Naveed Riaziat

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EDUCATION

PhD Mechanical Engineering **Johns Hopkins University**   2020-Present
  Advisor: Prof. Jeremy D. Brown
  TA: Mechatronics, Haptic Interface Design
MS Robotics **Johns Hopkins University University**   2020-2022
BS Mechanical Engineering **Purdue University**   2016-2020

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] S. Machaca, Z. Karachiwalla, N. D. Riaziat, and J. D. Brown, "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, pp. 1–7. DOI: 10.1109/ISMR48347.2022.9807479.

[2] A. J. Miller, N. D. Riaziat, and J. D. Brown, "An Open-Source Ungrounded Hapkit for Educational Applications," in *2021 IEEE World Haptics Conference (WHC)*, Jul. 2021, pp. 1155–1155. DOI: 10.1109/WHC49131.2021.9517254.

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

SKILLS

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

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

RELEVANT COURSE WORK

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