

Rohan Banerjee

Address: 344 Gates Hall, 107 Hoy Road, Cornell University, Ithaca, NY 14853

Phone: (703)-743-4178 E-Mail: rbb242@cornell.edu

EDUCATION

Cornell University

Ithaca, NY

Ph.D. Candidate, Computer Science, GPA: 4.0/4.0

September 2020 – present (expected: May 2026)

Relevant Coursework: Model-Based State Estimation, Robot Manipulation, Machine Learning Theory, Deep Probabilistic and Generative Models, Matrix Computations

Massachusetts Institute of Technology (MIT)

Cambridge, MA

M.Eng. in Electrical Engineering and Computer Science, GPA: 4.5/5.0

June 2019

S.B. in Electrical Engineering and Computer Science, GPA: 4.9/5.0

June 2018

Relevant Coursework: Statistical Learning Theory and Applications, Robotics: Science and Systems, Bayesian Modeling and Inference, Machine Learning, Inference and Information, Design and Analysis of Algorithms, Computational Cognitive Science, Discrete-Time Signal Processing, Elements of Software Construction, Computation Structures

Thomas Jefferson High School for Science and Technology

Alexandria, VA

SAT: 2400, GPA (weighted): 4.538/4.0

September 2010 – June 2014

Relevant Coursework: Artificial Intelligence, Parallel Computing

RESEARCH EXPERIENCE

Cornell University

Ithaca, NY

Ph.D. Student

September 2020 – present

- Principal Investigators: Prof. Sarah Dean and Prof. Tapomayukh Bhattacharjee (March 2023 – present)
- Conducting research as part of EmPRISE (Empowering People with Robots and Intelligent Shared Experiences) lab
- Research area: Developing human-in-the-loop interactive learning algorithms for failure recovery in robot-assisted bite acquisition.
- Skills: Developing active learning algorithms; training supervised linear models for predicting querying workload; training contextual bandit policies; software engineering; full-stack robot system design + integration
- Mentored M.Eng. student (Krishna Palempalli) on GPT prompt engineering + uncertainty quantification, and undergraduate student (Bohan Yang) on RT-1 fine-tuning + uncertainty quantification.
- Principal Investigator: Prof. Mark Campbell (September 2020 – October 2022); Conducted research as a member of the ASL (Autonomous Systems Laboratory) group
- Research area: Developing reinforcement learning (RL) algorithms for the autonomous navigation domain that are robust to variations in the surrounding environment

Massachusetts Institute of Technology

Cambridge, MA

Research Engineer

June 2019 – June 2020

- Conducted research as a member of the DRL (Distributed Robotics Laboratory) group at CSAIL (Computer Science and Artificial Intelligence Laboratory)
- Refined autonomous driving simulation platform based on CARLA open-source driving simulator
- Validated research algorithms in simulation for vehicle navigation, dynamic obstacle avoidance, and end-to-end learning
- Supported research in language understanding and human-robot interaction involving the Toyota Human Support Robot platform

Massachusetts Institute of Technology

Cambridge, MA

M.Eng. Researcher

March 2018 – June 2019

- Principal Investigator: Prof. Daniela Rus; Conducted research as a member of the DRL group at CSAIL.
- Thesis Title: “Development of a Simulation-Based Platform for Autonomous Vehicle Algorithm Validation”
- Developed autonomous vehicle simulation platform based on CARLA open-source driving simulator
- Investigated learning algorithms for LIDAR-based rural road detection

Updated: October 2025

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Massachusetts Institute of Technology

UIROP (Undergraduate Research Opportunities Program)

Cambridge, MA

November – December 2017

- Principal Investigator: Prof. Jonathan How
- Conducted research as a member of the ACL (Aerospace Controls Laboratory) group
- Contributed to the development of a tripod-based sensor platform for pedestrian localization and intention recognition
- Calibrated webcams and LIDAR (Velodyne VLP-16), and investigated power management options for tripod platform

Massachusetts Institute of Technology

SuperUIROP Advanced Undergraduate Research Program

Cambridge, MA

September 2016 – May 2017

- Principal Investigator: Dr. Jim Glass
- Conducted research as member of the SLS (Spoken Language Systems) group at CSAIL (Computer Science and Artificial Intelligence Laboratory)
- Contributed to the development of a conversational robotic system that can acknowledge speaking subjects
- Converted offline Voice Activity Detector module into real-time streaming module
- Researched techniques for integrating visual face detection and audio source localization

George Mason University

Applied Mathematics Intern, Aspiring Scientists Summer Internship Program

Fairfax, VA

June – August 2012, June – August 2013

- Principal Investigator: Prof. Padmanabhan Seshaiyer
- Developed MATLAB simulation of 1D Euler-Bernoulli Beam PDE system (2012); Modeled deformation of 2D membrane PDE system in COMSOL (2013)
- Simulated lung tissue fluid-structure interaction in MATLAB and developed lung tissue edge detection Python program: Pneumothorax Modeling and Diagnosis (2012)

THESES

R. Banerjee, “Development of a Simulation-Based Platform for Autonomous Vehicle Algorithm Validation”. MIT, 2019.

PUBLICATIONS

UNDER SUBMISSION

R. Banerjee, K. Palempalli*, B. Yang*, J. Fang, A. Abdullah, T. Silver, S. Deant, T. Bhattacharjee† “A Human-in-the-loop Confidence-Aware Failure Recovery Framework for Modular Robot Policies.”

P. Ray, R. Banerjee, M. Campbell. “Adversarial Curriculum Learning for Robust Autonomous Driving Policies.”

CONFERENCE PAPERS

R. Banerjee, R.K. Jenamani*, S. Vasudev*, A. Nanavati, K. Dimitropoulou, S. Deant†, T. Bhattacharjee†, “To Ask or Not To Ask: Human-in-the-loop Contextual Bandits with Applications in Robot-Assisted Feeding”, *IEEE International Conference on Robotics and Automation (ICRA)* 2025.

Finalist, IEEE ICRA Best Paper Award on Human-Robot Interaction

Finalist, IEEE ICRA Best Student Paper Award

Finalist, IEEE ICRA Best Paper Award

R. Madan, J. Lin, M. Goel, A. Xie, X. Liang, M. Lee, J. Guo, P. N. Thakkar, R. Banerjee, J. Barreiros, K. Tsui, T. Silver, T. Bhattacharjee, “PrioriTouCh: Adapting to User Contact Preferences for Whole-Arm Physical Human-Robot Interaction”, *Conference on Robot Learning (CoRL)* 2025.

J. Su, R. Banerjee, J. Sun, W. Sun, S. Dean, “MixUCB: Enhancing Safe Exploration in Contextual Bandits with Human Oversight”, *Reinforcement Learning Conference (RLC)* 2025.

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JOURNAL PAPERS

T. Ort, K. Murthy, **R. Banerjee**, S.K. Gottipati, D. Bhatt, I. Gilitschenski, L. Paull, and D. Rus, "MapLite: Autonomous Intersection Navigation Without a Detailed Prior Map," *IEEE Robotics and Automation Letters*, vol. 5, no. 2, pp. 556–563, 2020.

Winner, RA-L Best Paper Award

A. Amini, I. Gilitschenski, J. Phillips, J. Moseyko, **R. Banerjee**, S. Karaman, and D. Rus. "Learning Robust Control Policies for End-to-End Autonomous Driving From Data-Driven Simulation," *IEEE Robotics and Automation Letters*, vol. 5, no. 2, pp. 1143–1150, 2020.

R. Banerjee & P. Seshaiyer. "Computational Mechanics of a Coupled Flow-Structure Interaction Problem with Applications to Bio-Inspired Micro Air Vehicles," *International Journal of Aerospace and Lightweight Structures (IJALS)*, vol. 3, no. 3, pp. 399–407, 2013.

A.R. Bhandarkar, **R. Banerjee** & P. Seshaiyer, "On the Stability of Lung Parenchymal Lesions with Applications to Early Pneumothorax Diagnosis," *Computational and Mathematical Methods in Medicine*, vol. 2013, pp. 1–12, 2013.

WORKSHOP PAPERS

K. Palempalli, **R. Banerjee**, S. Dean[†], T. Bhattacharjee[†], "Human-in-the-loop Foundation Model Failure Recovery for Robot-Assisted Bite Acquisition," *Safely Leveraging Vision-Language Foundation Models in Robotics: Challenges and Opportunities, ICRA 2025*.

R. Banerjee, S. Dean, and T. Bhattacharjee, "To ask or not to ask: Robot-assisted bite acquisition with human-in-the-loop contextual bandits," in *First Workshop on Out-of-Distribution Generalization in Robotics at CoRL 2023*, 2023.

R. Banerjee*, P. Ray*, M. Campbell. Improving Environment Robustness of Deep Reinforcement Learning Approaches for Autonomous Racing Using Bayesian Optimization-based Curriculum Learning, *IROS Workshop on Learning Robot Super Autonomy*, 2023.

INDUSTRY EXPERIENCE

Autoliv (now Veoneer)

Lowell, MA

Intern, Advanced Sensing Group

June – August 2017

- Developed mapping algorithm for LIDAR data (Velodyne HDL-64) using point cloud registration to maintain coherent point cloud history and advance lane/object tracking algorithms
- Investigated mapping/registration techniques with lower-resolution (Velodyne VLP-32) LIDAR data to improve point cloud data resolution
- Investigated ego-motion estimation techniques with VLP-64 data to support vehicle localization

Northrop Grumman

San Diego, CA

Intern, Systems Integration, Test & Evaluation

June – August 2016

- Supported Systems Integration, Test & Evaluation for the Triton UAV (Unmanned Aerial Vehicle) program
- Developed Python test automation script for Triton test-bench landing test
- Co-developed SQL database for automated processing of Triton System Test Requests
- Improved upon Excel database for tracking flight requirements and test points
- Researched test automation methods for future modular hot-bench

NASA Goddard Space Flight Center

Greenbelt, MD

Intern, Mission Engineering and Systems Analysis Division

January 2015; June – August 2015; January 2016

- Contributed to the NICER (Neutron Star Interior Composition Explorer)/SEXTANT (Station Explorer for X-Ray Timing and Navigation) mission
- Updated 1PPS signal interrupt handler Linux kernel module for hardware timing and synchronization
- Co-developed simulator of bi-directional science and telemetry packet transmission with another intern

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HONORS AND AWARDS

- Finalist, IEEE ICRA Best Paper Award on Human-Robot Interaction, ICRA 2025
- Finalist, IEEE ICRA Best Student Paper Award, ICRA 2025
- Finalist, IEEE ICRA Best Paper Award, ICRA 2025
- Predoctoral Fellow, AI and Precision Nutrition T32 Program at Cornell, 2024
- Member, IEEE-HKN (Eta Kappa Nu), inducted 2018
- Fourth Place in Category: Mathematical Sciences, Intel International Science and Engineering Fair, Phoenix, 2013
- Regional Finals participant, Siemens Competition in Math, Science, and Technology, Atlanta, 2012

TEACHING EXPERIENCE

Cornell University **Ithaca, NY**

Teaching Assistant, Introduction to Reinforcement Learning (CS 4789) February – May 2023

- Revised problem set questions and managed grading of assignments

Cornell University **Ithaca, NY**

Teaching Assistant, Foundations of Artificial Intelligence (CS 4700) February – May 2021

- Developed problem set and exam questions
- Recognized by Prof. Haym Hirsh at Cornell CS Student Recognition Event (May 2021)

Cornell University **Ithaca, NY**

Teaching Assistant, Introduction to Machine Learning (CS 4780) September – December 2020

- Developed problem sets in coordination with undergraduate TAs
- Conducted office hours to assist students with concepts and problem sets

Massachusetts Institute of Technology **Cambridge, MA**

Teaching Assistant, Introduction to Probability (6.041/6.431) September – December 2018, February – May 2018

- Taught weekly tutorial problem-solving sessions to small student groups
- Conducted office hours to assist students with concepts and problem sets

Massachusetts Institute of Technology **Cambridge, MA**

Lab Assistant, Introduction to Electrical Engineering and Computer Science I (6.01) February – May 2015

- Assisted students with in-class Software Labs and engineering Design Labs

SERVICE

- Participated in Cornell Student-Applicant Support Program, assisting 2 prospective PhD applicants with preparing application materials (2022)
- Helped improve course materials for Cornell Foundations of Robotics class (CS 4750): Summer 2023
- Reviewer for ACM T-HRI (2025), IEEE RA-L (2025), HRI Short Contributions (2023, 2024), L4DC (2024)

PROJECTS

Generating Simulated Environments for 2D Path Planning Using Deep Conditional Generative Models **Ithaca, NY**

Class Project, Deep Probabilistic and Generative Models (CS 6783) February 2021 – May 2021

- Explored the application of deep generative models to the problem of generating simulated 2D map environments
- Experimented with conditional variational autoencoder (CVAE) and PixelCNN architectures on a synthetic 2D dataset

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3D Point Cloud Clustering Using Small-Variance Asymptotics

Cambridge, MA

Class Project, Bayesian Modeling and Inference (6.882)

March 2018 – May 2018

- Explored Bayesian non-parametric clustering of 3D point cloud data using small-variance asymptotics approximate inference algorithms
- Implemented Kulis and Jordan (2012) small-variance asymptotics algorithm for DP-GMM and Straub et al. (2015) algorithm for DP-vMF-MM in Python

MIT Unmanned Aerial Vehicle Team

Cambridge, MA

Student Participant

September 2014 – September 2017

- Developed refined 2D simulator of competition arena and agent dynamics for the International Aerial Robotics Competition as simulation team lead
- Managed development of computer vision gridline and circle detection Python programs as computer vision team lead
- Co-developed Python simulator of competition arena and contributed to UAV path planning algorithms as member of artificial intelligence team

SKILLS

Algorithms: Active learning, supervised machine learning, contextual bandits, reinforcement learning

Software engineering: Continuous integration (CI)

Robotics: Position control, Robot geometry/coordinate transformations

Programming Languages: Python, MATLAB, C++, Java, C, HTML, LaTeX

Frameworks/Libraries: PyTorch, ROS, Scikit-learn