Hossein Molavi

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Education

University of Waterloo — Waterloo, ON
Bachelor of Applied Science in Computer Engineering (Honours, Co-op) — Sept 2021 – Aug 2026 (Expected)
- **Relevant Courses:** Real-Time OS, Microprocessors, Computer Architecture, Systems & Concurrency, DSP

Technical Skills

Languages: C, C++, Python, Bash/Shell, Verilog, ARM Assembly, Java
Hardware/MCUs: STM32, ESP32, nRF, Arduino, ARM Cortex-M, PIC16F887, Raspberry Pi
Protocols: Bluetooth Classic/LE Audio, NFMI, I2C, SPI, UART, CAN, MQTT, USB, TCP/IP
Tools: FreeRTOS, Zephyr, GDB/JTAG/J-Link, CMake/Make, Git, Docker, AWS IoT Core, PlatformIO, KiCad, Linux
Testing: CppUTest, gcov, Pytest, Ellisys BT Analyzer, hardware-in-loop testing

Experience

onsemi — Waterloo, ON
Wireless Developer — Sept 2025 – Present
Contractor *(Apr 2026 – Present)*
- Extended NFMI driver robustness, debugging additional DMA and timing race conditions affecting received audio integrity on the RSL20 Hearing Aid platform.
- Built a self-validating AI agent pipeline (CMake, J-Link), new to the team, that drives a Jira ticket through code generation, concurrent multi-device build and flash, on-target serial-log and unit-test validation, then PR submission; cut routine task turnaround from 1-2 days to roughly 15 minutes.

Intern *(Sept 2025 – Apr 2026)*
- Hardened NFMI driver by resolving DMA race conditions, and built wireless audio interfaces (HFP/A2DP) with mSBC/CVSD codecs.
- Engineered BinauralManager with ACK-based retransmission, and achieved 100% code coverage via 580+ unit tests (CppUTest/gcov).

Asymptote Labs Inc – Anti-Drone Defense Systems — Waterloo, ON
Co-Founder & Firmware Lead — Apr 2025 – Present
- Led a team of 5 engineers to build a real-time computer-vision turret integrating YOLO detection with precision motor control
- Designed 4-byte UART protocol with state-machine parsing for low-latency Python-to-Arduino commands
- Engineered converging control system converting pixel offsets to stepper pulses via FOV-calibrated mapping

Wrmth Corp. — North Bay, ON
Embedded Firmware Intern — Jan 2025 – Apr 2025
- Engineered ESP32 C firmware integrating secure BLE/Wi-Fi via MQTT/AWS IoT Core, and architected OTA updates within 512KB RAM.
- Resolved critical memory leaks by debugging race conditions utilizing JTAG and ESP-IDF memory analysis tools.

Midnight Sun Solar Car Team — Waterloo, ON
Embedded Systems Programmer — Aug 2023 – Dec 2023
- Engineered hardware-in-loop test infrastructure and implemented FreeRTOS wrappers for tasks, semaphores, and queues.
- Implemented DMA-driven multi-channel ADC on STM32F1 with FPU acceleration, reducing codesize by 15%.

Projects

Real-Time Operating System | *C, ARM Assembly, STM32*
- Built preemptive RTOS with EDF scheduling, PendSV/SVC context switching, and 32KB buddy allocator
- Supports 16 concurrent tasks with priority-based preemption and interrupt-driven lifecycle management

RideSafe – Bike Safety System | *ESP32-S3, BLE (NimBLE), FreeRTOS, SPI/DMA*
- Built dual-MCU cyclist awareness system with BLE communication, radar sensors, LCD, and haptic feedback
- Implemented DMA-enabled SPI display driver at 80MHz with thread-safe FreeRTOS mutex synchronization

NVS Config (Open Source) | *C, ESP-IDF*
- Published ESP-IDF component providing macro-based type-safe APIs, built-in access control, and auto-save for production firmware.