

# Jiayuan Liu

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## Education

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### Olin College of Engineering

Sept 2021 – May 2025

*B.S in Electrical and Computer Engineering*

- GPA: 3.82/4.0
- Research Advisor: Prof. Andrea Cuadra

## Research Experience

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### LLM Generative Tutor for Online Teaching

Needham, MA

*Student Researcher @ Olin Plai Lab*

May 2024 – Present

- Utilized TSCC online ESL class corpus data as a benchmark to evaluate and compare GPT-4o's ability to display empathy towards students versus human tutors.
- Investigated how varying levels of student personal information disclosure affect the chatbot tutor's responses.
- Enhanced the software system for interacting with the GPT-4o API, enabling conversation simulation and analysis to identify potential biases related to gender and racial groups.
- Evaluated quantitative metrics of simulated conversations between generative students and tutors using various statistical tests.
- Drafted a research paper detailing the methodology and findings of the experiment.

## Teaching Experience

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### Computer Science and Engineering Teacher

2025 Fall - Current

*Menaul School*

- Teach two sections of AP Computer Science Principles (Beauty and Joy of Computing curriculum) and one section of AP Computer Science A (Java).
- Designed and piloted the middle-school elective "AI Foundations: Creativity, Code, and Consequences" for grades 7–8, introducing core AI concepts and block-based programming.
- Co-coach the Science Olympiad team; mentor projects in Robot Tour, Engineering CAD, and Circuit Lab.

### Student Lecturer, Introduction to Sensors, Instrumentation, and Measurement

2025 Spring

*Olin College of Engineering*

- Taught first-year introductory circuit class to 50+ students twice a week, covering instrumentation design and hands-on circuit implementation.
- Led lab sessions focused on building and troubleshooting RC filters and op-amp-based signal conditioning circuits for sensor measurements, including humidity, temperature, and EKG.

## Professional Experience

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### Water Treatment Chemical Detection and Preservation

Fort Myers, FL

*Research and Development Intern @ Watts Water Technologies*

May 2023 – Sept 2023

- Designed and conducted experiments to test a DPD preservation method on a chlorine colorimetry instrument (CLX).
- Designed and prototyped printed circuit boards (PCBs) to automate the detection process of PFAS (Per- and Polyfluoroalkyl Substances) in drinking water.

### Batch Reverse Osmosis System Building

Needham, MA

*Student Researcher @ Olin Water Desalination Lab*

Oct 2021 – Dec 2023

- Integrated flowmeters, conductivity probes, and pressure sensors into a customized reverse osmosis (RO) apparatus to model and monitor water chemistry and mechanical characteristics in the desalination cycle.

- Automated batch reverse osmosis process using MATLAB-controlled Arduino and relays to control solenoid valves, and analyzed sensors data collected with DAQ.

## Skills

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- **Programming Languages:** Python, MATLAB, C++, Swift, HTML/CSS
- **Hardware Design:** KiCad, SPICE, Microcontroller Programming (STM32, Arduino, Raspberry Pi), VLSI, Verilog HDL, FPGA Programming, PCB Assembly
- **Design & Prototyping:** Figma, Adobe Illustrator, Adobe Photoshop, Human-Centered Design, User Testing, Animation Design, Unity, Phaser, SolidWorks, OnShape, 3D Printing, Laser Cutting

## Projects

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### “Prism Pines”, Youth Gender Education Game

[Prism Pines](#) 

*Olin PInT Group & OUT Maine*

- Designed a 2D web-based educational RPG, “Prism Pines,” for children aged 9-13 to learn about gender identity, in collaboration with OUT Maine, an organization supporting LGBTQ+ youth.
- Conducted 10 in-depth interviews with users and volunteers to ensure diverse gender representation in the game.
- **Tools Used:** C#, Unity, Adobe Photoshop

### “Cane Game”, Orientation and Mobility (O&M) Training Tool

[Cane Game](#) 

*Project Guided by Prof. Paul Ruvo*

- Collaborated with a team of four to refine “Cane Game”, a research-based iOS app designed to gamify mobility skill practice for blind or visually impaired students (BVI) through music-based games.
- Developed individual student profile functionality in SwiftUI, enabling instructors to log in and access tailored student data.
- Conducted interviews with five Orientation & Mobility (O&M) instructors to gather feedback on visualizations of training data prototyped in Figma.
- Explored gameplay enhancements, such as introducing “pop-quiz” style counting, to promote greater student independence in cane use beyond reward-based engagement.
- **Tools Used:** SwiftUI, Figma

### “Dancing Degas”, Music-to-Spiralgraph Translator

[Dancing Degas](#) 

*Principle in Engineering Course Final Project*

- Built an algorithm that detects various components of music (liveliness, danceability, energy, instrumentality, valence, loudness, mode, acousticness, and key) using the Spotify API, and used these parameter values in a geometric model of spirographs.
- Wrote Python scripts to generate G-code based on the coordinates of spirograph points and streamed the G-code to Grbl on an Arduino to control an x-y gantry and a color wheel motors.
- **Tools Used:** Python, GRBL, CNC motor shield, Arduino, stepper motor

### MOSFET Simulator for Microelectronics Learning Visualization

[MOSFET Simulator](#) 

*Personal Project*

- Assisted in designing a MOSFET circuit simulator that animates current and voltage changes across five basic circuit configurations, enhancing visualization for introductory microelectronics students.
- **Tools Used:** Javascript

## ASL Immersive Classroom Product Proposal

### *Collaborative Design Course Final Project*

- Conducted in-depth interviews with various ASL interpreters to understand the needs and values of the ASL community.
- Engaged in iterative co-design with ASL interpreters, resulting in a proposal for an ASL Immersion Classroom model, supported by visual and physical prototypes.
- **Tools Used:** Figma, laser cutter

## “Braildle”, Braille Translator Cell

*Braildle* [↗](#)

### *MakeMIT Hackathon*

- Designed and prototyped a computer vision-based Braille translator in a 24-hour hackathon, aimed at helping new Braille learners translate visual text into physical information.
- **Tools Used:** Python(OpenCV) Arduino, servo motor

## Awards and Scholarship

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<b>1st Place</b> , 2022 MakeMIT Hackathon	<i>\$600</i>
<b>1st Place</b> , National MWLC Competition (Olin Water Desalination Lab) <a href="#">↗</a>	<i>\$150,000</i>
<b>Recipient</b> , Merit-Based Olin Tuition Scholarship (Annual)	<i>\$30,000</i>