

# PROGRAM IN COMPUTING PIC SPOTLIGHT

5-6:30PM, Wednesday, February 11<sup>th</sup>, 2026

DataX Impact Forum, 3312 Murphy Hall

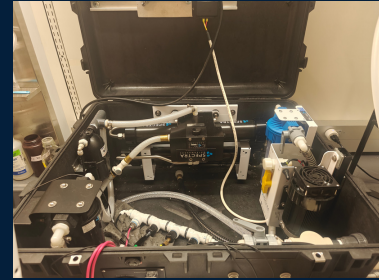
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## FUTURE OF FILTRATION: OPTIMIZING THE PERFORMANCE OF REVERSE OSMOSIS SYSTEMS

Mallika Ghante, Applied Mathematics

Growing demand for clean water has accelerated the adoption of desalination technologies, particularly reverse osmosis (RO), which accounts for 70% of global facilities. However, RO systems face challenges, including membrane fouling, inconsistent permeate quality, and energy inefficiency. Recent work uses machine learning to improve system functionality and lower maintenance costs. As a Sustainable LA Grand Challenge scholar, I am conducting research under Professor Eric Hoek to develop a time-series machine learning model (LSTM-PINN) that predicts membrane failure in the Navy's portable seawater reverse osmosis (SWRO) units.



## TEACHING A BOT TO NAVIGATE A MAZE WITH PYTHON

Eshika Abbaraju, Cognitive Science

My talk will be on a personal project utilizing reinforcement learning (RL) that I worked on as a Research Assistant in a lab. I started with Q-learning, an RL algorithm that learns optimal actions by updating initially random state-action values based on rewards received from previous actions. I'll talk about how I used my Python knowledge to visualize the RL process by building a Q-learning agent that moves through a grid maze. I'll also discuss how I added features such as evolving heat maps of the maze (where brighter regions indicate the spots the agent believes are the most optimal to go to) and a GIF of the agent navigating the maze using what it has learned. In this way, I'll demonstrate how code and machine learning can teach a bot to learn like humans do and solve a maze through trial and error.



## MAKING ACTIONS SPEAK LOUDER: REAL-TIME ASL TO EMOTIONAL SPEECH WITH MACHINE LEARNING

Gokul Nambiar, Cognitive Science

Every day 33 babies are born in the U.S. with permanent hearing loss. I will showcase a real-time ASL-to-speech translation system, how classroom machine learning skills can address real-world accessibility challenges. I used the MediaPipe library for computer vision-based hand landmark detection, trained LSTM neural networks on an ASL dataset to recognize sign language gestures, and integrated Hume AI's emotional voice synthesis API to convert these signs into natural, expressive speech. This project exemplifies what excites me most about AI: the limitless applications when we apply ML thoughtfully to help solve meaningful problems within our society. I will include more about my journey as well as a live demonstration discussing both the technical architecture and broader impact!



## VOROLIGHT: LEARNING QUALITY VOLUMETRIC VORONOI MESHES FROM GENERAL INPUTS

Jiayin Lu, Hedrick Assistant Adjunct Professor

I will present VoroLight, a differentiable framework for 3D shape reconstruction based on Voronoi meshing. Our method produces smooth, watertight surfaces and topologically consistent volumetric meshes directly from diverse inputs, including images, implicit level-set fields, point clouds, and meshes. Beyond reconstruction, VoroLight enables design-driven applications: using this framework, I created a series of 3D-printable artistic lamps. Through this project, I want to show how we can draw inspiration from beautiful mathematical ideas and use the power of modern computation to make art.



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