

# Irene Terpstra

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## Education

### Massachusetts Institute of Technology (MIT)

*Master of Engineering in Computer Science*, June 2024

*Bachelor of Science in Electrical Engineering and Computer Science*, June 2023

Cambridge, MA

GPA: 4.4/5

GPA: 4.8/5

**Concentration:** Artificial Intelligence

**Master's Thesis:** Empowering Analog Integrated Circuit Design through Large Language Models and Reinforcement Learning

**Relevant Coursework:** Underactuated Robotics, Computational Sensorimotor Learning, Quantitative Methods for Natural Language Processing, Robotics Science and Systems, Artificial Intelligence, Unmanned Marine Vehicle Autonomy

## Experience

### MIT CLEAR Lab

*Machine Learning Researcher*

Cambridge, MA

November 2024-Present

- Developing a diffusion model that learns energy landscapes to solve multimodal robotic manipulation tasks that align with human preferences.
- Reducing the number of demonstrations required using a pre-trained state-based diffusion model to learn effective motion control and then impose task preferences with a secondary image encoder.

### Themis AI

*Machine Learning Engineer Intern*

Cambridge, MA

July 2024 – September 2024

- Used uncertainty estimation to improve the real time reliability of reinforcement learning algorithms for energy grid management and robotic manipulation.

### MIT-IBM-AI Watson Lab

*Machine Learning Intern and Graduate Researcher*

Cambridge, MA

June 2023 – May 2024

- Introduced a reinforcement learning model that incorporates the guidance of the LLM to optimize circuit parameters.
- Built a framework to integrate LLMs as heuristic tools with existing optimization methods.
- Developed the infrastructure to evaluate the application LLM to the circuit design process.

### MIT Seethapathi Motor Control Group

*Undergraduate Research Assistant*

Cambridge, MA

October 2022 – January 2023

- Developed simulation for reinforcement learning algorithm to model locomotor adaption in novel walking environments.

### Sea Machines Robotics

*Autonomy Intern*

Boston, MA

June 2022 – August 2022

- Wrote a collision detection algorithm using C++ in ROS2; algorithm performed significantly faster than its predecessor and was designed to be modular.
- Implemented an RRT\* path planner that could be incorporated into the existing autonomy stack.

### Shell

*Machine Learning Intern*

Boston, MA

June 2021 – August 2021

- Designed a scalable program in Python that allowed the user to define and model energy trading in decentralized energy systems of any size and shape.
- Used Deep Q Reinforcement Learning to develop an optimal energy trading strategy for individual users and global agents using OpenAI Gym and PyTorch.

### MIT Sea Grant

*Undergraduate Research Assistant*

Cambridge, MA

May 2020 – June 2021

- Developed strategies for heterogeneous sensor calibration to align the LIDAR, RADAR and camera on an autonomous maritime surface vehicle in Python using OpenCV to improve the machine learning based autonomous vehicle control.
- Designed and fabricated a handheld heavy metal detection device modeled on a shark's olfactory system that uses a microcontroller programmed in C++ to record electrochemical measurements with a biomimetic sensor.

### MIT Media Lab Biomechatronics Project Group

*Undergraduate Research Assistant*

Cambridge, MA

September 2019 – May 2020

- Developed electronics to generate electrical signal patterns that stimulate AMI muscle pairs in a lower leg amputee to induce proprioception for a prosthetic through electrical stimulation of nerves.
- Successfully restored feeling in the patient's leg with the electronics I designed.