RIANNA JITOSHO

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EDUCATION

Stanford University | Stanford, CA   2025
- o PhD Candidate in the Department of Mechanical Engineering, GPA: 4.0/4.0
- o Research focus: Planning and Control for Soft Robots
- o Advisor: Allison Okamura
- o Relevant Coursework: Machine Learning, Robot Autonomy, Optimal and Learning-Based Control

Massachusetts Institute of Technology | Cambridge, MA   2019
- o Bachelor of Science in Mechanical Engineering, GPA: 4.9/5.0
- o Relevant Coursework: Dynamics and Control I & II, Feedback Systems, Design of Electromechanical Robotic Systems

RESEARCH EXPERIENCE

CHARM Lab at Stanford University | Stanford, CA
Graduate Student Researcher
<u>Modeling and Control for Soft Robots</u>   Mar 2020 - present
- o Created a high-speed dynamics simulator for soft growing "vine" robots to be used in motion planning algorithms
- o Implemented trajectory optimization for an aerial manipulator with a soft robot arm
- o Prototyped a lightweight version of the vine robot for use on mobile platforms
- o Exploring control methods for a mobile-base vine robot that leverage parallel actuation (base motion and vine bending) to improve dynamic performance

<u>Medical Robotics</u>   Sep - Dec 2019
- o Developed a practice environment in VR for surgeons to improve their suturing technique
- o Utilized C++, ROS, and QT for implementation on Intuitive Surgical's Da Vinci robotic-assisted surgical system

Honda Research Institute | San Jose, CA
Robotics Intern   June - Dec 2021
- o Developed planning and control methods for in-hand manipulation that exploits sliding contact between the hand and object
- o Implemented algorithms in C++ and ran simulations with ROS to verify functionality

NASA Jet Propulsion Laboratory | Pasadena, CA
Robotics R&TD (Research & Technology Development) Intern   June - Aug 2019
- o Designed hardware for an autonomous hybrid aerial-ground vehicle to compete in the DARPA Subterranean Challenge
- o Led sensor integration, electronics packaging, and wire harnessing of the aerial-ground vehicle
- o Experimentally characterized propeller thrust variation as a function of distance from a wall to verify first order dynamics model and inform vehicle controls

DART Lab at Georgia Institute of Technology | Atlanta, GA
NSF Robotics Research Fellow   May - Aug 2018
- o Designed and manufactured a bistable, reflexive, lightweight gripper featuring a high force density and rapid activation
- o Led project from concept phase to working prototype which carried 15-28 times its weight and actuated in 0.12 seconds
- o Accepted conference paper (first author) to the IEEE International Conference on Robotics and Automation

Responsive Environments at MIT Media Lab | Cambridge, MA
Undergraduate Researcher   Mar 2018 - June 2019
- o Demonstrated the locomotion for a pneumatically actuated, bio-inspired epidermal soft robot via proof-of-concept prototype
- o Designed a silicone actuator for bending in 3 directions, developed fabrication methods utilizing multi-part molds
- o Implemented electronic controls for the pneumatics and programmed multiple modes of locomotion

MENTORING AND OUTREACH

Research Mentor – CHARM Lab | Stanford, CA   Jan 2022 - present
- o Mentoring undergraduate students for research projects on soft and flexible robotics
- o Mentees: Max Alquist, Ryan Nguyen, Sofia Simón-Trench

Educational Outreach – CHARM Lab | Stanford, CA   Mar 2020 - present
- o Engage with students ranging from elementary school to community college
- o Provide demonstrations of robotics research and lead discussions on areas for future work

Solar Electric Vehicle Team Outreach – MIT | Cambridge, MA   Sept 2015 - Aug 2018
- o Hosted lab tours for students from local elementary and high schools or visiting students in MIT summer programs

TEACHING

Stanford University | Stanford, CA
Course Assistant   Sept 2022 - present
- o Facilitated discussions during class and hosted office hours for a dynamics and controls course

Experimental Study Group (ESG) | Cambridge, MA
Teaching Assistant   Aug 2016 - June 2019
- o Lead recitation sections and exam reviews for the Multivariable Calculus class taught at ESG, a freshman learning community that offers General Institute Requirement courses with a focus on small group learning and peer teaching
- o Completed a semester-long course on strategies for effective teaching

China Educational Technology Initiative (CETI) | Xi'an / Guangzhou / Fuzhou, China
Instructor   June 2016 - Aug 2016
- o Constructed and presented STEM curriculum that provided a more interactive learning experience
- o Facilitated discussion and activities for cross-cultural exchange
- o Collaborated with administration of schools in China for program logistics

Academic Teaching Initiative (ATI) | Cambridge, MA
SAT Prep Instructor   Aug 2015 - May 2016
- o Developed lesson plans to prepare students for the SAT Physics Subject Test
- o Presented concepts, guided discussion and activities, and provided one-on-one support

PUBLICATIONS

[1] R. S. Zarrin, K. Yamane, **R. Jitosho**, "Hybrid Learning- and Model-Based Planning and Control of In-Hand Manipulation," 2023 International Conference on Robotics and Automation (ICRA), Submitted.

[2] **R. Jitosho**, N. Agharese, A. Okamura and Z. Manchester, "A Dynamics Simulator for Soft Growing Robots," 2021 International Conference on Robotics and Automation (ICRA), Xi'an, China, 2021.

[3] B. Jackson et al., "ALTRO-C: A Fast Solver for Conic Model-Predictive Control," 2021 International Conference on Robotics and Automation (ICRA), Xi'an, China, 2021.

[4] A. Dementyev, **R. Jitosho** and J. A. Paradiso, "Mechanical Imaging of Soft Tissues with Miniature Climbing Robots," in IEEE Transactions on Biomedical Engineering (TBME), 2021.

[5] A. Kalantari et al., "Drivocopter: A concept Hybrid Aerial/Ground vehicle for Long-Endurance Mobility," 2020 IEEE Aerospace Conference, Big Sky, MT, USA, 2020, pp. 1-10.

[6] S. Backus, J. Izraelevitz, J. Quan, **R. Jitosho**, E. Slavick and A. Kalantari, "Design and Testing of an Ultra-Light Weight Perching System for Sloped or Vertical Rough Surfaces on Mars," 2020 IEEE Aerospace Conference, Big Sky, MT, USA, 2020, pp. 1-12.

[7] **R. Jitosho**, K. Choi, A. Foris and A. Mazumdar, "Exploiting Bistability for High Force Density Reflexive Gripping," 2019 International Conference on Robotics and Automation (ICRA), Montreal, QC, Canada, 2019, pp. 1241-1247.

AWARDS

National Science Foundation Graduate Research Fellow	2019
Peter and Sharon Fiekowsky Award for Excellence in Teaching	2019
Linda Gronlund Memorial Scholar	2018
William T. Haebler and Philip W. Skove Scholar	2017
MIT community service award	2014