

Sofia Isabel Zhang

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EDUCATION

Harvard College

A.B. in Mechanical Engineering joint with Chemistry and Physics | GPA: 3.87

Cambridge, MA

Aug. 2024 – May 2028

EXPERIENCE

Research Assistant

June 2025 – Present

Aizenberg Lab, Harvard University

Cambridge, MA

- Engineered a patented, fluidic window system leveraging metamaterials to dynamically modulate optical reflectivity (15-98%), diffusivity (6-86%), and thermal conductivity ($.04-.2 \text{ WK}^{-1}\text{m}^{-1}$), within a single layer.
- Explored and characterized limits of metamaterial's physical properties (states of matter, density, geometries).
- Conducted model-house testing, demonstrating 40% lower power consumption than traditional window systems.

Mechanical Engineering Intern

January 2026 – August 2026

Active Learning Labs, Harvard University

Cambridge, MA

- Improved lab space by designing, prototyping, and fabricating custom fixtures such as Instron accessory storage and display case, and modular 9V battery rack, improving storage capacity by 25% and accessibility by 75%.
- Indexed new drill presses and CNC mill beds within .001" tolerance, then machined test pieces modeled in CAD using SolidWorks.
- Reviewed weekly lab handouts to align course materials with updated shop capabilities.

Drivetrain Subteam Mechanical Lead

September 2025 – May 2026

Harvard Formula SAE

Cambridge, MA

- Researched, planned, and began fabricating team's first powertrain wiring harness required to convert existing Honda motorbike engine into FSAE-eligible powertrain by integrating safety circuits with engine electronics.
- Manufactured aluminum wheel hub cap using lathe and CNC mill as part of team's first rear suspension assembly.
- Increased trained member count by 50% by standardizing training materials and coordinating group trainings.

Course Assistant

January 2025 – May 2025

ES51: Computer-Aided Machine Design, Harvard University

Cambridge, MA

- Led weekly lab sections and office hours teaching over 50 combined students fundamental machining and engineering topics like manual milling, GD&T, calculating gear ratios, and static force analysis.
- Supported a team in building a robot able to navigate uneven terrain and interact with objects for competition.

Research Scholar

June 2023 – July 2023

Governor's School of Engineering and Technology, Rutgers University

New Brunswick, NJ

- Optimized autoclave temperatures for synthesizing carbon dots from polypropylene pellets and characterized carbon dots using UV-Visible spectroscopy, dynamic light scattering, and optical microscopy.
- Presented findings at 2023 IEEE MIT URTC and published results in *ACS Materials Letters*.

PROJECTS

The Bumblebee

September 2024 – December 2024

- Engineered scoop arm robot from design to assembly able to manipulate and store objects and climb 30° inclines.
- Modeled the drivetrain layout in SolidWorks and iterated to increase speed by 22% and torque by 15%.

Pop the Pinata

January 2026 – May 2026

- Built pinata memory game with 5-zone LED sequencing, piezo hit detection, and servo-actuated candy release.
- Reduced false-trigger hit detection by 50% through improved sensor design and iterative threshold calibration.

ACTIVITIES

Division I Women's Rugby

October 2025 – Present

- Dedicated 20 hours weekly to practices, lifts, games, and film review for a four-time national champion program.

CrimsonEMS EMT

September 2025 – Present

- Provided standby coverage across campus events, from parties to graduation, delivered emergency pre-hospital care.

TECHNICAL SKILLS

Technical: Python, JavaScript, HTML, CSS, Arduino, SolidWorks, Fusion360, COMSOL, GD&T.

Machine Shop: Lathe, manual mill, CNC mill, drill press, bandsaw, welding, laser cutter, and 3D printer.

Lab: UV-Visible spectroscopy, photoluminescence spectroscopy, dynamic light scattering, SEM, and optical microscopy.