

# SIDDHARTH SAHA

*Build it, break it, fix it.*

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## EDUCATION

### Carnegie Mellon University, School of Computer Science

Pittsburgh, PA

Master of Science, Robotic Systems Development | GPA: 4.00 / 4.00

May 2024

Ongoing Coursework: Optimal Control and RL, Manipulation, Systems Engineering, Robot Autonomy, Computer Vision

Achievement: J.N. Tata Scholarship, 97 scholars out of 1700+ applicants

### Indian Institute of Technology Bombay

Mumbai, India

Bachelor of Technology (Honors), Mechanical with Minors, Computer Science | GPA: 9.43 / 10.00

Aug 2021

Selected Coursework: Planning for Legged Robots, Reinforcement Learning, Algorithm Design, Linear Algebra

Achievements: Technical Citation; ROS Conference 2021: Two lightning talks on Thesis and GSoC project

## SKILLS

Programming: C++, Python, CMake, MATLAB

Software: Git, Docker, Linux, PyTorch, ROS 1, ROS 2, Jira

Optimization: MathProg, GLPK, Gurobi, PuLP, IPOPT, OSQP

## EXPERIENCE

### CMU Robotic Exploration (REx) Lab, Graduate Research Assistant | Pittsburgh, PA

Nov 2022 – Present

- Understanding contact implicit model predictive control (MPC) to implement motion planning on Unitree quadruped robot

### CMU AirLab – Search and Rescue Quadruped, Planning Engineer | Pittsburgh, PA

Sep 2022 – Present

- Leveraging mobility characteristics of Unitree Go1 for autonomous exploration in human untraversable environments
- Executed systems analysis, including objectives tree, functional and cyber-physical architectures, and trade studies

### Goldman Sachs, Analyst | Bengaluru, India

Jul 2021 – Jul 2022

- Ideated and executed payment structuring ideas for mortgage-backed securities in multi-national desk of 15 members
- Achieved sharp improvement of 1.62% profits by optimizing cash-flows through derivative instruments

### Google Summer of Code – JdeRobot, Student Developer | Remote

Jun 2021 – Aug 2021

- Migrated Robotics Academy Docker from ROS1 to ROS2 and built VNC-based RViz2 web interface
- Implemented navigator for warehouse pick and delivery exercise as behavior trees in SLAM Toolbox
- Pushed contributions to production environment as the new Robotics Academy ROS2 Foxy image

## PROJECTS

### Quadruped Robot | RoboCup Rescue League Challenge

Dec 2019 – May 2021

- Founded and led a two-tiered team of 15 members, overseeing a budget of 14K USD granted by IIT Bombay
- Modelled virtual leg compliance with impedance control and simulated gaits with Bézier curve foot trajectories using C++

### Robot Vision Scene Understanding Challenge | CVPR 2021, Nashville

Mar 2021 – Apr 2021

- Built object-based 3D semantic map utilizing RGBD and odometry measurements from robot traversing environment
- Implemented parallel perception pipeline of YOLOv4 with 3D detection techniques (VoteNet, Group-Free 3D)

### Multi-robot Path Planning for Capture of Moving Target

Mar 2021 – Apr 2021

- Formulated motion primitives and capture probability as Mixed Integer Linear Programming (MILP) problem in Python
- Optimized in joint path space with Gurobi, and achieved target capture in graph-represented world with Networkx

### F1/10th – Autonomous Grand Prix | IROS 2020, Las Vegas

Oct 2020

- Leveraged Bernstein polynomial based local trajectory planner and MPC for Ackermann steering in 4-membered team
- Acquired global optimal path via Operator Splitting Quadratic Program (OSQP) solver & implemented obstacle detection

[More projects...](#)

## LEADERSHIP

MRSD Representative, CMU: Serving as the liaison between MRSD and the Robotics Institute

Jan 2023 – Present

Mentor, Summer of Science: Guided 4 mentees with Data Structures and Algorithms

Apr 2020 – Jun 2020

Teaching Assistant, IIT Bombay: Tutored 70+ students across two freshmen courses

Jan 2019 – Apr 2019

Convener, Electronics & Robotics Club: Guided 600+ freshmen with their first wheeled robot

Apr 2018 – Mar 2019

## COMMUNITY AND VOLUNTEER WORK

JdeRobot: Heading JdeRobot's ROS2 Working Group as an open-source contributor

Mar 2021 – Aug 2022

Indian Women in Engineering: Mentored 4 sophomores under initiative by Goldman Sachs

Sep 2021 – Nov 2021