Luke Tao

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https://github.com/tao-luke

Skills

Languages
- C, C++, Rust, Python

Tools and Frameworks
- GDB, V4L2, Bazel, CMake, Valgrind, Matlab, CMock

Work Experience

Tesla, Autopilot Core Software Engineering Intern — Palo Alto, California | 01/2024 – 05/2024
- Developed and integrated drivers for new **Autopilot** camera sensing SoCs and IPs.
- Implemented kernel features in **C** to enhance autonomous driving capabilities.

Tesla, Vehicle Simulation Software Engineering Intern — Palo Alto, California | 01/2023 – 04/2023
- Created continuous, behavior-based assertion features for model validation in over **50** safety-critical vehicle firmware components.
- Integrated a simulation backend with open data transformation using **Rust**, **Polars**, and **PyO3**, enabling flexible signal processing for **RTOS** validation.

Sibros, Firmware Engineer Intern — San Jose, California | 09/2022 – 12/2022
- Designed a heuristic-based **MQTT** packet transmission protocol in **C++**, increasing MTU utilization by over **204%** across 10,000 executions.
- Extended core product to support CAN multiplexer signal logging, allowing OEMs to trace complex **CAN DBC** data remotely with confidence.

Research

High-Performance User-level Threading, Undergraduate Research Assistant — 04/2022 – 09/2022
- Integrated **LTTng** for non-intrusive tracing (<=2% CPU cycles) of synchronization primitives and user threads in massively-concurrent systems, facilitating direct comparison against theoretical performance bounds.

Projects

TheOS — 09/2023 – 12/2023
- Developed an **RTOS** and its microkernel in **C** and **ARM assembly**, supporting context-switching, scheduling, and interrupt handling for managing a train system on a Raspberry Pi.

Waterloo Rocketry, Intercollegiate Rocket Engineering Competition — 04/2022 – 12/2022
- Embedded various sensor peripherals onto PIC micro-controllers using **C** to support rocket load delivery.
- Managed and triaged technical tasks to meet competition deadlines.

Education

Honours Bachelor of Computer Science, **University of Waterloo** — 09/2019 - 04/2024
- **Relevant Courses**: Real-Time Operating Systems, Computer Security and Privacy, Computer Networks, Operating Systems, Data-Structures, Algorithms
- **Awards**: Duke of Edinburgh's Award Gold, President's Research Award, President's Scholarship of Distinction