Jack Nystrom

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Education

University of California Santa Cruz **Anticipated Graduation: June 2027**
B.S. in Computer Science | Electrical Engineering Minor GPA: 3.88
Coursework: Computer Architecture, C Programming, Computer Systems and Assembly, Data Structures and Algorithms

Experience

FSAE Electric Team, Formula Slug | Firmware Lead *Santa Cruz, CA* | **September 2024 – Present**

- Lead racecar firmware design, including battery management, throttle control, data logging, & CAN bus architecture
- Enabled team to pass inspection and compete for the first time by fixing throttle control bugs at 2025 competition
- Caught design mistakes with 2026 BMS in isoSPI and cell balancing circuits, allowing timely battery completion
- Improved lap times and drivability by developing a traction control algorithm using data from IMU, wheel speed, and motor controller to prevent tire slip and ensure traction during acceleration
- Teach dozens of members skills to collaboratively design racecar electrical system, firmware and PCBs
- Improved vehicle reliability by eliminating dynamic memory allocations in firmware and enforcing non-blocking I/O
- Implemented a C++ interop layer for embedded Threading and UART APIs, enabling usage of new IMU in our RTOS

Zero Motorcycles | Software Intern *Scotts Valley, CA* | **June 2025 – Present**

- Develop customer-facing motorcycle debugging software, enabling successful 1.0 release to bike dealers
- Improve reliability and implement new features in CAN communication, ECU firmware updates, cloud integration, and Flutter UI development
- Develop CI/CD infrastructure and internal tooling to streamline testing and development of the diagnostic software

Electronics Workshop | Course Development Volunteer *Albany, CA* | **August 2023 – June 2024**

- Assisted creating new Electronics Workshop high school course, leading curriculum and project design
- Enabled class projects by developing the MicroPython libraries for motor controller, IMU, distance and color sensors
- Authored 3,000-word course documentation detailing all hardware and software used, requested by teachers

Projects

Telemetry Peripheral PCB (Formula Slug) **November 2024 – June 2025**

- Developed Telemetry PCB for data acquisition in KiCad, with AVR microcontroller and SPI-based CAN controller
- Created a C driver from scratch for the MCP2515 CAN controller w/ AVR's HAL. Implemented full SPI instruction set
- Designed strain gauge amplifier and frequency-to-voltage converter to process sensor data in small form factor

STM32 Board Template (Formula Slug) **June 2025 – September 2025**

- Created STM32 design template and PCB, enabling our transition away from Nucleo development boards and reducing board size and cost from previous years
- Implemented switching DC-DC converter, LDO, CAN transceiver, and a high-spec and affordable STM32
- Developed custom MbedOS board targets for all racecar PCBs, allowing a pure-CMake build system for firmware

Data Visualization Stack (Formula Slug) (link) **September 2024 – Present**

- Developed telemetry and data visualization systems, providing instant and accessible insights for team members
- Created full-stack pipeline, from C++ data logging firmware to high-performance browser visualizations in React
- Designed custom columnar binary data logging format, enabling easy on-car decoding of CAN into data tables

Minecraft Mods (link) **August 2020 – June 2022**

- Added bug fixes, rendering improvements, gameplay features, and UI enhancements to Minecraft via client-side modifications written in Java
- Gained over 16 thousand downloads and hundreds of positive reviews on CurseForge

Skills

Areas: Software Engineering, Embedded Programming, PCB Testing, Digital/Analog Circuit Design
Programming Languages: C, C++, CMake, Python, Rust, Lua, Java, Bash, JS/TS
Digital Protocols: CAN, I2C, SPI, UART, USB, 1Wire
Tools: Oscilloscope, Multimeter, Waveform Generator, Logic Analyzer, Power Supplies, ADC&DAC, THT&SMT Soldering
Software: KiCad, Git, Linux, GDB, Docker, CLIs, Nix