

# Rohan Banerjee

Home Address: 2907 Blue Holly Lane, Oak Hill, VA 20171-3853

School Address: 550 Memorial Drive, Apt. 12E-4, Cambridge, MA 02139

Phone: (703)-743-4178 E-Mail: rohanb@mit.edu

## EDUCATION

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### Massachusetts Institute of Technology (MIT)

Cambridge, MA

Candidate for 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

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### Massachusetts Institute of Technology

Cambridge, MA

*M.Eng. Researcher*

March 2018 – present

- Principal Investigator: Prof. Daniela Rus
- Conducting research as a member of the DRL (Distributed Robotics Laboratory) group at CSAIL (Computer Science and Artificial Intelligence Laboratory)
- Thesis Title: "Towards the Development of a Simulation-Based Platform for Autonomous Vehicle Algorithm Prototyping and Testing using the CARLA Simulator"
- Developing autonomous vehicle simulation platform based on CARLA open-source driving simulator
- Developing algorithms for LIDAR-based rural road detection

### Massachusetts Institute of Technology

Cambridge, MA

*UIROP (Undergraduate Research Opportunities Program)*

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

Cambridge, MA

*SuperUIROP Advanced Undergraduate Research Program*

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

Fairfax, VA

*Applied Mathematics Intern, Aspiring Scientists Summer Internship Program*

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)
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## INDUSTRY EXPERIENCE

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### **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

## HONORS AND AWARDS

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### **Intel International Science and Engineering Fair**

**Phoenix, AZ**

*Fourth Place in Category: Mathematical Sciences*

May 2013

### **Siemens Competition in Math, Science, and Technology**

**Atlanta, GA**

*Selected for Regional Finals at Georgia Tech for biophysics project*

November 2012

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## PUBLICATIONS

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[1] 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.

[2] 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.

## TEACHING EXPERIENCE

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### 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

## PROJECTS

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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