Naveed Riaziat

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EDUCATION

PhD Mechanical Engineering **Johns Hopkins University**   2020-Present
  Advisor: Prof. Jeremy D. Brown
MS Robotics **Johns Hopkins University University**   2020-2022
BS Mechanical Engineering **Purdue University**   2016-2020

SKILLS AND COURSEWORK

Software:	C++, Python, OpenCV, MATLAB, ROS, Linux
Hardware:	Solidworks, CAD/CAM, DFM, GD&T
Misc:	Sensor integration, PCB Design, Microcontrollers, Signal Processing, Statistics

Control Courses:	Robust Control, Adaptive Control, Nonlinear Control, Linear Systems, Algorithms for Sensor Based Robots, "Robot Devices, Kinematics, Dynamics, and Control"
Mathematics Courses:	Partial Differential Equations, Linear Algebra
Misc Courses:	Mechatronics (TA), Electromechanical Motion Devices, Digital Logic Design, Analog Circuit Design, Haptic Interface Design (TA), Human Robot Interaction

PROJECTS

Haptic Feedback for Ungrounded Magnetically Actuated Robots

– Developed real-time localization and control framework using OpenCV, Python, and C++
– Designed and manufactured novel EMI-resistant force sensing PCB and brain aneurysm phantom for mock aneurysm coiling task
– Implemented kinesthetic haptic interface and novel Tikhonov Regularization control

Control Arbitration for Robot-Assisted Minimally Invasive Surgery

– Designed trackers for custom tool localization via Atracsys Fusion Track camera
– Developing blending-mode controller with haptic feedback to improve surgeon performance on electrocautery disection task

PUBLICATIONS

1. Machaca, S., Karachiwalla, Z., Riaziat, N. D. & Brown, J. D. *Towards a ROS-based Modular Multi-Modality Haptic Feedback System for Robotic Minimally Invasive Surgery Training Assessments* in *2022 International Symposium on Medical Robotics (ISMR)* ISSN: 2771-9049 (Apr. 2022), 1–7.

2. Miller, A. J., Riaziat, N. D. & Brown, J. D. *An Open-Source Ungrounded Hapkit for Educational Applications* in *2021 IEEE World Haptics Conference (WHC)* (July 2021), 1155–1155.

WORK EXPERIENCE

Mechanical Engineering Intern Intuitive Surgical   May - Aug 2020

– Developed hardware, software, and electronics for new testing equipment.
– Used PLCs to control and measure electromechanical systems
– Performed dynamics analysis for life cycle evaluation and material selection
– Produced design documents and manufacturing drawings

Mechatronics Intern Intuitive Surgical   May - Aug 2019

– Prototyped Next-Generation System Components

– Analyzed Workflow and Operating Room (OR) integration

– Introduced Electromechanical Systems for Improved Testing

– Designed Fixtures for System Characterization

– Coordinated with CDE's, Surgeons, Engineers to Inform Design Requirements.

CMC Manufacturing Eng. Intern Rolls-Royce High Temperature Composites   May - Aug 2018

– Introduced novel machining fixtures for 5-Axis Machines

– Instated Tool Tracking to predict tool wear for purchasing

– Launched SOP/TI development for new capabilities

Motion Algorithms Intern TDK Invensense   May - Aug 2018

– Developed Motion Algorithms for navigation with 9-axis MEMS

– Streamlined signal processing with Python, C++, MATLAB to be implemented on FPGAs

– Leveraged time and frequency domain signal analysis for motion identification

– Characterized sensor performance in high shock or vibration environments

Awards

– NSF GRFP Honorable Mention - 2020

– Laboratory for Computational Sensing and Robotics (LCSR) Distinguished Graduate Fellowship - 2020

– Purdue Senior Design First Place - 2020

– Purdue Presidential Scholarship