Richie Chen

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Education

University of California, Los Angeles – B.S. Electrical Engineering — Expected Jun. 2029
Los Angeles, CA — GPA: 3.7/4.0

Skills

Programming Languages: C++, C, Verilog, SystemVerilog, Python
Hardware: KiCad, Questa, LTspice, SMD/Through-hole soldering, crimping
Coursework: Digital Design (in progress), Probability and Statistics (in progress), Data Structures

Activities

Team Member, Bruin Supermileage Racing — Sep. 2025 – Present

Low Voltage Subteam — *September 2025 – September 2026*

- Designed shutdown-control and power-management PCBs in KiCad, including schematics, layout, and STM32 integration
- Integrated hydrogen-sensor conditioning, latched emergency stops, CAN, buck/LDO regulation, and a MOSFET-driven 48 V disconnect relay
- Performed PCB testing and trace repair on PCBAs

Powertrain/Embedded Systems Subteams — *September 2026 – Present*

- Developed a reusable SPI library for board programming

In progress:

- Designing a 48 V protection PCB with STM32 control in KiCad, including component selection, schematics, and layout
- Integrating shunt-based current sensing, supercapacitor pre-charge and load-switch control for overcurrent, overvoltage, and reverse-polarity protection
- Porting ESP32 motor-control firmware to STM32 with Hall-based closed-loop velocity control, PWM drive, and phase-current feedback

Member, IEEE Student Branch

Micromouse — *Oct. 2025 – May 2026*

- Implemented STM32 PID control in STM32CubeIDE to reduce drift during maze navigation
- Implemented shortest-path search through mapped maze cells
- Designed a KiCad PCB integrating an MCU, IR sensors, and motor control
- Repaired PCB connections and debugged sensors on competition day, restoring robot operation

Projects

FPGA Image Processing Accelerator (Verilog)

- Designed a pipelined Sobel edge detector in Verilog with block RAM line buffers for streaming image processing
- Implemented fixed-point Hough line detection with lookup tables, saturated voting, and peak suppression
- (In progress) Developing vertex detection from Hough-line intersections and convex-polygon filling using incremental edge functions

ESP32 Embedded Chess Engine (C++ & PCB Design)

- Developed a C++ chess engine with board evaluation; replaced board copying with move undo to increase search depth from 3 to 6 moves
- Integrated an opening book using binary search over hashed board positions
- Designed a handheld chess-device PCB integrating an ESP32, keyboard, display, battery, and power regulation

PIC Embedded C Wolf–Sheep Simulation & Hardware RNG

- Programmed an embedded C wolf–sheep simulation on a PIC16 microcontroller, with RNG-driven behavior and LCD output
- Configured a ring oscillator using configurable logic cells, with asynchronous timer counting and least-significant-bit sampling to explore hardware entropy
- Implemented a GPIO bit-banged SPI driver for LCD communication