

RAHUL MITRA

111, Cummington Mall, Boston, MA 02215 | rahulm@bu.edu

✉ rahulmitra.xyz | 📞 Rahul Mitra | 🌐 rahul-mitra13 | 📺 rahul-mitra13

EDUCATION

Boston University

Ph.D. in Computer Science

Advisor: Edward Chien

September 2021 - Present

Trinity College, CT

B.S., Computer Science (honors) & Physics (honors)

Summa Cum Laude

September 2017 - May 2021

GPA: 3.95/4.0

Relevant coursework: Advanced Algorithms, Operating Systems, Programming Languages, Differential Equations, Multivariable Calculus, Quantum Mechanics, Electrodynamics, Experimental Physics

RESEARCH EXPERIENCE

Real-time Object Detection Aid for the Visually Impaired

Department of Computer Science, Trinity College

Sep 2020 - May 2021

Advisor: Dr. Peter Yoon

- Built white cane, enhanced with a microcomputer, to identify objects and provide audio feedback in real-time.
- Configured Jetson Nano high-performance microcomputer for efficient object identification using a trained model.
- Developed iOS application for audio feedback and seamless interfacing between user and enhanced white cane.
- Winner of best thesis award based on completeness, technical maturity and relevance.

Contact Sensing via Active Oscillatory Actuation (Pub. 2)

Department of Engineering, Trinity College

Mar 2020 - Jul 2020

Advisor: Dr. Kevin Huang

- Designed and built a low-cost, low-intrusion vibration-based contact sensor.
- Implemented machine learning models to classify exact location of contact.

Vision-based Force-Feedback in RMIS (Pub. 3)

Department of Engineering, Trinity College

Jan 2020 - Mar 2020

Advisor: Dr. Kevin Huang

- Examined the extent to which haptic feedback could deviate from ground truth while still resulting in an acceptable teleoperated performance in robot-assisted minimally invasive surgery (RMIS).
- Developed mathematical model for node-to-node interaction in simulated tissue surface.

Haptic Interface for Legged Robot Locomotion (Pub. 4 & 1)

Department of Engineering, Trinity College

Apr 2019 - Mar 2020

Advisor: Dr. Kevin Huang

- Developed software and experimental protocol to compare a haptic feedback interface vs a keyboard interface and a joystick interface for legged robot locomotion.
- Implemented data analysis models to interpret results from user study.

Sampling of 3DOF Manipulator Joint-Limits for Haptic Feedback (Pub. 5)

Department of Engineering, Trinity College

Dec 2018 - Jul 2019

Advisor: Dr. Kevin Huang

- Implemented point cloud generation/retrieval models for providing haptic feedback in teleoperated robots.
- Presented research paper at the IEEE International Conference on Advanced Robotics and Mechatronics (ICARM), 2019, Osaka.

PUBLICATIONS

1. K. Huang, D. Subedi, **R. Mitra**, I. Yung, K. Boyd, E. Aldrich, D. Chitrakar, "Telelocomotion—Remotely Operated Legged Robots", *Applied Sciences* 2021, 11, 194.
2. **R. Mitra**, K. Boyd, D. Subedi, D. Chitrakar, E. Aldrich, A. Swamy, K. Huang, "Contact Sensing via Active Oscillatory Actuation", *IEEE International Conference on Mechatronics, Robotics and Automation (ICMRA)*, Shanghai, China, 2020.
3. K. Huang, D. Chitrakar, **R. Mitra**, D. Subedi, Y.H. Su, "Characterizing Limits of Vision-Based Force Feedback in Simulated Surgical Tool-Tissue Interaction", *Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Montreal, Canada, 2020.

4. D. Chitrakar, **R. Mitra**, K. Huang, “Haptic Interface for Hexapod Gait Execution”, IEEE International Conference on Robotic Computing (IRC), Taichung, Taiwan, 2020.
5. K.Huang, Y.H. Su, M. Khalil, D. Melesse, **R. Mitra**, “Sampling of 3DOF Robot Manipulator Joint-Limits for Haptic Feedback”, IEEE International Conference on Advanced Robotics and Mechatronics (ICARM), Osaka, Japan, 2019.

PRESENTATIONS

1. “Real-time Object Detection Aid for the Visually Impaired”, Computer Science Senior Thesis Presentation, 2021.
2. “Sampling of 3DOF Robot Manipulator Joint-Limits for Haptic Feedback”, IEEE International Conference on Advanced Robotics and Mechatronics (ICARM), Osaka, Japan, 2019.
3. “Telelocomotion - Remotely Operated Legged Robots”, Trinity College Summer Research Symposium, 2019.

TEACHING & SERVICE

Head Teaching Assistant, Data Structures and Algorithms (CPSC 215) <i>Department of Computer Science, Trinity College</i>	Feb 2021 - May 2021
Teaching Assistant, Mechanics (PHYS 141) <i>Department of Physics, Trinity College</i>	Sep 2020 - Dec 2020
Teaching Assistant, Data Structures and Algorithms (CPSC 215) <i>Department of Computer Science, Trinity College</i>	Jan 2020 - May 2020
President, Trinity College Chapter of IEEE <i>Department of Engineering, Trinity College</i>	Sep 2019 - Jan 2020
Mentor, Introduction to Engineering Design: Mobile Robots (ENGR 120) <i>Department of Engineering, Trinity College</i>	Jan 2019 - May 2019
Teaching Assistant, Introduction to Computing (CPSC 115) <i>Department of Computer Science, Trinity College</i>	Jan 2019 - May 2019
Teacher, Teach the Teachers Program <i>Department of Engineering, Trinity College</i>	Jun 2018
<ul style="list-style-type: none"> • Introductory robotics program aimed at school teachers with the goal of having more robotics curriculum in Hartford middle schools. 	

TECHNICAL SKILLS

Programming Languages	Java, Python, C/C++, HTML, CSS, JavaScript, Arduino programming language, MATLAB, Mathematica, SQL, familiar with Standard ML
Software and Technologies	Git, Raspberry Pi, Arduino Board, LATEX, familiar with ROS
Natural Languages	English, Hindi, Bengali

HONORS AND AWARDS

† Senior Research Prize (best thesis), Department of Computer Science	Spring 2021
† President’s Fellow, Department of Physics	Fall 2020
† Albert J. Howard Jr. Prize in Physics	Spring 2020
† Phi Gamma Delta Prize in Mathematics	Spring 2020
† Faculty Honors	All Semesters
† Herbert J. Hall Scholar	All Semesters
† Full Tuition Scholarship	2017 - 2021

†= Awarded at Trinity College