Nicholas Tang

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Portfolio — GitHub — LinkedIn

Summary

Embedded firmware engineer with hands-on experience developing safety-critical systems in C/C++ for electric vehicles. Built STM32 firmware for PID-based traction control and regenerative braking, with robust communication over CAN and UART. Strong focus on low-level systems, real-time constraints, and hardware–software integration.

Education

UC Santa Cruz Sept 2024 – Jun 2027
B.S. Computer Science, EE Minor GPA: 3.95

Experience

Formula Slug (Formula Society of Automotive Engineers) @ UC Santa Cruz Sept 2024 – Present
Firmware Engineer (C++)

- Developing firmware for a custom electric vehicle for the FSAE international collegiate competition.
- Implemented automatic lap counting using GPS data from CAN bus with accuracy of ±10 meters.
- Managed 10 MHz UART communication with VN-200 for performant IMU and GPS data acquisition.
- Developed firmware for regenerative braking and PID-based traction control on STM32 MCUs.
- Utilized MbedOS RTOS, CMake, and Ninja for building and flashing to ARM-Cortex M cores.
- Engineered safety-critical power delivery systems, implementing LV undervolting detection and relay actuation.

UCSC Earth and Planetary Sciences Jun 2025 – Present
Planetary Cloud Tracking Research (C/C++)

- Exploring computer vision algorithms to track wind patterns on Jupiter and other planetary atmospheres.
- Exposure to and translation between HDF5, NetCDF, TIFF, etc.
- Using CMake to manage complex, large-scale projects
- Implementing image/signal processing algorithms in C
- Solving Euler-Lagrange equations with numerical integration

Projects & Other Experience

NASA's Professional Development Program (NPWEE) June 2025 – Aug 2025
Lead Systems Engineer

- Worked on mid-air battery swap infrastructure for electric planes.
- Spearheaded design and writing for the final proposal of 7 pages.
- Researched airspace management and aviation systems; workforce development program.
- Collaborated on a team of 12.

Musical Auto-Transcribe DSP Dec 2025 – Present

- Turns audio files into human readable musical notation
- Applying FFT algorithms, Hann windowing, and general signal denoising

WindowWise — ACMHacks (Node.js, Python) Oct 2024

- Enables passive cooling systems instead of HVAC by solving heat equation
- Optimizes climate control while reducing energy waste by 100%.

Three-Body Problem Simulator (Python) 2025

- Built a numerical physics engine simulating gravitational interactions of three bodies in 2D.
- Implemented ODE solvers and visualization of orbital trajectories.

Leadership & Activities

Formula Slug — Software + Firmware Engineering Member
Association for Computing Machinery (ACM) — Member
Google Developer Groups on Campus — Former Instruction Officer, Workshop Organizer

Skills

Languages:	C/C++, Python, Java, MATLAB, Node.js, Bash
Embedded/HW:	RTOS (MbedOS), STM32, CAN bus, UART, SPI, KiCad, Oscilloscopes
Tools/DevOps:	Git, CMake, Ninja, Docker, Valgrind, GNU Make, GDB, Vim
Math/Theory:	DSP, FFT, Numerical Integration, ODE Solvers, PID Control
AI/Productivity:	LLM Prompt Engineering (Copilot, Gemini, Grok), Technical Documentation