

William Hatcher

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EDUCATION

Queen's University, Bachelor of Engineering Science – Computer Engineering 2021-2026

- Dean's List 2021-present and GPA to date **3.92**
- Notable courses:
 - Digital Systems | Computer Architecture | Data Structures | Autonomous Robotics | Object Oriented Programming | Microprocessor Systems | Operating Systems | Algorithms | Safety Critical Software Engineering | Machine Learning | Computer Vision

Nanyang Technological University - Semester Abroad January – May 2024

- Notable courses:
 - Software development | Database Systems | Computer Networks

TECHNICAL SKILLS

- **Languages:** C | Python | Java | HTML | CSS | VHDL | Assembly | Bash | YAML
- **DevOps & Automation:** Git | CI/CD | Docker | Ansible | Pytest
- **Communication Protocols:** UART | CAN | I2C | SPI
- **Debugging and Testing Tools:** JTAG | GDB | PCAN-USB | Serial Debugging
- **Operating Systems:** Linux (Ubuntu) | Windows (10/11) | macOS
- **Embedded Systems:** Arduino (ARM) | Raspberry Pi (Linux) | FPGA

WORK EXPERIENCE

Queen's University, Engineering Department – ePOWER September 2025 - Present

Undergraduate Research Assistant – Software Lead

- Designed and implemented a **Zephyr RTOS**-based embedded sensing platform on **Nordic nRF52** microcontrollers for a research **lysimeter** system, integrating **9** digital and analog environmental sensors.
- Designed a modular sensor abstraction layer supporting digital (**I²C**) and analog (**SAADC**) inputs with calibrated physical unit conversion.
- Built a **Bluetooth Low Energy (BLE) GATT** service for real-time wireless transmission of packed sensor telemetry, supporting notifications, custom UUIDs, and low-power periodic sampling.
- Coordinated periodic sampling and communication using Zephyr work queues and **kernel scheduling primitives**.
- Led sensor bring-up and debugging, resolving hardware, protocol, and timing issues for reliable field operation.

Geotab, Embedded Engineering Department

May 2024-August 2025

Embedded Engineering Intern – Quality and Test Automation

- Working with a large team to improve **hardware-in-the-loop** testing framework
- Designed and implemented a custom, **multi-threaded TCP/IP** serial communication protocol in **C** and **python** for a Linux-based embedded system, leveraging **POSIX threads**, **semaphores**, and **mutexes** for concurrent client connection management and thread-safe data handling
- Architected and deployed **26 HIL** test stations, expanding test capacity by over **10x**; each station integrates **5 embedded DUTs** interfaced through multiple communication buses including **GPIO**, **CAN**, **ADC**, and **UART/serial**, via **Raspberry Pis**
- Developed **automated smoke test** suites using **Pytest**, integrated with **CI/CD** pipelines to ensure continuous monitoring and fault detection across all hardware interfaces

- Owned the **end-to-end** configuration for dozens of physical test rigs, defining hardware specifications, IP reservations, and device capabilities in **version-controlled** configuration files
- **Presented** to **60+** students about internships, university options and early career tips during Bring Your Kid to Work Day to inspire interest in technology and professional development
- Led the technical onboarding process for new team members, enabling quick and effective team integration
- Performed technical interviews to evaluate candidates for multiple positions within the team

Queen's University, Engineering Department

2023, 2025

Teacher's Assistant Introduction to Programming for Engineers(2023) – Operating Systems(2025)

- Held weekly office hours to assist students in completing assignments
- Helped students gain a solid understanding of the C programming language from the basics of coding to pointers and dynamic memory allocation
- Assisted students with Linux OS labs involving kernel module development, user-space shell programming, producer-consumer synchronization using pthreads, and /proc-based process inspection.
- Provided hands-on debugging support for C, bash, and x86-64 concepts including stack memory, race conditions, and system call usage.

Queen's Esports Association

Co-President & Director of Competitive Esports

April 2024-Present

- Led executive operations for a **500+** member student organization
- Supervised a leadership team of **20**, including 10 Game Directors, 5 Marketing staff, and 5 Community Coordinators
- Oversaw financial planning and managed a **\$10000** budget for competitions, equipment, and promotional campaigns; collaborated with university administration and external sponsors to secure funding and institutional support

PROJECTS

Queen's University, Engineering Department

Anti-theft Package Security System

- Collaborated with a team to research, architect, and implement a smart anti-theft package security system utilizing **Arduino microcontroller** hardware and embedded C/C++ development
- Solely responsible for developing firmware to interface with multiple hardware components, including an **ultrasonic distance sensor** (HC-SR04) for proximity detection, **RFID** module (ISO/IEC 14443) for secure activation via radio-frequency identification cards, and a Wi-Fi-enabled IP camera for remote visual monitoring using **ESP8266/ESP32** modules and **MQTT** communication protocol
- Integrated sensor data acquisition, **interrupt-driven** event handling, and real-time system control using **I2C** and **SPI** communication protocols on the **Arduino** platform
- Designed secure, low-latency wireless communication workflows for alert notifications and remote system access, leveraging **TCP/IP** stack over Wi-Fi
- Delivered a comprehensive technical presentation detailing system architecture, embedded code design, and sensor integration, earning a finish in the top **5%** of the class cohort