

# YUHAO JIANG

Post-doctoral Researcher, EPFL

## CONTACT

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## RESEARCH STATEMENT

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I advance soft robotics through innovative mechanism design and AI-enhanced computational approaches, with a focus on robotic manipulation, multi-robot systems, and human-robot interaction. My research develops novel compliant structures and control strategies that enable sophisticated manipulation and coordination while minimizing actuation requirements. Through my work, I aim to enhance the capabilities of soft robotic systems in complex manipulation tasks and multi-robot scenarios, addressing key challenges in design, control, and human-robot interaction through the integration of soft structures and AI-driven approaches.

## EDUCATIONAL EXPERIENCE

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**Arizona State University, Tempe** *Jan. 2019 - Aug. 2023*  
Ph.D. in Mechanical Engineering  
**Advisor:** Prof. Daniel Aukes  
**Dissertation:** Design and Modeling of Soft Curved Reconfigurable Anisotropic Mechanisms

**University of Florida, Gainesville** *Sep. 2015 - May 2017*  
Master of Science in Mechanical Engineering

**Donghua University, Shanghai** *Sep. 2011 - Jun. 2015*  
Bachelor of Engineering in Mechanical Engineering

## PROFESSIONAL EXPERIENCE

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**EPFL, Lausanne** *Sep. 2023 - Present*  
Post-doctoral Researcher, Reconfigurable Robotics Lab  
**Supervisor:** Prof. Jamie Paik

## SELECTED PROJECTS

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**MOZART: Morphing Computerized mats with Embodied Sensing and Artificial Intelligence** *Sep. 2023 - Present*  
<https://mozart-robotics.eu/>  
EPFL, Reconfigurable Robotics Lab  
**Funded by:** European Union Horizon Europe Research and Innovation Programme

**SCRAM: Soft Curved Reconfigurable Anisotropic Mechanisms** *Jan 2020 - May 2023*  
<https://www.scrambots.com/>  
Arizona State University, IdeaLab  
**Funded by:** NSF EFRI C3 SoRo

**TEACHING AND STUDENT MENTORING**

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**Course Instructor**

Course Name	Affiliation	Period
ME410: Mechanical Engineering Product Design and Development	STI, EPFL	Fall 2024
ME420: Advanced Design for Sustainable Future	STI, EPFL	Fall 2024
ME410: Mechanical Engineering Product Design and Development	STI, EPFL	Fall 2023

**Master's Thesis and Semester Project Advisor**

Name	Topic	Program	Period
Aurora Ruggeri <sup>1</sup>	Study on soft metamaterials for object sensing and geometry generation	MS in Mechanical	Spring 2024
Louis Flahault <sup>1</sup>	Kinematic study and design for spatial reconfigurable modular robotic platform	MS in Robotics	Spring 2024
Serge Asmar <sup>1</sup>	Locomotion design and control using surface wave change generated by ori-pixel platform	MS in Robotics	Spring 2024
Nicolas Nouel <sup>2*</sup>	Programmable surface using bistable structure	MS in Robotics	Spring 2024

<sup>1</sup> Semester Project<sup>2</sup> Thesis

\* Co-advisor

**PEER-REVIEWED PUBLICATIONS**

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**Journal Publications**

- [1] **Y. Jiang**, S. Asmar, Z. Wang, S. Demirtas, and J. Paik, "CPG-based Manipulation with Multi-Module Origami Robot Surface," submitted, October 2024
- [2] **Y. Jiang**, F. Chen, J. Paik, and D. M. Aukes, "Locomotion via Vibration of Soft, Twisted Beams with an Under-actuated Quadruped," submitted, June 2024
- [3] **Y. Jiang**, F. Chen and D. M. Aukes, "Tunable Dynamic Walking via Soft Twisted Beam Vibration," IEEE Robotics and Automation Letters, vol. 8, no. 4, pp. 1967-1974, April 2023, <https://doi.org/10.1109/LRA.2023.3244716>
- [4] 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>
- [5] 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>

**Conference Publications**

- [1] **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>
- [2] **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>

- [3] P. Bupe, **Y. Jiang**, J. Lin, T. Nguyen, M. Han, D. Aukes, C. Harnett, "Embedded Optical Waveguide Sensors for Dynamic Behavior Monitoring in Twisted-Beam Structures," 2024 IEEE 7th International Conference on Soft Robotics (RoboSoft), San Diego, CA, USA, 2024, pp. 139-144, <https://doi.org/10.1109/RoboSoft60065.2024.10521938>
- [4] 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>
- [5] M. Sharifzadeh, **Y. Jiang**, R. Khodambashi, D. M. Aukes, "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>

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## PATENTS

- [1] "Tunable Motion Using Flexible Twisted Beams", Daniel Aukes, **Yuhao Jiang**, Fuchen Chen - US Patent Application 20240391542
- [2] "Pinched tubes for reconfigurable robots", Daniel Aukes, Mohammad Sharifzadeh, **Yuhao Jiang**, Nicholas Gravish, Mingsong Jiang - US Patent US20230127106A1
- [3] "Buckling beams for underwater and terrestrial autonomous vehicles", D Aukes, M Sharifzadeh, **Y Jiang** - US Patent US20230121727A1
- [4] "Mechanisms for steering robotic fish", D Aukes, M Sharifzadeh, K Nichols, **Y Jiang** - US Patent US11124281B2

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## TALKS

### Seminar Talks

- [1] "Empowering Actuation of Soft Robotic Systems via Soft Curved Reconfigurable Anisotropic Mechanism", hosted by Prof. Nick Gravish and Prof. Michael Tolley, UCSD, Feb. 2023.

### Conference Proceedings Talks

- [1] **RoboSoft 2023**: "Tunable Dynamic Walking via Soft Twisted Beam Vibration"
- [2] **ICRA 2022**: "Compensating for Material Deformation in Foldable Robots Via Deep Learning – a Case Study", <https://youtu.be/AwS4vabv-JQ>
- [3] **ICRA 2021**: "Reconfigurable Curved Beams for Selectable Swimming Gaits in an Underwater Robot", <https://youtu.be/EszTDc9slyw>
- [4] **Robosoft 2021**: "Shape Change Propagation Through Soft Curved Materials for Dynamically-Tuned Paddling Robots"
- [5] **IROS 2020**: "Reconfigurable Soft Flexure Hinges via Pinched Tubes", <https://youtu.be/J5heXXD6mVo>

### Workshop Presentations

- [1] **RoboSoft 2023**: "Model Order Reduction for Vibrational Soft Twisted Beams Using Pseudo-rigid-body Modeling – A Case Study"
- [2] **ICRA 2022**: "Modular Robots Using Soft Curved Reconfigurable Anisotropic Mechanisms"

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## ACADEMIC SERVICE

## Journal Reviewer

The International Journal of Robotics Research (IJRR)  
IEEE Transactions on Robotics (T-RO)  
IEEE Robotics and Automation Letters (RA-L)  
Soft Robotics (SoRo)  
Journal of Field Robotics (JFR)  
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)

## PUBLIC OUTREACH

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### Media Interview

- [1] **RTS Education and Scientific Program:** feature in “A guide to the future: Seiss Federal Institute of Technology 02”, <https://youtu.be/9yoNLg5Qho0?si=T48imzSqyShXc3ks>

### Organized Events

- [1] **Robosoft 2021 Workshop:** “Breaking the Mold: Challenging Current Paradigms in Soft Robotics”, <https://www.scrambots.com/robosoft-2021-workshop>
- [2] **2023 RRL Demo Day:** Full-day public event for projects from RRL and ME-410 class, <https://sites.google.com/view/rrl-me410/home>  
[https://youtu.be/wza144iqfco?si=\\_HfGVhsnzebmp7ZM](https://youtu.be/wza144iqfco?si=_HfGVhsnzebmp7ZM)

### Demos and Expositions

- [1] RRL lab tours (~6 times per year)
- [2] 2024 RRL Demo Day
- [3] 2024 Swiss Robotics Day
- [4] 2023 RRL Demo Day
- [5] 2023 Swiss Robotics Day
- [6] IdeaLab lab tours (~4 times per year)
- [7] 2019 Southwest Robotics Symposium (SWRS)