Sha Yi

She/Her

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Research Interests

I am interested in designing and controlling novel robotic systems, with a focus on adaptive and compliant mechanisms. I aim to explore data-driven computational methods for robot design. My goal is to embed intelligence directly into the robot's physical morphology, by co-optimizing the manufacturing process, control policies, and hardware design.

Current Employment

Postdoc Scholar *Sep 2024 - now*
UC San Diego
Work with Xiaolong Wang & Mike Tolley on machine learning for soft robot design.

Education

Carnegie Mellon University *2024*
PhD in Robotics
Advisor: Katia Sycara, Zeynep Temel

Carnegie Mellon University *2019*
MS in Robotics
Advisor: Katia Sycara

The Hong Kong Polytechnic University *2017*
BEng in Electronic and Information Engineering

Journal Publications

Reconfigurable Robot Swarms for Terrain Traversal with Passive Coupling Mechanisms
Sha Yi, Shashwat Singh, Allison Seo, Ryan St. Pierre, Katia Sycara, Zeynep Temel
Under Review

Conference Publications

ACE: A Cross-platform Visual-Exoskeletons for Low-Cost Dexterous Teleoperation
Shiqi Yang, Minghuan Liu, Yuzhe Qin, Runyu Ding, Jialong Li, Xuxin Cheng, Ruihan Yang, **Sha Yi**, Xiaolong Wang
Conference on Robot Learning (CoRL), 2024

Decentralized Multi-Robot Line-of-Sight Connectivity Maintenance under Uncertainty
Yupeng Yang, Yiwei Lyu, Yanze Zhang, **Sha Yi** and Wenhao Luo
Robotics: Science and Systems (RSS), 2024

Enhancing Heterogeneous Swarm Locomotion Through Simple 1-DOF Arm Mechanisms

James Clinton, **Sha Yi**, and Zeynep Temel
Distributed Autonomous Robotic Systems (DARS), 2024
Workshop in Tensegrity Robots, IROS, 2023, ***Best Demo Award***

Decentralized Model Predictive Control for Constrained Multi-Robot System
Allison J. Seo, **Sha Yi**, and Katia Sycara
Workshop in Advances in Multi-Agent Learning, IROS, 2023

Reconfigurable Robot Control Using Flexible Coupling Mechanisms
Sha Yi, Katia Sycara, and Zeynep Temel
Robotics: Science and Systems (RSS), 2023

Configuration Control for Physical Coupling of Heterogeneous Robot Swarms
Sha Yi, Zeynep Temel, and Katia Sycara
International Conference on Robotics and Automation (ICRA), 2022

PuzzleBots: Physical Coupling of Robot Swarms
Sha Yi, Zeynep Temel, and Katia Sycara
IEEE International Conference on Robotics and Automation (ICRA), 2021

Distributed Topology Correction for Flexible Connectivity Maintenance in Multi-Robot Systems
Sha Yi, Wenhao Luo, and Katia Sycara
IEEE International Conference on Robotics and Automation (ICRA), 2021

Multi-agent Deception in Attack-Defense Stochastic Game
Xueting Li, **Sha Yi**, and Katia Sycara
International Symposium on Distributed Autonomous Robotic Systems (DARS), 2021

Adaptive Informative Sampling with Environment Partitioning for Heterogeneous Multi-Robot Systems
Yunfei Shi, Ning Wang, Jianmin Zheng, Yang Zhang, **Sha Yi**, Wenhao Luo, and Katia Sycara
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020

Behavior Mixing with Minimum Global and Subgroup Connectivity Maintenance for Large-Scale Multi-Robot Systems
Wenhao Luo, **Sha Yi**, and Katia Sycara
IEEE International Conference on Robotics and Automation (ICRA), 2020

Indoor Pursuit-Evasion with Hybrid Hierarchical Partially Observable Markov Decision Processes for Multi-Robot Systems
Sha Yi, Changjoo Nam, Katia Sycara
International Symposium on Distributed Autonomous Robotic Systems (DARS), 2018

Work Experiences

Amazon Robotics *North Reading, MA*
Applied Scientist Internship *Jun 2022 - Aug. 2022*
with *Dr. Andreas Kolling* on Multi-robot planning and control.

Google Summer of Code *Virtual*
DEVELOPER *May 2017 - Aug. 2017*
with *Prof. Kei Okada* on manipulator and humanoid, JSK Robotics Lab of *University of Tokyo*.

HAI Robotics *Shenzhen, China*
ROBOTICS INTERNSHIP *Mar. 2016 - May 2016*
Implemented path planning algorithm for warehouse automation.

Microsoft *Beijing, China*
SOFTWARE ENGINEER *Jul. 2015 - Dec. 2015*
Cloud and Enterprise division, Platform and Tools group.

Honors & Awards

CMU Presidential Fellowship *2021*
HKSAR Government Scholarship *2014, 2015, 2016*

Academic Services

Conference Reviewer ICRA, IROS, RoboSoft
Journal Reviewer TRO, RAL, AURO
Others Organizer of ICRA 2024 workshop *Unconventional Robots: Universal Lessons for Designing Unique Systems*

Teaching Experiences

Math Fundamentals for Robotics *Fall 2019, CMU*
Kinematics, Dynamics, and Control *Spring 2020, CMU*

Diversity & Outreach Services

Robotics Institute Summer Scholars (RISS) *2019, 2020, 2021, 2023*
Served on the admission committee and reviewed applications.
Mentored undergraduate students for three-month research projects.

Women@SCS/SCS4ALL Mentoring Program *2020, 2021, 2022*
Mentored undergraduate students from underrepresented backgrounds.
Introduced students to research and helped them shape their career paths.

SCS Graduate Application Support Program (GASP) *2020, 2021, 2022, 2023*
Helped underrepresented students from outside of CMU for graduate school applications.
Provided advice on resume and personal statements.

Talks

Improving Robot Capabilities Through Reconfigurability *2024*

Invited talk, UBC
Invited talk, UCSD (Host: Xiaolong Wang & Mike Tolley)
Invited talk, REALM Lab, MIT (Host: Chuchu Fan)
Invited talk, Sung Robotics Lab, UPenn (Host: Cynthia Sung)

Physical Coupling in Robot Swarms *2023*

Guest lecturer, Insects and Robots, Fall 2023 CMU
Workshop on Tensegrity Robotics, IROS

Filling in the Gaps: Physical Coupling for Reconfigurable Robots *2022*

Workshop on Modular Self-Reconfigurable Robots, ICRA

Students Mentored

Master	Erin Wong, Xueting Li, Yunfei Shi
Undergraduate	Allison J. Seo, James Clinton, Bohan (Harry) Huang, Emily Guo, Simran Virk, Emily Duan, Xinyu Wang, Raghavv Goel, Berin Celik