

RIANNA JITOSHO

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EDUCATION

Stanford University | Stanford, CA 2019-2025

- Ph.D. Candidate in Mechanical Engineering, M.S. in Mechanical Engineering (2019-2021), GPA: 4.0/4.0
- Advisors: Allison Okamura and Karen Liu, Collaborator: Zachary Manchester (Carnegie Mellon University)
- Relevant Coursework: Machine Learning, Robot Autonomy, Optimal and Learning-Based Control

Massachusetts Institute of Technology | Cambridge, MA 2015-2019

- Bachelor of Science in Mechanical Engineering, GPA: 4.9/5.0
- 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

Modeling, System Identification, and Control for Soft Robots

Mar 2020 - present

- Created a high-speed dynamics simulator for soft growing “vine” robots to be used in motion planning algorithms
- Prototyped a lightweight version of the vine robot for use on mobile platforms such as aerial vehicles
- Developed a system identification method for approximating soft robot dynamics with multi-link rigid body models
- Exploring trajectory optimization and reinforcement learning for a mobile-base vine robot to leverage parallel actuation (base motion and vine bending) for improving dynamic performance; validating control methods on physical hardware

Soft Robotics Consulting

Mar 2022 - Jun 2023

- Consulting for a team competing in the XPRIZE rainforest challenge to integrate vine technology into field robots

Medical Robotics

Sep - Dec 2019

- Developed a practice environment in VR for surgeons to improve their suturing technique
- Utilized C++, ROS, and QT for implementation on Intuitive Surgical’s Da Vinci robotic-assisted surgical system

Autonomous Systems Lab at ETH | Zürich, Switzerland

Visiting Researcher

Jun - Sep 2021

- Analyzed the existing physics-based methods for allocating controls for an overactuated aerial vehicle
- Investigated alternate allocation methods that leverage reinforcement learning

Honda Research Institute | San Jose, CA

Robotics Intern

Jun - Dec 2021

- Developed planning and control methods for in-hand manipulation that exploits sliding contact
- 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

Jun - Aug 2019

- Designed hardware for an autonomous hybrid aerial-ground vehicle to compete in the DARPA Subterranean Challenge
- Led sensor integration, electronics packaging, and wire harnessing of the aerial-ground vehicle
- Experimentally characterized propeller thrust variation to verify first order dynamics and inform vehicle controls

DART Lab at Georgia Institute of Technology | Atlanta, GA

NSF Robotics Research Fellow

May - Aug 2018

- Designed and manufactured a bistable, reflexive, lightweight gripper featuring a high force density and rapid activation
- Led project from concept phase to working prototype which carried 15-28 times its weight and actuated in 0.12s

Responsive Environments at MIT Media Lab | Cambridge, MA

Undergraduate Researcher

Mar 2018 - Jun 2019

- Demonstrated locomotion on a proof-of-concept prototype of a pneumatic, bio-inspired epidermal soft robot
- Designed a silicone actuator for bending in 3 directions, developed fabrication methods utilizing multi-part molds
- Implemented electronic controls for the pneumatics and programmed multiple modes of locomotion

MENTORING AND OUTREACH

Research Mentor – CHARM Lab | Stanford, CA

Jan 2022 - present

- Mentoring undergraduate students for research projects on soft and flexible robotics
- Mentees: Austin Yang, Jinxin (Ricardo) Li, Nick Woehrle, Max Alquist, Ryan Nguyen, Sofia Simón-Trench

Educational Outreach – CHARM Lab | Stanford, CA

Mar 2020 - present

- Engage with students ranging from elementary school to community college
- Provide demonstrations of robotics research and lead discussions on areas for future work

Solar Electric Vehicle Team Outreach – MIT | Cambridge, MA

Sep 2015 - Aug 2018

- 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 for Dynamic Systems, Vibrations and Control

Sep 2022 - present

- Facilitated discussion during class and office hours, designed homework problems, graded assignments and exams

Experimental Study Group (ESG) | Cambridge, MA

Teaching Assistant for Multivariable Calculus

Aug 2016 - Jun 2019

- Led recitation sections and exam reviews, hosted office hours, graded assignments and exams
- Completed a semester-long course on strategies for effective teaching

China Educational Technology Initiative (CETI) | Xi'an / Guangzhou / Fuzhou, China

Instructor

Jun 2016 - Aug 2016

- Constructed and presented STEM curriculum that provided a more interactive learning experience
- Facilitated discussion and activities for cross-cultural exchange

PUBLICATIONS

- [1] C. Winston, H. Choi, **R. Jitosh**, Z. Zhakypov, J.E. Palmer, M. Cutkosky, A.M. Okamura, “Fourigami: A 4-Degree-of-Freedom, Force-Controlled, Origami, Finger Pad Haptic Device,” Transactions on Robotics (T-RO), Submitted.
- [2] **R. Jitosh***, M. Ahlquist*, J. Bao, and A. Okamura, “phloSAR: a Portable, High-Flow Pressure Supply and Regulator Enabling Untethered Operation of Large Pneumatic Soft Robots,” International Conference on Soft Robotics (RoboSoft), 2024.
- [3] **R. Jitosh***, T. Lum*, A. Okamura and C.K. Liu, “Reinforcement Learning with Dynamic Models Expands the Workspace of Soft Robots,” Conference on Robot Learning (CoRL), 2023.
- [4] R.S. Zarrin, K. Yamane and **R. Jitosh**, “Hybrid Learning- and Model-Based Planning and Control of In-Hand Manipulation,” International Conference on Intelligent Robots and Systems (IROS), 2023.
- [5] **R. Jitosh***, S. Simón-Trench*, A. Okamura and B. Do, “Passive Shape Locking for Multi-Bend Growing Inflated Beam Robots,” International Conference on Soft Robotics (RoboSoft), 2023.
- [6] **R. Jitosh**, N. Agharese, A. Okamura and Z. Manchester, “A Dynamics Simulator for Soft Growing Robots,” International Conference on Robotics and Automation (ICRA), 2021.
- [7] B. Jackson, T. Punnoose, D. Neamati, K. Tracy, **R. Jitosh** and Z. Manchester, “ALTRO-C: A Fast Solver for Conic Model-Predictive Control,” International Conference on Robotics and Automation (ICRA), 2021.
- [8] A. Dementyev, **R. Jitosh** and J. A. Paradiso, “Mechanical Imaging of Soft Tissues with Miniature Climbing Robots,” in Transactions on Biomedical Engineering (TBME), 2021.
- [9] A. Kalantari, T. Touma, L. Kim, R. Jitosh, K. Strickland, B. Lopez and A. Agha-Mohammadi, “Drivocopter: A concept Hybrid Aerial/Ground vehicle for Long-Endurance Mobility,” IEEE Aerospace Conference, 2020.
- [10] S. Backus, J. Izraelevitz, J. Quan, **R. Jitosh**, E. Slavick and A. Kalantari, “Design and Testing of an Ultra-Light Weight Perching System for Sloped or Vertical Rough Surfaces on Mars,” IEEE Aerospace Conference, 2020.
- [11] **R. Jitosh**, K. Choi, A. Foris and A. Mazumdar, “Exploiting Bistability for High Force Density Reflexive Gripping,” International Conference on Robotics and Automation (ICRA), 2019.

PRESENTATIONS

Poster Presentation Achievement Rewards for College Scientists (ARCS) Symposium	2024
Poster Presentation International Conference on Soft Robotics (RoboSoft)	2024
Poster Presentation Conference on Robot Learning (CoRL)	2023
Poster Presentation Bay Area Robotics Symposium (BARS)	2023
Poster Presentation International Conference on Soft Robotics (RoboSoft)	2023
Poster Presentation Stanford Wearable Electronics Symposium (eWEAR)	2023
Invited Workshop Speaker International Conference on Soft Robotics (RoboSoft)	2022
Paper Presentation International Conference on Robotics and Automation (ICRA)	2021
Poster Presentation International Conference on Robotics and Automation (ICRA)	2019

INDUSTRY EXPERIENCE

SPI System Integration | São Paulo, Brazil

Automation Intern

Jan-Feb 2019

- Assisted in developing an automated process for assembling GM vehicles
- Designed machine tooling in **NX** for constraining and positioning vehicle parts during assembly
- Simulated robot arm operations in **NX** to perform motion planning for clinching as well as pick and place

Draper | Boston, MA

Programming Intern

Jan 2017, Jun-Jul 2017

- Developed enhancements to a python program that incorporated GUI, online database accesses, and excel generation which sped up the system testing department's workflow by automating multiple data entry processes
- Conducted software research and developed a test plan for the data organization, scripting, and execution of automated testing for a company-wide web application that organized the related files, documents, and other information for all ongoing projects

PROFESSIONAL AFFILIATIONS

IEEE | Student Member

2019-present

Tau Beta Pi Engineering Honor Society | Member

2019-present

AWARDS

Scholar Achievement Rewards for College Scientists (ARCS) Fellowship

2023-2024

National Science Foundation Graduate Research Fellowship

2019-2022

Stanford Graduate Engineering Fellowship

2019

Peter and Sharon Fiekowsky Award for Excellence in Teaching

2019

MIT Community Service Award

2014