Charlie Chen

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EDUCATION

Harvard University Cambridge, MA

Bachelor of Science in Electrical Engineering, Minor in Computer Science | GPA: 3.97/4.0 May 2027

- Relevant Courses: Semiconductor Electronic Circuits (MIT), Circuits Devices & Transduction, Computing Hardware, Signals & Communications, Systems & Control, Physics E&M, Systems Programming, Data Structures & Algorithms

TECHNICAL SKILLS

Hardware & Circuits: PCB Design, Schematic Capture, KiCad, LTSpice, Analog Circuit Design, Op-Amps, Soldering, Board Bring-Up, Oscilloscopes, Multimeters, Function Generators, Power Supplies

Digital & Embedded: FPGA Programming, SystemVerilog, Vivado, Digital Circuit Design, Arduino, GPIO, Linux

Programming: Python, C, MATLAB, Git

ENGINEERING PROJECTS

NAND-Only Logic Gate Demo PCB | PCB Design & Bring-Up, Power & Signal Integrity, KiCad

- Designed & assembled 2-layer PCB implementing all six Boolean functions using only NAND-gates with user inputs
- Added **per-IC decoupling capacitors** to suppress noise & prevent transient VDD droop on input transitions
- Reduced ground bounce & improved signal integrity using **solid ground plane** to minimize return path impedance
- Performed **hardware validation** & debugging across all input combinations during **board bring-up** using LEDs & **DMM**

Reverb Karaoke Machine | Analog Signal Conditioning, Op-Amps, Filters, ADC/DAC

- Engineered **op-amp signal conditioning** of audio input for unipolar ADC, preserving vocal dynamics without clipping
- Applied **band-limiting** & **reconstruction filtering** to suppress quantization artifacts across ADC/DAC boundaries
- Characterized **frequency response** & end-to-end signal quality with **oscilloscope** during prototyping to diagnose noise

MIPS Multicycle Processor & Assembler | SystemVerilog, RTL Design, FPGA, FSM Control, Testbenches

- Architected multicycle CPU to reuse shared datapath resources, trading control complexity for hardware efficiency
- Implemented **FSM control path** to correctly sequence register, ALU, memory, & PC operations across instruction types
- Developed MIPS assembler & **self-written testbenches**, verifying cycle-accurate CPU behavior via **waveform analysis**

Mask Detector | Embedded Systems, Arduino, Real-Time IO, Serial Communication

- Built real-time embedded system that live detected & sprayed water at unmasked faces with 91% accuracy
- Integrated **low-latency serial communication** between inference pipeline & **Arduino-driven relay circuit**

EXPERIENCE

Course Staff – CS1410: Computing Hardware | Cambridge, MA Jan 2026 – Present

- Redesigning problem sets covering **CMOS transistors**, **digital logic**, FSMs, memory systems, & **MIPS processors**
- Reworking assignments to emphasize reasoning about **hardware behavior**, correctness, & **design tradeoffs**
- Developing design- & verification-based questions involving **RTL error diagnosis** & targeted **testbench construction**

Undergraduate Researcher – Harvard Ability Lab | Cambridge, MA June – Nov 2025

- Enabled human-in-the-loop experiments by prototyping **stable wearable mounting system** for supernumerary arm
- Designed task protocols varying complexity & motion to evaluate system behavior under **realistic human movement**
- Collected **10,000+ frames** of egocentric video & actuator states to support VLA training & **control analysis**

ADDITIONAL SKILLS

Fluent Languages: English, Mandarin

Interests: Hiking, Cooking, Running, Speedcubing