

Sydney Yang

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Skills

Software: C, C++, Python, C#, MATLAB, RTOS

Interfaces/Protocols: SPI, UART, I2C, CAN, I2S, TCP/IP, UDP, HTTP, RS-232, SCPI, Protobuf

Tools: Altium, KiCAD, Oscilloscope, DMM, Signal Generator, Power Supply, LTSpice, NI, Intrepid

Experience

Software Developer Intern

Sep 2025 – Dec 2025

Ford Motor Company

Waterloo, ON

- Developed low-level driver libraries in **C#** for automated hardware test stations, enabling **electrical, RF, audio, and network validation** for production TCUs.
- Optimized test sequence software for **2G-5G validation and RF** calibration, redesigning library integration to **reduce test times by 80% to <1 minute**.
- Identified and resolved logic error in **FFT differential audio signal analysis** correcting a **2x amplitude discrepancy**, validated with **signal generator** and **oscilloscope**.

Firmware Lead

Feb 2026 – Present

Waterloo Space Research Team

Waterloo, ON

- Architecting embedded payload system for a CubeSat space debris imager (SOBER), using **visible and IR cameras** on **STM32** communicating with an **ARM** processor TI RM46 controlled OBC over **I2C**.
- Conducted OBC capability review, analyzing **SPI vs. I2C** bus, **DMA** availability, and CPU time.

Embedded Flight Software Member

Jan 2025 – Dec 2025

Waterloo Aerial Robotics Group

Waterloo, ON

- Implementing FIFO buffering and watermark interrupts on **IMU** driver using **STM32 and SPI**, which enabled **1 kHz** sensor acquisition, **reducing data loss for AHRS and acceleration collection by 10% to <1%**.
- Programmed low-latency motor control on an STM32 in **C** to support testing of drone movement, mapping potentiometer input into digital **PWM** values via **SPI protocol** and ADC with 0.3 millisecond resolution.
- Architected battery fail-safe system in **C++**, developing interfaces for embedded, telemetry, and ground station communication for **autonomous drone**.

Data Analyst Intern

Jan 2025 – Apr 2025

Treasury Board Secretariat of Ontario

Toronto, ON

- Analyzed fiscal constraints by cleaning multi-year capital planning data in **Python** with **PANDAS**, producing automated variance checks and visual summaries that reduced manual review time by over **30%**.
- Automated CAPEX and OPEX calculations for school boards by building **Python** scripts that validated financial inputs and flagged funding envelope deviations, caught **8 discrepancies worth \$40,000**.

Projects

Transit Tracker LED Matrix | C++, ESP32, FreeRTOS, Protobuf, HTTP

Nov 2025 – Jan 2026

- Developed firmware for LED display in **C++** to show arrivals every 30s with **DMA**, and **RTOS multi-threaded concurrency** on dual-core MCU, eliminating blocking behavior.
- **Reduced peak RAM usage by 30%** by streaming **protobuf** decoding over **HTTP** with early-exit logic.

Automatic Tracking Turret | C, UART, ESP32, FreeRTOS, OpenCV

Nov 2025

- Built a **FreeRTOS**-based tracking turret on ESP32, integrating OpenCV with **UART**, enabling **<1ms command and <1s person-tracking latency**.
- Implemented **2-axis servo control using MCPWM at 50 Hz**, mapping $\pm 90^\circ$ motion with **$\pm 5^\circ$ fine-step adjustments** to prevent mechanical overshoot during tracking.

Education

University of Waterloo

Candidate for Bachelor of Applied Science in Systems Design Engineering

Waterloo, ON

Sep 2024 – Apr 2029