

Shruti Garg

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www.linkedin.com/in/srg914

Education

Massachusetts Institute of Technology (MIT) <i>B.Sc Electrical Engg and Computer Science</i> <i>Candidate for MEng Electrical Engg and Computer Science</i>	Cambridge, MA 2024 2025 GPA: 4.9/5.0
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Research Experience

MIT Robot Locomotion Group CSAIL <i>Planning Shorter Paths in Graphs of Convex Sets by Undistorting Parametrized Configuration Spaces</i> Advisor: Prof. Russell Tedrake Wrote Projected Gradient Descent solver, with optimizations such as pre-compiling gradients using JAX, backtracking line search for step sizes and efficient Quadratic Program projections Using Non-convex Optimization to improve motion plans for bimanual manipulators, planning in certified regions and planning over rotations	Cambridge, MA Sept23 - ongoing Drake, Python, Optimization methods
MIT Distributed Robotics Lab <i>Tactile Sensing in Blind Grasping</i> Mentor: Lillian T Chin, PI: Daniela Rus Iterated on pressure based sensor design and fabrication process Integrated sensor electronics on end effector hardware Setup with UR5, linux, ROS, and dynamixels. implemented planning and task execution so team can easily test sensor performance in gripping and picking	Cambridge, MA Sept 2022 - May 2023 ROS, grasshopper + Rhino, Arduino, Docker
MIT Hacking Medicine sentiment analysis to identify early signifiers of success at hackathon venues	Spring 2021
Research at NJ Governor's School of Engineering and Technology @ Rutgers University Using Machine Learning to Correlate User Sentiment and Weather Patterns presented at IEEE MIT Undergraduate Research Technology Conference 2019.	NJ Cambridge, MA 2019

Teaching Experience

6.4210 Robotic Manipulation: Perception Planning and Control Running OH, grading, advising student projects, revising and prepping problem sets.	<i>Teaching Assistant</i>	MIT <i>Fall 2024</i>
6.310 Dynamical System Modeling and Control Design Staffed OH and Lab sessions, answering questions and helping students with labs and class concepts.	<i>Lab Assistant</i>	MIT <i>Spring 2024</i>

Industry Experience

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Anduril Industries

Robotics Software Intern

Costa Mesa, CA

Off the shelf gimbal simulator deployed across multiple product lines

Summer 2023

tracer bullet approach: took an existing **rust daemon** written for one interface/product, fleshed it out with more functionality and integrated it into a very different stack. Also delivered smooth synthetic video on the new stack.

Rust, NixOS, Systems work

Enabling remote access to hardware testing stack for Roadrunner

Set up a SSH-able NUC NixOS station with network access to the hardware and remote control of power supply via SICP over usbtmc

NVIDIA

Robotics Systems

Santa Clara, CA

Software Intern

Jun 24 - Sept 24

System Monitors

ROS, c++

Wrote system monitors that used the ROS diagnostics interface to make sensor vitals such as frame drops and frame rates accessible to users via ROS topics and also through the FoxGlove visualization. Shipped as part of Isaac 3.2

Honest AI (ML real estate startup)

SWE and Machine

London, UK

Learning Intern

Summer 2022

ETL pipeline to prepare London Housing Data for a Language model powered real estate search tool. Communicated with external data providers to acquire an appropriately extended data set.

Viziverse (early Augmented Reality startup)

Pose detection

Boston, Spring

& tracking

2022

Delivered a self-contained first stage prototype from ground up for pitching to Angel investors. OpenCV, python, integrating ML models.

Publications

[Under review] S. Garg, T. Cohn, R. Tedrake, "Planning Shorter Paths in Graphs of Convex Sets by Undistorting Parametrized Configuration Spaces," Submitted to IEEE Robotics and Automation Letters, 2024. <https://arxiv.org/pdf/2411.18913>

Awards/Funding

- MIT EECS | Lincoln Laboratory Undergraduate Research and Innovation Scholar | \$6000 for research on Bimanual Manipulation with the Robot Locomotion Group (Sept 2023 - May 2024)
- Lockheed Martin STEM Scholarship (2020-2024) | \$10,000/yr for undergraduate studies at MIT
- MIT Global Languages Department-China (2024) | \$3000 to study Chinese in Taiwan for 1 month
- MIT International Science and Technology Initiative-UK | \$3000 to assist startup with machine learning applications in housing, Summer 2022

Leadership

Student Government in East Campus (residential dormitory @ MIT)

2021-2022

- *Executive Board (Treasurer)* Oversaw a 60k+ budget used by many committees and events. Advocated for residents and negotiated to achieve smooth operation of a building of 300+ people and an active counterculture hub. Chaired multiple other smaller task groups and committees.

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- Organized MIT's Pumpkin Drop 2021 oversaw operations and approvals for dropping 100 pumpkins off the top of Tang Hall.
- *Floor Chair, Resident Peer Mentor.* Major point of communication between students and administration.
- *REX Chair* safety approvals and execution of student designed and lead builds including a rollercoaster.

Arcturus Robotics- MIT's Autonomous Boat Team

Electrical

Engineering Lead

Njord Competition, Trondheim Norway

Given 2 months between competitions to overhaul our boat's electrical design, organized team for tight deadlines for building multiple (electrically) new boats and designing and integrating new subsystems

Designed and Delivered a MOSFET based signaling tower controller to indicate power to thrusters and drive modes.

Jointly responsible for all electrical systems on board our boat for Roboboat 2023 in Florida.

Team won **best technical design** along with other awards.

**Fall 2022 -
Summer 2023**

RC and
autonomous
boat systems
design, Altium
PCBing,
Oscilloscope,
Multimeters

Cool Class Projects

SIFT on an FPGA

Bimanual Rubik's Cube Solver

Underactuated Staff Spinner

loop.

Implement a SIFT keypoint matcher on a xilinx fpga.

Low level planning and control for an iiwa in simulation.

Optimizing for a controller to throw and catch a staff in a

2023 Fall

2022 Fall

Spring 2023