tools:** Arduino IDE, ROS, Gazebo, Pac-Machine Edition
- **Design Tools:** SolidWorks, Inventor, Blender, Fusion 360, Revit, LTSpice, SAP2000

Experience

Teaching Assistant – APSC 142, Queen's University   Jan 2025 - Present

- Delivered instructional support to over 150 first year engineering students, guiding them through fundamental programming concepts in **C**.
- Facilitated weekly lab sessions, promoting hands-on learning and practical application of course materials.
- Evaluated assignments, projects, and labs ensuring accurate grading with constructive feedback to enhance student understanding.

Hardware Team Lead, Queen's Autodrive   Sept 2024 – Present

- Led a cross-functional team of mechanical and electrical engineers in designing and installing key vehicle components, including sensor suites, HMI mounts, and AV mode indicators, enhancing system reliability and driver accessibility.
- Collaborated with perception sub-team to determine the desirable orientation of sensory components, which was further optimized using **MATLAB Simulations,** resulting in an increase of over 10° in the FOV compared to the previous year.
- Utilized **SolidWorks** for the design and development of the prototypes, ensuring compliance with official SAE standards through thorough **FEA** and **GD&T analyses.**
- Led the assembly process of the final sensor mount, enhancing functionality and precision through the integration of **3D printed** sensor mounts, proficient sheet metal fabrication and utilizing aluminum extrusions.

SCADA Summer Student, Durham Region   Summer 2023, 2024

- Assisted in the comprehensive maintenance, support, and deployment of Supervisory Control and Data Acquisition (SCADA) Systems, ensuring seamless operations across water and wastewater facilities in the Durham region.
- Collaborated with multidisciplinary teams to design and implement SCADA system upgrades and expansions, optimizing process performance and scalability.
- Independently developed and implemented Programmable Logic Controller Programs using Ladder Logic, Functional Block Diagrams, and Structured Text, resulting in more robust and reliable system operations.
- Demonstrated expertise in handling software and hardware components related to industrial and engineering domains, including PLC, RTU, HMI, OIT, and UPS Systems.
- Created comprehensive documentation for SCADA systems, including system configurations, operational procedures, and component inventory, using **Microsoft Suite** for effective communication and knowledge transfer across teams.

Hardware Team Member, Queen's Autodrive   **Sept 2023 – Aug 2024**

- Collaborated with **cross-functional teams** of Mechanical, Electrical, and Mechatronics Engineers to conceptualize and implement sensor mounts for LiDAR, Cameras, and SAE Blue Light for autonomous vehicles.
- Contributed to the development process of the roof-mounted sensor mount assembly, serving as the primary interface between the vehicle and sensory devices, thereby improving data accuracy and reliability.
- Contributed to the assembly process of the final sensor mount, enhancing functionality and precision through the integration of 3D printed sensor mounts, proficient sheet metal fabrication, and utilizing aluminum extrusions.
- Implemented rapid prototyping techniques such as **3D printing** to transform conceptual designs into functional models, significantly reducing development time.

Autonomous Systems Engineer, Queen's aQuatonomous   **Nov 2023 – Apr 2024**

- Played a pivotal role within a team dedicated to developing autonomous surface vessels (ASVs) for the RoboBoat Challenge, an international competition promoting maritime robotics for various applications, including environmental monitoring, research, and rescue missions.
- Investigated and implemented advanced path planning algorithms such as A* and D* Lite, optimizing route planning and decision-making processes to enhance the autonomy and efficiency of the ASV's navigation system.
- Leveraged **ROS2** and **Gazebo** simulation environment to iteratively refine autonomous behaviors and validate system performance in simulated scenarios.
- Adapted to various roles and responsibilities, from algorithm development to simulation testing, effectively addressing the diverse needs of the project.

Customer Service Associate, Lowe's Canada   **May 2021 – Aug 2023**

- Anticipate and address customer needs, and provide timely and satisfactory solutions, while building positive relationships, enhancing customer satisfaction and loyalty.
- Consistently met or exceeded sales targets through proactive engagement and solution-oriented service.

Relevant Coursework

MECH 350 – Automatic Controls
- Design and analysis of control systems, including feedback, stability, and dynamic modeling.

ELEC 371 - Microprocessor Interfacing and Embedded Systems
- Microprocessor architecture, embedded systems programming, and hardware interfacing.

ELEC 274 – Computer Architecture
- Design and organization of computer systems; including CPU architecture, memory systems, and input/output devices.
- Introduces assembly language programming, including instruction set architecture, assembly code development, and low-level system interaction.

MREN 318 – Sensors and Actuators
- Principles and applications of sensors, actuators, and signal integration in mechatronic systems.

ELEC 271 – Digital Systems
- Design and Analysis of Digital Systems using Logic Gates, Sequential Circuits, and Programmable Logic Devices

MREN 241 – Fluid Dynamics & Fluid Power
- Explores the principles of fluid mechanics, including fluid flow behavior, conservation laws, and fluid power

MREN 230 – Thermodynamics and Heat Transfer
- Highlights principles of thermodynamics, including energy transfer, thermodynamic cycles, and heat transfer processes

APSC 143 – Intro to Computer Programming
- Introduces basic programming concepts with a focus on C programming, including data types, control structures, functions, arrays, and pointers.

CISC 235 – Data Structures and Algorithms
- Explore foundational concepts and techniques for organizing and processing data efficiently, essential for developing optimized algorithms in Python.

APSC 162 – Engineering Graphics
- Explore comprehensive engineering technical drawing techniques, CAD software skills, and Tolerancing

ELEC 353 – Electronics II
- Advanced analog and digital circuit design, including amplifiers, filters, and PCB implementation.

ELEC 252 – Electronics I
- Fundamentals of electronic devices, circuits, and systems; Including semiconductors, amplifiers, and rectification.

MREN 223 – Signals and Systems
- Explores the analysis and processing of continuous and discrete-time signals and systems.

ELEC 221 – Electrical Circuits
- Explores principles of circuit analysis, including Ohm's Law, Kirchhoff's Laws, and analysis of AC and DC circuits.

MECH 221 – Statics and Solid Mechanics
- Introduces the principles of static equilibrium and the mechanics of materials, including stress, strain, and elasticity.

MECH 229 – Kinematics and Dynamics
- Introduces fundamental concepts in engineering mathematics and their practical application using MATLAB, empowering mechatronics engineers with computational tools for analysis, simulation, and problem-solving.