Clive Fellows

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Work Experience

Independent Consultant May 2025 — Present
Aston Dynamics Canada LTD *Toronto, ON*
Intelligent wireless trailer braking systems.

- Lead a 3-person firmware team: break product requirements into scoped work, own architecture, review PRs, interview candidates, and drive integration with the electrical team.
- Write control board firmware in sync/async Rust with generated ESP-IDF C bindings, defining firmware's peripheral requirements and reviewing IC selections with the electrical team.
- Implemented the iOS/Android app's BLE layer as a Rust library exposed to React Native via UniFFI-generated turbo module bindings, enabling cross-product logic sharing.

Testing & Development Intern May 2024 — May 2025
Aston Dynamics Canada LTD *Toronto, ON*

- Led firmware in a three-person team (electrical, controls, firmware) to transition the brake controller from Australia to Canada; identified app team coordination gaps and established recurring meetings and a GitHub issues system.
- Designed BLE streaming protocol for OTA firmware updates, reducing transfer time from 3 minutes to 30 seconds; built webserver backend (Rust Axum, React, Docker).
- Led RF and EMC certification research across US, Canadian, and Australian/NZ regulatory bodies; discovered the original hardware would be prohibitively expensive to certify and selected the ESP32-C6 as a pre-certified replacement.

Innovation Management Intern May 2023 — Aug 2023
CN Rail *Toronto, ON*

- Developed Electron desktop app for parsing wearable safety program logs, visualizing incident conditions on a Google Maps heatmap, and analyzing patterns across yard locations. Served as technical liaison to external engineering partners.

Projects

Maze Rover (MIE444 Course Project) (clivefellows.com/projects/mie444-rover) Sep 2025 — Dec 2025
Autonomous rover with LIDAR-based localization and sensor fusion for maze navigation.

- Implemented LIDAR localization with DFT and occupancy grid matching; 2cm accuracy with no cumulative drift (absolute fix per frame); Kalman filter with IMU for jitter smoothing
- Developed embedded control system using OS threads for I/O and computation, with Rust async runtime for control logic
- Achieved the fastest autonomous navigation in course, completing milestone 2 in 25 seconds within a 5-minute limit, using A* path planning and proportional control

UTFR Wireless CAN Telemetry (clivefellows.com/projects/wireless-telemetry) Sep 2025 — Apr 2026
Live CAN bus telemetry for a Formula SAE electric race car, streamed over BLE to a pit-side base station.

- Diagnosed mobile BLE stack as throughput bottleneck; redesigned to a fully embedded pipeline and optimized connection intervals and packet timing, achieving 720kbps (8× over 88kbps baseline, near practical 1M PHY limit of 771kbps)
- Hybrid async/RTOS firmware architecture: async tasks for CAN and BLE drivers, RTOS threads (actor pattern) for SD logging and USB serial bridge to base station
- Rust/Docker base station bridges CAN frames to MQTT and Grafana, advertised on the pit LAN via mDNS

CollabCAD (clivefellows.com/projects/collabcad) Nov 2023 — Present
Cloud-based sync software for sharing large binary files (e.g., CAD).

- Built desktop app (Dioxus/Rust) and website (React/Rust Axum) with RESTful API for file synchronization
- Managing 180+GB of CAD and Sim files for 150 users across UTFR's UT25 and UT26 seasons

Education

University Of Toronto Toronto, ON
Bachelor of Applied Science *September 2021 — April 2026*

- Mechanical Engineering + Robotics and Mechatronics Minor + Engineering Business Certificate

Skills

- **Languages**: Rust, JavaScript/TypeScript, HTML/CSS, C/C++, Python
- **Tech**: Git, Linux, Docker, ESP-IDF, SvelteKit, React, React Native, UniFFI, Axum, STM32Cube, BLE, CAN, SPI, I2C
- **Practices**: TDD, bare-metal development, real-time constraints, async programming
- **Certifications**: DELF B2 (French language proficiency, 2024)