

# SIDDHARTH SAHA

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## EDUCATION

**Carnegie Mellon University, School of Computer Science** | GPA: [3.97 / 4.00](#) Pittsburgh, PA  
Master of Science in Robotic Systems Development (MRSD) May 2024  
Courses: Deep Learning, Optimal Control & Reinforcement Learning, SLAM, Planning & Decision-making  
Achievements: [J.N. Tata Scholar](#); ICRA 2023 Quadruped Robot Challenge: Travel grant to London and 3<sup>rd</sup> Prize

**Indian Institute of Technology Bombay** | GPA: [9.43 / 10.00](#) Mumbai, India  
Bachelor of Technology in Mechanical (with Honors), Minor in Computer Science Aug 2021  
Courses: Foundations of Learning Agents, Design & Analysis of Algorithms, Design of Mechatronic Systems  
Achievements: Technical Citation; [ROS Conference](#) 2021: Delivered two lightning talks  
1<sup>st</sup> Prize: Micromouse Challenge (International), Off-track Bot (National), Operations Challenge (IIT Bombay)

## EXPERIENCE

**Amazon Robotics, SDE Intern (C++ Specialist)** | Westborough, MA May 2023 – Aug 2023  
• Implemented collision modelling and motion planning for 6-DOF manipulator arm operating on unpackaged items  
• Achieved 50% speedup in failure handling of dropped packages via suction feedback and low-level interrupts

**Goldman Sachs, Analyst** | Bengaluru, India Jul 2021 – Jul 2022  
• Ideated and executed payment structures for mortgage-backed securities in multi-national desk of 15 members  
• Achieved steep 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 their Docker Image from ROS 1 to ROS 2 Foxy, built RViz 2 web interface, and deployed to production  
• Post-GSoC, headed JdeRobot's ROS 2 Working Group as an open-source contributor till Aug 2022

**Stride – Quadruped Team, Co-founder and Team Lead** | Mumbai, India Dec 2019 – May 2021  
• Led a two-tiered team of 15 members, overseeing a budget of 14,000 USD granted by IIT Bombay  
• Demonstrated real-time SLAM via sensor fusion of cost-effective IMU sensor and RealSense PointCloud data  
• Modelled virtual leg compliance with impedance control and simulated gaits using Bézier curve foot trajectories

## SKILLS

Programming: C++, CMake, CUDA, Julia, MATLAB, Python, Scripting (Bash, Sed, Awk)  
Robotics: Drake, Gazebo, Isaac Gym, MoveIt, MuJoCo, OpenCV, PyTorch, ROS 1/2  
Software: Docker, Git, Jira, LaTeX, Linux, Protobuf, Vim  
Optimization: CppAD, Eigen, GLPK, GNU MathProg, Gurobi, IPOPT, OSQP, PuLP

## PROJECTS

[Demos and More Projects](#)

**Long Horizon Task Planning for Quadruped Robot** | *Research Project, CMU* Sep 2023 – Present  
• Obtained controller using curriculum-based learning in Isaac Gym; distilling vision-based policy to real Go1 robot  
• Generated local motion time & energy costs dataset and trained cost predictor as a multi-head convolutional NN  
• Demonstrated long horizon task planning with user-defined objective using A\* search guided by the cost predictor

**Autonomous Quadruped in Unknown Cluttered Terrains** | *MRSD Capstone, CMU* Sep 2022 – Dec 2023  
• Devised non-linear MPC tracked using reactive whole-body control and deployed to quadruped  
• Implemented safety features for disaster sites & demonstrated on-demand temporary takeover by safety operator  
• Integrated localization (Superodometry), controller (custom), and exploration (TARE Planner) sub-systems  
• Demonstrated robust exploration at 16.5 m<sup>2</sup>/min coverage rate of unknown, cluttered room with trapped humans

**Quadruped Robot Challenge** | *ICRA 2023 Competition, London* May 2023 – Jun 2023  
• Deployed controller to Unitree Go1 & navigated challenge course using Beyond Visual Line-of-Sight teleoperation  
• Recovered from falls using pre-defined maneuvers and achieved the third position representing Carnegie Mellon

**Robot Vision Scene Understanding Challenge** | *CVPR 2021 Competition, Remote* Mar 2021 – Apr 2021  
• Built object-based 3D semantic map utilizing RGBD & odometry measurements from robot traversing environment  
• Devised consensus across YOLOv4, VoteNet, & Group-Free 3D and implemented 3D NMS for perception pipeline

**F1/10th – Autonomous Grand Prix** | *IROS 2020 Competition, Remote* Oct 2020  
• Leveraged Bernstein polynomial based local trajectory planner & MPC for Ackermann steering in 4-member team  
• Acquired global optimal path via Operator Splitting quadratic program solver and implemented obstacle detection