ELIZABETH FOX
(919)370-0707 elizabethfox981@gmail.com Atlanta, Georgia

EDUCATION:

University of Rochester, Rochester, NY 2013-2017
B.S. Mechanical Engineering, Minor in Computer Science; Magna Cum Laude, GPA 3.91

Georgia Institute of Technology, Atlanta, GA 2017-Present
Ph.D in Robotics, researching robotic grippers and dexterous manipulation, GPA 3.90 (est. grad December 2022)

RESEARCH AND WORK EXPERIENCE:

Doctoral Research, Georgia Institute of Technology, Atlanta, GA 2017-Present

- Developed 3D printing methods for simultaneous printing of flexible and rigid components
- Designed soft robotic mechanism for controllable-stiffness gripper joints
- Created underactuated hand prototype with optimized controllable synergies
- Integrated EMG and ultrasound sensors to control prosthetic devices
- Wrote machine vision software to track robotic fingers in 3D space
- Developed methodology for characterization of soft nonlinear devices
- Used soft device characterization to estimate kinetics from known device kinematics
- Wrote simulator add-on that accurately simulate motions of soft compliant underactuated hand
- Mentored undergraduates on smaller research projects

Doctoral Research—Semi FlexTech Project, Georgia Institute of Technology, Atlanta, GA 2021

- Worked as part of a team to develop wearable device to augment shoulder and elbow strength
- Characterized motions of pneumatic artificial muscles (PAMs) in cable-driven system
- Developed strategies to use PAMs in wearable device in parallel with human motions
- Characterized and designed device and controller to mitigate effects of stretch and slip in system
- Designed internal frame for backpack to protect PAM's and transfer large forces and contractions
- Tuned pneumatic controllers to achieve motions similar to that of user's intent

Graduate Intern, Nvidia Robotics Research Lab, Seattle, WA Summer 2020

- Simulated newly designed fully-actuated robotic hand with soft finger pads using soft materials simulator
- Helped debug novel simulator incorporating both soft and rigid structures
- Worked on machine learning process to control hand and virtual arm trajectories during grasping
- Developed control strategies to pick up flat objects by leveraging soft finger pad properties

Teaching Assistant, Georgia Institute of Technology, Atlanta, GA 2019-2021

- Lead weekly lab sections for ME 4056: Systems Laboratory and ME 4405: Fundamentals of Mechatronics
- Ensured student safety and understanding of the material
- Consulted on mechatronics project feasibility and methodology

Undergraduate Research, University of Rochester, Rochester, NY 2016-2017

- Worked in lab on opto-mechanical machinery
- Updated and created GUIs to calibrate and interface with machines
- Created and managed database interface
- Ran study on transient effects of laser writing on hydrogel

Robotics in the Real World REU, Oregon State University, Corvallis, OR Summer 2016

- Researched fluidic ankle actuation for bipedal walking and running robot
- Designed gerotor pump and had pump professionally manufactured
- Built test setup and ran tests to prove concept of offset-mass hydraulic actuation

Summer Intern, Alcoa, New Kensington, PA Summer 2015

- Designed various parts for continuous pressure casting machine
- Observed and learned about many different types of manufacturing processes

OTHER EXPERIENCE:

Robograds, Georgia Institute of Technology: Treasurer 2018-2020

- Planned and managed budget for organization of graduate students performing research in robotic
- Planned lectures and various social events

Baja SAE, University of Rochester: Club Member and Head of Manufacturing 2013-2017

- Led frame and suspension manufacturing for club-designed all-terrain vehicle
- Instructed new members in tool use and safety measures
- Designed gear webbing to reduce weight
- Met with sponsors and convinced them to continue sponsoring team
- Hosted international team and helped reconstruct their car for local competition

PUBLICATIONS AND PRESENTATIONS:

- "Contact Force and Synergy Matrix Estimation for Compliant Underactuated Soft Robotic Hands" [upcoming journal submission], E. Fox and F. L. Hammond, *Soft Robotics Journal*, Spring 2022
- "Soft Variable Stiffness Joints for Controllable Grasp Synergies in Underactuated Robotic Hands," E. Fox and F. L. Hammond, *IEEE International Conference on Soft Robotics (RoboSoft)*, 2020
- "Towards Sonomyography-Based Real-Time Control of Powered Prosthesis Grasp Synergies," K. Bimbraw, E. Fox, G. Weinberg and F. L. Hammond, *International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, 2020
- "Sonomyography-Based Real-Time Hand Grasp Configuration Identification via Supervised Learning to Control a Soft Robotic Gripper" [poster presentation], K. Bimbraw, E. Fox, G. Weinberg and F. L. Hammond, *International Symposium on Medical Robotics*, 2019

ASSOCIATIONS:

- Tau Beta Pi Engineering Honors Society
- Phi Beta Kappa Academic Honors Society
- Institute of Electrical and Electronics Engineers

AWARDS AND RECOGNITIONS:

- Covid Disruption Funding, Georgia Institute of Technology, 2022
- NSF ARMS Graduate Fellowship for healthcare robotics research, 2017-2019
- Outstanding Senior in Mechanical Engineering award, University of Rochester, 2017
- Institute for the International Education of Students Study Abroad Scholarship (New Zealand), 2015
- Phi Beta Kappa Iota Book Award to outstanding freshman, University of Rochester, 2014
- Rush Rhees and National Merit Finalist Scholarships, 2013-2017

SKILLS:

- Programming: MATLAB, Python, C, ROS
- Simulation: PyBullet, Isaac sim
- Computer vision
- Data analysis
- CAD and FEA: Solidworks, NX
- Mechanical testing
- Prototyping
- Fabrication and knowledge of fabrication processes