

Amy Katherine Strong

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Education

Ph.D. Mechanical Engineering

Duke University, GPA: 3.86

2021 – Present

Advisor: Dr. Leila Bridgeman

MS Mechanical Engineering

Auburn University, GPA: 3.9

2018 – 2021

Advisors: Dr. David Bevly, Dr. Scott Martin

BME Mechanical Engineering

Auburn University, GPA: 3.6

2014 – 2018

Research Interests

My research interests involve using **robust control theory** to analyze and characterize **deep learning** techniques. I aim to enforce stability and robustness on learned controllers so that they can be used on **safety critical autonomous systems** – such as medical robotics.

Publications and Presentations

- **Amy Strong***, Ethan LoCicero*, and Leila J. Bridgeman. Dissipative Imitation Learning for Robust Dynamic Output Feedback. In *Conference on Decision and Control*, December 2022. (Accepted). [Link](#).
- Siobhan Rigby Oca, **Amy Strong**, Jiselle Havas, Daniel M. Buckland, and Leila J. Bridgeman. Development and Testing of a Durable and Novel Breast Phantom for Robotic Autonomous Ultrasound Systems. In *Journal of Medical Robotics Research*, 2022. (Under Review).
- **Amy Strong**, Siobhan Rigby Oca, Daniel M. Buckland, and Leila J. Bridgeman. Autonomous Ultrasound Scanning for Complex, Deformable Tissue. In *Military Health System Research Symposium*, September 2022. (Poster Presentation).
- **Amy Strong**, Scott Martin, and David Bevly. Utilizing Hidden Markov Models to Classify Maneuvers and Improve Estimates of an Unmanned Aerial Vehicle. In *Modelling, Estimation, and Controls Conference*, 2021. [Link](#).
- **Amy Strong**, Nathan Hogaboom, Alicia Koontz, and Michael Boninger. Development of an Upperlimb Musculoskeletal Wheelchair Propulsion Model to Analyze the Influence of Axle Position on Shoulder Moments. In *American Society of Biomechanics Conference*, 2018. (Poster Presentation).
- Lorenzo Cremaschi, Ellen Harges, Burak Adanur, and **Amy Strong**. Frost Nucleation and Frost Growth on Hydrophobic and Hydrophilic Surfaces for Heat Exchanger Fin Structures. In *17th International Refrigeration and Air Conditioning Conference*, 2018.

Awards and Achievements

NSF Traineeship: Advancement of Surgical Technologies: 2022 – 2024

Burroughs Wellcome Fund Fellowship: 2022

Duke University Pratt-Gardner Graduate Fellowship: 2021

Auburn University Mechanical Engineering Undergraduate Research Stipend: 2017 – 2018

HERL ASPIRE REU Paper Competition Winner: 2017

O’Neal Austin Best Student Award: 2017

Auburn University Presidential Scholarship: 2014 – 2018

Research Experience

Bridgeman Lab: Duke University

Graduate Research Assistant: 2021 – Present

- Applying robust control theory to imitation learning for learned controllers with guaranteed stability.
- Tuning and design of contact force control for an autonomous robotic ultrasound system.

Autonomy for Hypersonics (A4H): Sandia National Laboratories

Graduate R&D Intern: 2020 – 2022

- Employed deep learning methods to learn constraints of a high-fidelity dynamic model.
- Performed hyperparameter sweeps and data consolidation for a Generative Adversarial Network (GAN).

GPS and Vehicle Dynamics Laboratory (GAVLAB): Auburn University

Graduate Research Assistant: 2018 – 2021

- Utilized system dynamics to perform time series classification via Hidden Markov Models (HMM).
- Implemented nonlinear estimation methods to track a highly non-linear system using radar measurements.
- Improved Extended Kalman Filter state estimation with information from HMMs.

High Performance Integrated Building Energy Systems and Technologies Lab: Auburn University

Undergraduate Research Assistant: 2017 – 2018

- Created an image processing protocol to determine frost height from videoscope images.
- Trained in lab procedure – calibrating thermocouples, operating wind tunnel, frost growth measurement.

Human Engineering Research Labs (HERL): University of Pittsburgh

Undergraduate Research Intern, Summer Research Experience for Undergraduates: 2017

- Created an upper extremity musculoskeletal model of wheelchair propulsion in OpenSim to study effects of wheelchair set up on transverse, sagittal, frontal, and net shoulder moments using VICON data.

Teaching Experience

Introduction to Robotics

Fall 2022

System Dynamics and Controls (Teaching Assistant)

Spring 2020, Fall 2020, Spring 2021

Skills

Programming Languages: Python, MATLAB, C++

Software: Git, Latex, Robot Operating System (ROS)

Relevant Coursework

Machine Learning	Optimal Estimation and Control	Intro to Medical Robotics
Deep Learning	Feedback Control for Dynamic Systems	Convex Optimization
Reinforcement Learning	Model Predictive Control	Flight Dynamics
Advanced Topics: Deep Learning	Nonlinear Systems and Control	Vehicle Dynamics
Robot Learning	Multivariable Control of Uncertain Systems	Advanced Dynamics
Information Theory	Software for Sensors and Systems	State Variable Analysis
Probability and Stochastic Processes		