Hewitt McGaughey

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SKILLS

Languages: C, C++, Python, Rust, ARM Assembly, Linker script, MATLAB
Tools: Bazel, GDB, CMake, Wireshark, Hyperfine, Git, Bash, Vim
Technologies/Frameworks: FreeRTOS, Linux/POSIX, Zephyr, Docker

WORK EXPERIENCE

Applied Intuition **Mountain View, California, USA**
Software Engineer *September 2024 – Present*

- Wrote FreeRTOS-based C firmware for ARM Cortex-M7/R52 and Infineon Tricore TC3xx.
- Wrote C++ systems software for POSIX platforms, including Qualcomm 8255 and Nvidia Jetson Orin.
- Designed and owned a cross-platform diagnostics stack (FreeRTOS and QNX) over CAN and Ethernet.
- Profiled and optimized firmware platform for a 23% CPU usage reduction. Included redesign of CAN stack.
- Built cross-device USB update functionality across embedded Linux platforms using RAUC and Nginx.
- Designed a segfault reconstruction mechanism for Cortex-M7 persisting RTOS state and CPU registers to flash, enabling GDB-readable, thread-aware core dumps.
- Implemented sequencing of Ethernet switch OTA updates between firmware and QNX computes.
- In Python, built observability tooling for firmware: CPU load, CAN status, test routine execution.

Tesla **Palo Alto, California, USA**
Firmware Engineering Intern (Body Controls) *May 2023 – August 2023*

- Wrote high-performance DMA UART firmware enabling Cybertruck lighting animations on all exterior lights.
- In C, implemented step-tracking algorithm for SPI stepper motor driver, eliminating positional drift.
- Added performance metric reporting functionality to LIN driver; now deployed across all Tesla platforms.

Parallel Systems **Los Angeles, California, USA**
Software Engineering Intern *January 2023 – April 2023*

- Wrote Rust software running on an Nvidia Jetson Orin to govern the operation of a self-driving electric train.
- Wrote PID controller allowing for 5% increased range via progressive restriction of charge current.
- Integrated LZ4 compression into TCP telemetry stream, leading to a 7x reduction in bandwidth usage.

Splunk **Toronto, Ontario, Canada**
Software Engineering Intern *May 2022 – August 2022*

- In C, wrote firmware for a Nordic nRF52840 to report a variety of sensor readings over BLE.
- Wrote full-stack Python code for an Embedded Linux device to forward environmental sensor readings.
- Added redundancy to software update process, using MQTT to gracefully detect and handle failures.

EDUCATION

University of Waterloo **Sept. 2019 – May 2024**
Bachelor of Applied Science, Mechatronics Engineering *Waterloo, Ontario, Canada*
Computing Option · 87% average (3.9 GPA)

PROJECTS

Firmware Subteam Project Lead, Midnight Sun Solar Car Team

- From 2019 to 2023, wrote C firmware to control a solar car using STM32F407 microcontrollers.
- Led firmware development for power selection and motor controller interface boards.
- Developed low-level drivers for various ICs, incl. MCP2515 CAN controller and BTS7200 load switch.

Cymric RTOS

- In C, wrote a real-time kernel supporting fixed-priority pre-emptive task scheduling.
- Hand-wrote Cortex-M4 context switch implementation using ARM assembly.