

# Charlie Chen

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## EDUCATION

### Harvard University

Cambridge, MA

**Bachelor of Science in Electrical Engineering**, Minor in Computer Science | GPA: 3.96/4.0

May 2027

- Relevant Courses: Computing Hardware, Circuits Devices & Transduction, Systems & Control, Physics E&M, Systems Programming, Intro to Machine Learning (MIT), Intro to Distributed Computing, Data Structures & Algorithms

### Friends Select School

Philadelphia, PA

High School Diploma | GPA: 4.31/4.0, Phi Beta Kappa | Student President, Robotics Club Founder

June 2023

## TECHNICAL SKILLS

**Software & Programming:** SystemVerilog, Vivado, Arduino, MATLAB, LTSpice, Python, Git, Linux

**Hardware & Systems:** FPGA Programming, Analog & Digital Circuit Design, Embedded Systems, Oscilloscope, Function Generator, Soldering

## ENGINEERING PROJECTS

**32-bit Arithmetic Logic Unit (ALU)** | SystemVerilog, FPGA, Vivado

Sept. - Oct. 2025

- Built gate-level ALU using hierarchical modular design for arithmetic, logic, & shift operations via muxes & submodules
- Designed carry-lookahead adder to reduce propagation delay & integrated zero, equal, & overflow flag circuitry
- Created comprehensive testbenches for edge-case validation & synthesized design on Xilinx FPGA using Vivado

**VLA Robot Arm** | Python, Arduino, Computer Vision

June - July 2025

- Wrote camera handler to undistort, crop, & stream Meta Aria glasses video into SmolVLA recording/inference pipeline
- Developed Arduino firmware to drive arm servo (with stabilizing capacitor) over lightweight custom serial protocol
- Engineered teleoperation recorder to log camera frames, servo angles, & tasks to curate dataset for model fine-tuning
- Implemented autonomous action inference loop that parses inputs & issues live servo commands to complete task

**Reverb Karaoke Machine** | Filters, Op Amps, DAC, Soldering

April 2025

- Built passive high-pass & low-pass filter stages with op-amp buffers to condition microphone signals for Arduino ADC
- Coded Arduino signal processing firmware at 8 kHz sample rate, featuring dynamic compression and reverb effects
- Engineered 10-bit R-2R DAC with low-pass output filters to reconstruct & smooth processed audio for speaker playback

**Mask Detector** | PyTorch, OpenCV, Arduino, Embedded Software

Sept. 2021 - Dec. 2022

- Built face detection pipeline with optimized MobileNetV2 (91% accuracy) to spray unmasked people with water
- Wrote Arduino firmware for serial-controlled relay actuation and prototyped/soldered the relay & motor circuit

## EXPERIENCE

**Harvard Ability Lab** | Cambridge, MA

June - Nov. 2025

Undergraduate Researcher

- Analyzed vision-language-action model performance on egocentric robotic arms in human-robot interaction tasks
- Engineered human-mounted rig for supernumerary robotic arm by designing custom CAD chest plate & harness
- Teleoperated arm to build high-fidelity 10K+ frame dataset for VLA fine-tuning & quantified movement using OpenCap
- Designed protocol with varying interaction complexity, human movement, etc. on ADL tasks to benchmark performance

## ADDITIONAL SKILLS & INTERESTS

**Fluent Languages:** English, Mandarin

**Interests:** Hiking, Cooking, Running, Speedcubing