

Rahul Mitra

MCS 117G, 111 Cummington Mall, Boston, MA 02215 | rahulm@bu.edu | +1 206 751 7697

✉ rahulmitra.xyz |  rahul-mitra13 |  rahul-mitra13

EDUCATION	Boston University: Ph.D. in Computer Science, advised by Edward Chien Sep 2021 - Present Research Interests: Computer Graphics/Geometry Processing & Digital Fabrication Trinity College: B.S. Computer Science (Hons.) & Physics (Hons.), Research Advisor: Kevin Huang May 2021 Research Interests: Robotic Teleoperation, Evaluating Haptic Interfaces, Contact Sensing GPA: 3.95/4.0, <i>Summa Cum Laude</i> , <i>Phi Beta Kappa inductee</i> , <i>Class of 2021's President's Fellow in Physics</i>
EXPERIENCE	Graduate Research Assistant , Boston University Department of Computer Science Sep 2021 - Present <ul style="list-style-type: none">Implementing geometry processing techniques to solve problems in meshing for computational knitting.Involves aspects from non-convex optimization, topology and computational fabrication. Real-time Object Detection Aid for the Visually Impaired , (undergrad. CS senior thesis) Sep 2020 - May 2021 <ul style="list-style-type: none">Built white cane, enhanced with a microcomputer, to identify objects and provide audio feedback in real-time.Configured Jetson Nano high-performance microcomputer for 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. Researcher, Vibration-based Contact Sensing , Trinity College Dept. of Engineering Mar 2020 - Jul 2020 <ul style="list-style-type: none">Designed and implemented a Vibration-based Contact Sensor.Wrote code in C and Python to interface sensor with a Raspberry Pi.Co-authored research paper accepted at IEEE ICMRA, 2020. [Pub. 1] Researcher, Vision-based force-feedback in RMIS , Trinity College Dept. of Engineering Jan 2020 - Mar 2020 <ul style="list-style-type: none">Examined deviation of haptic feedback from ground truth for acceptable performance in Robot-Assisted Minimally Invasive Surgery (RMIS).Developed mathematical models for node-to-node interaction in simulated tissue surface.Co-authored research paper published at IEEE EMBC, 2020. [Pub. 2] Researcher, Haptic Interface for Robot Locomotion , Trinity College Dept. of Engineering Apr 2019 - Mar 2020 <ul style="list-style-type: none">Developed software and experimental protocol to compare a haptic feedback interface vs a keyboard interface and joystick interface for legged robot-locomotion.Conducted and interpreted results from user study with Matlab.Co-authored research paper published at IEEE IRC, 2020. Co-authored follow-up journal paper published at MDPI Applied Sciences Journal. [Pub. 3 & Pub.4] Researcher, Joint-limit haptic feedback , Trinity College Dept. of Engineering Dec 2018 - Jul 2019 <ul style="list-style-type: none">Implemented point cloud generation/retrieval models for providing haptic feedback in teleoperated robots.Co-authored research paper published at IEEE ICARM, 2019. [Pub. 5]
RESEARCH PRESENTATIONS	Boston University Graphics Seminar x 2 <ul style="list-style-type: none">External paper presentation: Monte-Carlo Geometry Processing, published at SIGGRAPH 2020 (Jun 2022).Presented our ongoing research in computational knitting (Nov 2021). IEEE International Conference on Advanced Robotics & Mechatronics (ICARM, 2019) July 2019 <ul style="list-style-type: none">Presented our paper on joint-limit haptic feedback. [Pub. 5]
TEACHING	Teaching Assistant x 5 , Trinity College CS, Engineering Dept. Jan 2019 - May 2021 <ul style="list-style-type: none">Data Structures & Algorithms (Head TA, Spring '21), Intro. Mechanics (Fall '20), Data Structures & Algorithms (Spring '20), Intro. Computing (Spring '19), Intro. Engineering Design (Spring '19).
SKILLS	Programming: C++, Python, C, Mathematica, Matlab HTML CSS, Javascript, SQL, SML Software & Technologies: Git, Blender, MeshLab, Gurobi, libigl, RaspberryPi
PUBLICATIONS	[1] 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. [2] K. Huang, D. Chitrakar, R. Mitra , D. Subedi, and 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. [3] D.Chitrakar, R. Mitra , and K.Huang, "Haptic Interface for Hexapod Gait Execution", IEEE International Conference on Robotic Computing (IRC), Taichung, Taiwan, 2020. [4] K.Huang, R. Mitra , I. Yung, D. Chitrakar, "Telelocomotion - Remotely Operated Legged Robots", MDPI Applied Sciences, 2020. [5] K.Huang, Y.H. Su, M. Khalil, D. Melesse, and R. Mitra , "Sampling of 3DOF Robot Manipulator Joint-Limits for Haptic Feedback," 2019 IEEE International Conference on Advanced Robotics and Mechatronics (ICARM), Osaka, Japan, 2019.