Heramb Modugula

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Education

University of Edinburgh
Ph.D. Student in Robotics — *Sep 2025 - Aug 2028*

- PI: Subramanian Ramamoorthy (Centre for AI in Assistive Autonomy)
- Fully-funded Studentship supported by the Alan Turing Institute
- Research Focus: Personalisation of learnt robot behaviours using dialogue in human-assistive settings

University of Cambridge — Merit, Class I (Thesis)
M.Eng.(Hons) Information and Computer Engineering, Electrical and Information Sciences — *Jun 2024 - Jun 2025*

- Relevant coursework: Deep learning, Computer vision, Probabilistic Machine Learning, Data-driven and learning based methods, Brain Machine Interfaces, Embedded systems for IoT, Algorithms and data structures
- Thesis: A contextual inference approach to robotics sensory-motor learning

University of Cambridge — Class II.1
B.A.(Hons) Information and Computer Engineering, Bio-engineering (Minor) — *Sep 2021 - Jun 2024*

- Relevant coursework: Dynamics, Inference, Information Theory and Coding, Mathematical Methods, Signals and Systems, Statistical Signal Processing, Introduction to neuroscience, Medical Imaging and 3D Computer Graphics
- Activities: Mathworks Ambassador, CU Robotics Society, CU Riviera Racing, Men's Rowing

Technical Skills

Hardware: Franka Emika Panda, Dyson MAKS, Kuka iiwa, UR5, Unitree Go1, Turtlebot 2 and 3
Software: ROS 2, Python, C++, MATLAB, Gazebo, MuJoCo, MoveIt, PyTorch, TensorFlow, Git, Docker
Developer Tools: SolidWorks, Rhinoceros 3D, Blender, Adobe InDesign/Photoshop, Final Cut Pro
Workshop/Lab: Woodworking, Metal Fabrication, Technical Drawing, 3D Printing

Research Experience

University of Cambridge — Jun 2024 - Jul 2025
Graduate Student Researcher (Bio-Inspired Robotics Lab; Advised by Prof. Fumiya Iida) — *Cambridge, UK*

- Enabling robot agents to understand multimodal contextual information and adapt to social cues using the novel COntextual INference (COIN) model of sensorimotor learning, originally developed for humans
- Research undertaken in collaboration with the Computational and Biological Learning Lab, Cambridge University and the Sensorimotor Learning Group, Columbia University

Komodo Health — Jun 2023 - Sep 2023
Data Science Research Intern (Advised by Prof. Meghan Dierks, Harvard University) — *San Francisco, CA*

- Identified and cataloged various data anomalies in Medicare and Medicaid beneficiary enrollment de-identified (DeID) data and later verified them using the source-identified data from faculty at Harvard Medical School
- Created realistic, comprehensive synthetic datasets for the entire US population, using public SSA and Census datasets, to benchmark DeID third-party software

Dyson — Jun 2022 - Sep 2022
Robotics Research Intern (Manipulation Group; Advised by Dr. Ali Akbari and Charles Collis) — *Hullavington, UK*

- Was the only undergrad intern selected by their future robots division
- Wrote custom algorithms for whole-body motion planning in Python and integrated them with the entire behavior and intelligence system as a demonstration (using pyBullet, Gazebo, and Rviz)
- Optimized buggy low-level C++ libraries based on MoveIt, modified associated Python bindings and refactored the high-level task and motion planning (TAMP) libraries
- Generated and evaluated custom ik-fast plugins for various 6/7 DOF arms and gripper configurations

GreenSys Nov 2019 - Dec 2019
System Integration Research Intern *Delhi, India*

- Integrated Turtlebot-2-based service robot with home automation platform
- Wrote ROS API handlers to exchange text, images, and videos between robots and cloud
- Demonstrated this work at IEEE Ro-Man 2019 and was placed 2nd in Socialis Impermiere Student Exhibition

Step By Step School Jun 2020 - Feb 2021
High School Senior Thesis *Delhi, India*

- Studied the effect of varying the left and right wheel torques (τ_L and τ_R) on the linear and angular acceleration (ν and ω) of a differential drive robot using the Euler-Lagrangian formulation

Projects

At University 2021-2024

- **Mars Lander simulation** - Designed a C++ orbital mechanics/dynamics simulator and an Entry, Descent and Landing controller for various scenarios to optimize fuel consumption
- **Robotics capstone project** - Technology demonstrator to show the capabilities of a wheeled robot to navigate obstacles, find objects, and make decisions
- **Freshman robotics lab** - Prototyped a greyscale flying spot camera using LEGO Mindstorms and Python

5-DOF Arm Kinematic Modelling Fall 2020

- Derived and benchmarked analytical models of the 5-DOF manipulator (Turtlebot Arm) forward/inverse kinematics and quintic spline trajectory planning in MATLAB

Honors/Awards

2nd Place - Socialis Impermiere Student Exhibition, **IEEE RO-MAN 2019**, New Delhi
1st Place - High School category, RoboCup@Home EDU, **RoboCup 2018**, Montreal
Best Improvement Award - RoboCup@Home EDU, **RoboCup Asia Pacific 2017**, Bangkok

Service

Team Mentor and Judge - MiniBots and UniBots UK 2021-24, Cambridge
Robotics Activity Lead - Cambridge Festival 2024, Cambridge
Society Rep - Cambridge University Robotics, Freshers Fairs and CUED Open Days 2022-24, Cambridge
Volunteer - FLL Cambridge 2023, Cambridge
Volunteer - IEEE MRS 2021, Cambridge
Finals Judging Volunteer - RoboCup@Home EDU, RoboCup 2021, Online
Workshop Trainer - Online Tutorials RoboCup@Home EDU, RoboCup 2020, Online
Workshop Trainer and Organizing Committee - RoboCup@Home EDU, RoboCup India 2020, New Delhi

References

Prof. Subramanian Ramamoorthy, *Professor of Robotics, University of Edinburgh* 2025 – Present
Prof. Fumiya Iida, *Professor of Robotics, University of Cambridge* 2021 – Present
Sebastian Castro, *Senior Applied Scientist, Boston Dynamics AI Institute* 2017 – Present
Charles Collis, *ex Global Head of Robotics Research, Dyson* 2022 – Present