

Yuhao Jiang

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Summary

Ph.D. Candidate in Mechanical Engineering with a focus on robotic systems; I have a solid background in mechanism design, prototyping and testing, system identification, simulation, and control. My previous research is mainly about the design, modeling, and control of novel soft robotic systems. More specifically, I study the curvature and shape change in soft surfaces and implement these behaviors into novel soft robotic systems to ameliorate the manufacture, actuation, and control difficulties in traditional robotic systems.

Education

Arizona State University

Ph.D. in Mechanical Engineering

Jan. 2019 - Apr. 2023 (expected)

University of Florida

Master of Science in Mechanical Engineering

Sep. 2015 - May. 2017

Donghua University

Bachelor of Engineering in Mechanical Engineering

Sep. 2011 - Jul. 2015

Publications

Google Scholar: Yuhao Jiang

- **Y. Jiang**, F. Chen, and D. M. Aukes, "Tunable Dynamic Walking via Soft Twisted Beam Vibration," IEEE Robotics and Automation Letters (under review), pre-print available at: <https://doi.org/10.48550/arxiv.2211.00715>.
- **Y. Jiang**, M. Sharifzadeh, and D. M. Aukes, "Reconfigurable Soft Flexure Hinges via Pinched Tubes," 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020, pp. 8843-8850, <https://doi.org/10.1109/IROS45743.2020.9341109>.
- **Y. Jiang**, M. Sharifzadeh, and D. M. Aukes, "Shape Change Propagation Through Soft Curved Materials for Dynamically-Tuned Paddling Robots," 2021 IEEE 4th International Conference on Soft Robotics (RoboSoft), 2021, pp. 230-237, <https://doi.org/10.1109/RoboSoft51838.2021.9479208>.
- M. Sharifzadeh, **Y. Jiang**, A. Lafmejani, D. M. Aukes, "Compensating for Material Deformation in Foldable Robots via Deep Learning – A Case Study," 2022 IEEE International Conference on Robotics and Automation (ICRA), 2022, <https://doi.org/10.1109/ICRA46639.2022.9811752>.
- M. Sharifzadeh, **Y. Jiang**, A. Lafmejani, K. Nichols, and D. M. Aukes, "Maneuverable gait selection for a novel fish-inspired robot using a CMA-ES-assisted workflow," in Bioinspiration & Biomimetics, vol. 16, no. 5, pp. 056017, August 2021, <https://doi.org/10.1088/1748-3190/ac165d>.
- M. Sharifzadeh, **Y. Jiang**, and D. M. Aukes, "Reconfigurable Curved Beams for Selectable Swimming Gaits in an Underwater Robot," in IEEE Robotics and Automation Letters, vol. 6, no. 2, pp. 3437-3444, April 2021, <https://doi.org/10.1109/LRA.2021.3063961>.
- Sharifzadeh, M, **Jiang, Y**, Khodambashi, R, & Aukes, D. "Increasing the Life Span of Foldable Manipulators With Fabric." Proceedings of the ASME 2020 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 10: 44th Mechanisms and Robotics Conference (MR). Virtual, Online. August 17–19, 2020. V010T10A087. ASME, <https://doi.org/10.1115/DETC2020-22757>.

Technical Skills

- **Programming Languages and Technologies** : Python, Matlab, ROS, Linux
- **Simulation and FEA**: MuJoCo, PyChrono, ANSYS, COMSOL
- **Hardware Technologies** : UR5 robotic arm, ATI F/T sensor, Arduino, ESP32, Dynamixel Servos, Brushless Motor Control (ODrive, SimpleFOC), NI-DAQ, OptiTrack
- **Manufacturing Technologies** : 3D printing (Ultimaker, Markforged), Laser cutting, CNC, Mold Making, Laminate Fabrication
- **Control Technologies** : PID control, Adaptive Control, Data-driven Control, Model Predictive Control
- **Optimization and Machine Learning Technologies** : CMA-ES, Deep Neural Network, Differential evolution optimization, OpenCV

Conference Talks

ICRA 2022:

- **Conference proceedings talk:** “Compensating for Material Deformation in Foldable Robots Via Deep Learning – a Case Study”, <https://youtu.be/AwS4vabv-JQ>.
- **Workshop presentation:** “Modular Robots Using Soft Curved Reconfigurable Anisotropic Mechanisms”.

ICRA 2021:

- **Conference proceedings talk:** “Reconfigurable Curved Beams for Selectable Swimming Gaits in an Underwater Robot”, <https://youtu.be/EszTDc9slyw>.

Robosoft 2021:

- **Conference proceedings talk:** “Shape Change Propagation Through Soft Curved Materials for Dynamically-Tuned Paddling Robots”.

IROS 2020:

- **Conference proceedings talk:** “Reconfigurable Soft Flexure Hinges via Pinched Tubes”, <https://youtu.be/J5heXXD6mVo>.

Patents

- “Mechanisms for steering robotic fish” – US Patent No. 11124281B2 – Date of Patent: Sep 21, 2019;
- “Pinched Tubes for Reconfigurable Robots” (submitted);
- “Soft, Curved, Reconfigurable Buckling Beams for Underwater and Terrestrial Autonomous Vehicles” (submitted).

Academic Services

Reviewer

- **Journal Reviewer:** Soft Robotics (SoRo), Journal of Field Robotics (JFR), IEEE Transactions on Robotics (T-RO), IEEE Robotics and Automation Letters (RA-L), ASME Journal of Mechanisms and Robotics (JMR).
- **Conference Reviewer:** IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), International Conference on Robotics and Automation (ICRA), International Conference on Soft Robotics (Robosoft), ACM Symposium on Computational Fabrication (SCF).

Organizing Workshops

- **ICRA 2023 Workshop:** “Breaking the Mold: Empowering Soft Robots with Reconfigurable Nonlinearity” (under review), <https://www.scrambots.com/icra-2023-workshop>.
- **Robosoft 2021 Workshop:** “Breaking the Mold: Challenging Current Paradigms in Soft Robotics”, <https://www.scrambots.com/robosoft-2021-workshop>.

Technical Experience (Selected)

Dynamic System Identification for a Fan-damper VAV System

DiCE Lab, University of Florida

Graduate Student Researcher, PI: Dr. Prabir Barooh

Dec. 2016 - May. 2017

- Established fan-air pressure model, damper-air pressure model, air converging and diverging model;
- Built the pressure balance equilibrium to connect models together;
- Solved steady-state value and obtained relationship between air flow rate, fan speed, and damper position using Newton’s iteration method;
- Controlled the thermal environment in multiple zones based on determining cooling air’s flow rate with the control of fan speed and damper position.

Speech Interaction Control System for Flight Control

Aviation Industry Corporation of China

Intern, Flight Control Engineer

Jun. 2014 - Sep. 2014

- Identified the details of voice commands, developed corresponding codes, optimized loop statements, and improved the recognition rate;
- Developed GUI using Matlab Simulink;
- Established non-specific voice control for mini RC drones to achieve various maneuver motions.