ISABELLA YU

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EDUCATION

Massachusetts Institute of Technology *Expected September 2024 - May 2025*
MEng in Electrical Engineering and Computer Science

Massachusetts Institute of Technology *September 2020 - May 2024*
B.S. in Electrical Engineering & Computer Science
B.S. in Mathematics
Minor in Comparative Media Studies

Overall GPA: 5.0/5.0

Relevant coursework: Computer Vision (grad), Machine Learning for Inverse Graphics (grad), Robotic Manipulation (grad), Algorithms I and II, Computational Cognitive Science, Theory of Computation, Abstract Algebra

PUBLICATIONS

Andrei Atanov, Jiawei Fu, Rishubh Singh, **Isabella Yu**, Andrew Spielberg, Amir Zamir, "Solving Vision Tasks with Simple Photoreceptors instead of Cameras", accepted as poster to ECCV 2024, Milan, Italy, Sep 29-Oct 4, 2024

Amir Zamir, Andrew Spielberg, Andrei Atanov, Jiawei Fu, **Isabella Yu**, "Computational Ecological Vision: Tutorial on Computational Design for Perception and Robotics", CVPR 2024, Seattle, WA, Jun 17-21, 2024

Kristine Zheng* and **Isabella Yu***, "Jenga as a performance art: computational generation of surprisingly stable structures", MIT Undergraduate Research and Technology Conference, Cambridge, MA, Oct 6, 2023
* denotes equal authorship

RESEARCH EXPERIENCE

MIT Scene Representation Group February 2024 - present
Undergraduate researcher

- Advisor: Vincent Sitzmann, with Lester Li and Ana Dodik
- Developing self-supervised methods for learning robot motion for contact-rich manipulation from vision.
- Developing methods for inverse rendering and 3D construction of Escherian "impossible" objects.

EPFL Visual Intelligence Laboratory June 2023 - June 2024
Research Intern

- Advisor: Amir Zamir, with Andrei Atanov
- Designed and ran experiments for novel reinforcement-learning based methods for computational design of robot sensor morphologies. Integrated PyTorch3D differentiable renderer to enable a fully differentiable optimization pipeline. Ran experiments in the Habitat Simulator to optimize sensor placement for target navigation. Conducted survey to compare intuitive human sensor designs to computationally generated designs. Tutorial in CVPR 2024 and publication in submission to ECCV 2024.

MIT Distributed Robotics Laboratory May 2021 - Aug 2021
Undergraduate Research Assistant

- Advisor: Daniela Rus, with Noam Buckman

- Deployed state-of-the-art 3D object detection and lane detection algorithms on scaled autonomous cars, enabling accurate real-world simulation of multi-car interaction. Covered in Mashable.

MIT Personal Robotics Group September 2020 - May 2021
Undergraduate researcher

- Advisor: Cynthia Breazeal, with Sharifa Alghowinem
- Developed novel multi-modal deep learning models for suicide risk classification. Submitted to ACII 2021.

INDUSTRY EXPERIENCE

Robotics/Autonomous Vehicles Software Engineering Intern at **NVIDIA** (Summer 2024) and **Lawrence Livermore National Laboratory** (Summer 2022), Design Technologist intern at **Amazon** (January 2024).

TECHNICAL SKILLS

Programming Languages	Python, C++, Javascript, Java, SQL, Lisp
Libraries & Tools	PyTorch, NumPy, ROS, OpenCV, Git, Linux, Slurm, React, Unity3D, Blender

PROJECTS

Designing 3D impossible objects using differentiable rendering Fall 2023

- Created novel 3D representations of impossible objects using differentiable mesh rendering. Implementation here.

Belief space planning for robotic manipulation Fall 2022

- Implemented Platt et al.'s belief space planning algorithm in the Drake simulator. Implementation here.

AWARDS AND HONORS

Phi Beta Kappa Inductee	2024
MIT Lincoln Laboratory Undergraduate Research and Innovation Scholar	2022
Andy Grove Scholarship	2022
AP Scholar with Distinction	2020
National Merit Finalist	2020

TEACHING AND MENTORING

Lab Assistant, *MIT 6.3900: Introduction to Machine Learning*	Fall 2023 - Present
Grader, *MIT 6.3000: Signal processing*	Spring 2023

ACTIVITIES AND COMMUNITY SERVICE

MIT AI Alignment September 2023 - present

- Participant in research-oriented reading group on technical AI safety. Topics include neural network interpretability, learning from human feedback, goal misgeneralization in reinforcement learning settings, and potential catastrophic risks from advanced AI systems.

MIT Admissions Film Director, Producer, and Artist September 2022 - Present

- Directed and produced MIT's 2024 Pi Day video (200K+ views on YouTube/Instagram) and the 2023 animated Pi Day video (80K+ views on YouTube/Instagram). Create comics, videos, and livestreams for MIT's social media accounts (1.2M followers on Twitter, 46K followers on Instagram).

MIT Project Manus Makerpsace Mentor September 2021 - Present

- Lead workshops in 3D printing, laser cutting, and MIG welding. Mentor students on personal projects.