

Irene Sha

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Experience

Graduate Researcher, *Self-Organizing Swarms and Robotics Lab* – Princeton, NJ Aug 2022 – Present

- Lead design and development of a fish-inspired robotic platform for studying bio-inspired locomotion, using CAD (Fusion) to model and iterate on body form, actuator placement, and internal component layout.
- Redesigned a single-actuator, tethered prototype into a fully untethered platform within four months, incorporating waterproof sealing, onboard power, and a custom PCB electronics stack (KiCad) for controlled 2D and 3D locomotion.
- Fabricate and assemble multiple prototypes through in-house 3D printing (FDM, SLA), CNC water jet cutter, and other hand tools.
- Create a dynamic hydrodynamic model with Python and MATLAB to analyze how design parameters influence maneuverability, and validate model predictions through experiments in both lab and near-shore environments.
- Communicate findings through 2 first-author publications and presentations at 5 symposiums/conferences.
- Mentor 3 undergraduate researchers over the course of the project, guiding individual contributions to subproblems on mechanical design, testing, and fabrication.

Visiting Researcher, *WHOI's Autonomous Robotics and Perception Lab* – Woods Hole, MA June 2026 – Present

- Develop a new differentiable CFD solver (JAX-Fluids) pipeline to enable gradient-based exploration and optimization of vehicle geometry and module arrangement, supporting early-stage design decisions.

Graduate Assistant, *StudioLab Makerspace* – Princeton, NJ Oct 2025 – May 2026

- Facilitated use of the makerspace by offering hands-on technical assistance to users on various pieces of equipment, providing examples of projects that they can create, and designing instructional materials.
- Troubleshoot equipment issues, monitored system status, and coordinated maintenance activities with supervisors.
- Developed and delivered instructional sessions for StudioLab that ensured safe and engaging use of the tools.

Mechanical Engineering Intern, *L3Harris MariPro* – Goleta, CA June 2021 – Aug. 2021

- Prepared models and simulated high voltage, DC subsea connectors for breakdown potential and electric field distribution for underwater submarine training range nodes.
- Determined appropriate tilt angles for a tethered buoy under seafloor currents using hydrodynamic analysis and anode resistance in a seawater power return system in MathCAD; proposed engineering modifications based on quantitative analysis.

Undergraduate Researcher, *Bioinspired Robotics and Design Lab* – San Diego, CA June 2021 – June 2022

- Modeled millimeter-scale, laminate springs in SolidWorks for integration in a legged robot using parametrized definitions for accessible changes.
- Simulated loading conditions using ANSYS to determine most ideal usage in parallel with actuators.
- Fabricated prototypes using laser cutters; analyzed experimental pull-test data to validate spring dynamics.

Education

Princeton University – PhD in Mechanical Engineering Expected June 2027
UC San Diego – BS in Mechanical Engineering June 2022

Skills and Interests

CAD: Autodesk Fusion, Solidworks, ANSYS, KiCad

Programming: MATLAB, Python, Microcontrollers and sensor modules

Fabrication: 3D printing (FDM, SLA), Lathes, Mills, Water jet cutters, Laser cutters, Soldering

Interests: Birdwatching, Flying gliders, 3D printing, Volleyball