Sharfin Islam

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LinkedIn

Education

2021-Present **Columbia University in the City of New York**,
Doctor of Philosophy (PhD), Mechanical Engineering.
GPA – 4.0/4.0

2022 **Columbia University in the City of New York**,
Master of Science (MS), Mechanical Engineering, MS/PhD Track.
GPA – 3.723/4.0

2021 **Carnegie Mellon University**,
Bachelor of Science (BS), Mechanical Engineering, Minor in Robotics.
GPA – 3.910/4.0, Major GPA – 3.960/4.0

Research Experience

Aug 2021 – Present **Robotics and Manipulation (ROAM) Lab**, COLUMBIA UNIVERSITY.
- Formulated novel multi-flexor tendon model for underactuated kinematic chains. Co-optimized design parameters using reinforcement learning for reaching tasks.
  - Co-optimized design parameters using reinforcement learning for reaching tasks.
  - Designed and fabricated robot with optimized parameters and deployed learned policies on real hardware.
- Designed and fabricated a novel, compact, and low-cost 6-axis force/torque sensor.
  - We used light as our sensing modality and trained a neural network to map corresponding forces/torques.
- Building a novel, compact end-effector for compact, coordinated robot dexterity. Developing data collection procedure for behavioral cloning of dexterous manipulation tasks.
- Advised by Matei Ciocarlie

Sep 2019 – Sep 2021 **RoboMechanics Lab**, CARNEGIE MELLON UNIVERSITY.
- Designed small (15cm leg length) minimally actuated (2 servos), open loop, scalable quasi-passive walker
- Modelled walker in Matlab to investigate impact of physical and control parameters on walking gait. Validated simulation results with experimental motion capture data
- Advised by Sarah Bergbreiter and Aaron Johnson

June 2019 – Oct 2019 **Rehabilitation Robotics Lab**, UNIVERSITY OF PENNSYLVANIA.
- Updated a perception and affordance pipeline to work with Intel Realsense camera. Designed housing for camera and obtained rich binary maps of activity of daily living objects
- Advised by Michelle Johnson

Sep 2018 – May 2019 **Neuromuscular Control and Robotics Lab**, UNIVERSITY OF PITTSBURGH.
- Designed force sensing shin bracket to be used in impedance control algorithms to limit latency between electrical stimulation and joint motors in FES assisted lower extremity exoskeleton
- Advised by Nitin Sharma

Industry Experience

May 2020 – Aug 2020 **Exyn Technologies**, *Hardware Design Intern*.
- Assisted in design of production, advanced, autonomous drones for surveying and mapping
- Designed and fabricated integrated camera and lighting system - still used on production drones today.
- Validated thermal design of custom LED heat sinks using thermal imaging

Paper Publications

Under Review **A Compact, Low-cost Force and Torque Sensor for Robot Fingers with LED-based Displacement Sensing**,
2025 IEEE International Conference on Intelligent Robots and Systems (ICRA),
A. El-Azizi, **S. Islam***, P. Piacenza*, I. Kymissis, and M. Ciocarlie.

Oct 2024	**Task-Based Design and Policy Co-Optimization for Tendon-driven Underactuated Kinematic Chains**, *2024 IEEE International Conference on Intelligent Robots and Systems (IROS)*, **S. Islam***, Z. He*, and M. Ciocarlie.
May 2022	**Scalable Minimally Actuated Leg Extension Bipedal Walker Based on 3D Passive Dynamics**, *2022 IEEE International Conference on Robotics and Automation (ICRA)*, **S. Islam***, K. Carter*, J. Yim*, J. Kyle, S. Bergbreiter and A. M. Johnson, *Awarded Finalist for Outstanding Locomotion Paper*.

Press

May 31, 2022	**A First Small Step Toward a Lego-Size Humanoid Robot How small can a bipedal robot get?**, *IEEE Spectrum*.

Workshop Presentation

Oct 2024	**Towards a Miniature Bi-Manual End-effector for Compact Coordinated Robot Dexterity**, ***Sharfin Islam*** *and Matei Ciocarlie*, IROS 2024: 3rd Workshop on Mobile Manipulation and Embodied Intelligence (MOMA.v3) .
May 2021	**3D Passive Dynamics-inspired Walking Actuated by Open Loop Leg Extension**, *Justin K. Yim; Kamal Carter;* ***Sharfin Islam****; Sarah Bergbreiter; and Aaron M. Johnson*, Dynamic Walking 2021.
May 2020	**Integrating Passive Dynamic Wobbling with Leg Extension to Produce Stable Gaits in a Two-Actuator Bipedal Robot**, ***Sharfin Islam****; Kamal Carter; Ryan St. Pierre; Sarah Bergbreiter; and Aaron M. Johnson* Dynamic Walking 2020.
May 2020	**Design and Control of a Mesoscale Hip Actuated Powered Walker**, *Kamal Carter;* ***Sharfin Islam****; Ryan St. Pierre; Sarah Bergbreiter; and Aaron M. Johnson.* Dynamic Walking 2020.
October 2019	**Comparison of Microsoft Kinect and Intel Realsense for Object Recognition in Robotic Rehabilitation**, ***Sharfin Islam****; Michelle J. Johnson* BMES Conference 2019.

Honors and Awards

May 2022	**Outstanding Locomotion Paper Finalist**, *International Conference of Robotics and Automation*.
Aug 2021	**Herbert French Fellowship**, *Columbia University*.
May 2021	**Undergraduate Excellence in Research Award**, *CMU Department of Mechanical Engineering*.
	Most Innovative Senior Design Award, *CMU Department of Mechanical Engineering*.
	College of Engineering Research Honors, *Carnegie Mellon University*.
	University Honors, *Carnegie Mellon University*.
May 2020	**Tau Beta Pi**, *Carnegie Mellon University*.

Teaching Experience

Sept 2024 – Present	**Columbia University**, *Graduate Teaching Assistant*. ○ Teaching assistant for Applied Robotics, helping students learn fundamental robotic principles and applying them in simulated environments using ROS and Python
Feb 2023 – Mar 2024	**NYC STEM Club**, *Tutor and STEM Curriculum Consultant*. ○ Developing robotics curriculumn for various programs for middle school and high school students ○ Tutoring students in upper level and advanced placement math, physics, and computer science

July 2021 – Feb 2022	**SMASH**, *Computer Science and To & Through Instructor*. ○ Taught Python and To & Through classes to underrepresented high school students. To & Through classes focused on navigating college as a low-income student.
Aug 2020 – May 2021	**Carnegie Mellon University**, *Undergraduate Teaching Assistant*. ○ UTA for 24-370 Engineering Design 1 - Methods and Skills. Assisted students in their analysis, design, and fabrication of various hands-on engineering design challenges. ○ Designed and Fabricated updated rig to test student's 4-bar linkage projects
Sept 2019 – May 2020	**Fund for the Advancement of Minorities Through Education**, *Tutor*. ○ Tutored students from underrepresented backgrounds 1-on-1 in various subjects including higher level high school math and science courses (AP Calculus BC, AP Chemistry, AP Physics)
June 2019 – Aug 2019	**SMASH Wharton**, *STEM Project Coach*. ○ Co-instructed a group of 40 high school juniors from underrepresented backgrounds. Mentored them in their conceptualization, design, and presentation of an augmented reality app
Aug 2018 – May 2019	**University of Pittsburgh Swanson School of Engineering**, *Undergraduate Teaching Assistant*. ○ TA for first year engineering courses (ENGR 0011 & 0012). Held office hours, supported class hours, and graded students work in Unix, Excel, HTML, MATLAB, and C++.
Aug 2016 – Aug 2017	**Kumon Math and Reading of Bryn Mawr**, *Tutor*. ○ Graded student assignments and assisted them in their Kumon-guided work. I focused on higher-level math students working on algebra, geometry, and calculus.

Volunteer and Outreach Experience

Oct 2020 – May 2021	**Homewood Children's Village**, *Robotics Program Volunteer*. ○ Led an after school robotics program for underrepresented elementary and middle school students in the Homewood Children's Village. Students built robots using Lego Boost Platform
Aug 2020 – Dec 2020	**Carnegie Mellon University Leonard Gelfand Center**, *Road 2 Research Mentor*. ○ Presented my path to undergraduate research to a group of middle school students. I also directed an activity where the students were challenged to build a passive dynamic walker with household items. Stressed the problem solving and critical thinking nature of engineering at a personal level to the students to make engineering research more approachable.
Feb 2021 – Apr 2021	**Carnegie Mellon University**, *Team Leader - Moving 4th Into Engineering*. ○ Lead a team of 4th graders in their first exposure to the engineering design process as they built Rube Goldberg machines remotely. Gave students feedback during weekly sessions and facilitate online Zoom sessions