XIANGYU PENG

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Homepage Google Scholar

EDUCATION

University of Michigan (Ann Arbor), USA *August 2021 - Present*
Ph.D. in Robotics, GPA: 4.0/4.0

University of Michigan (Ann Arbor), USA *August 2019 - April 2021*
M.S. in Robotics, GPA: 4.0/4.0

Shanghai Jiao Tong University, China *September 2015 - June 2019*
B.E. in Nuclear Engineering and Technology, GPA: 86.4/100

Stanford University, USA *June 2017 - August 2017*
Intensified Study in Computer Science (Summer Session), GPA: 4.0/4.0

PUBLICATION

[1] **Xiangyu Peng**, Shunzhang Li, and Leia Stirling, "Evaluation of Data-Driven Adaptive Controllers to Support Complex Task Performance with a Powered Upper Limb Exoskeleton", *IEEE Robotics and Automation Letters (RA-L)*, 2023 (In preparation)

[2] **Xiangyu Peng** and Leia Stirling, "Examination of Biofeedback to Support the Use of EMG-Based Upper-Extremity Exoskeletons", *IEEE Transactions on Medical Robotics and Bionics (T-MRB)*, 2023 (under review)

[3] **Xiangyu Peng** and Leia Stirling, "Effects of Biofeedback on Muscle Effort Reduction when Holding Positions with a Powered Upper Limb Exoskeleton", *67th Annual Meeting of the Human Factors and Ergonomics Society (HFES)*, Washington DC, October 23-27, 2023 (Accepted)

[4] **Xiangyu Peng**, Yadrianna Acosta-Sojo, Man I Wu, and Leia Stirling, "Actuation Timing Perception of a Powered Ankle Exoskeleton and its Associated Ankle Angle Changes During Walking", *IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE)*, 2022

[5] **Xiangyu Peng**, Yadrianna Acosta-Sojo, Man I Wu, and Leia Stirling, "Perception of Powered Ankle Exoskeleton Actuation Timing During Walking: A Pilot Study", *The 43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Guadalajara, Mexico, October 31 - November 4, 2021

[6] **Xiangyu Peng**, Ningbin Zhang, Lisen Ge, and Guoying Gu, "Dimension Optimization of Pneumatically Actuated Soft Continuum Manipulators", *The 2nd IEEE International Conference on Soft Robotics (RoboSoft)*, Seoul, Korea, April 14-18, 2019

RESEARCH EXPERIENCE

Development of Co-Adaptive Controller for Upper Exoskeletons *Oct 2022 - Present*
Advisor: Prof. Leia Stirling, University of Michigan *Research Assistant*

- Developed experiment-based data-driven method to personalize EMG-based controller for different users in the pick-and-place task.
- Applied reinforcement learning to develop co-adaptive EMG-based controller for upper-extremity exoskeleton to mitigate dynamic changes of EMG.

EMG Biofeedback Helps the Usage of Upper Exoskeletons *Sep 2021 - Oct 2022*
Advisor: Prof. Leia Stirling, University of Michigan *Research Assistant*

- Designed visual and haptic biofeedback for EMG-based upper-extremity exoskeleton to investigate the effects of biofeedback on people's usage of the device (potentially accelerate the adaptation and increase the performance).
- Understood how naive users learn to use exoskeletons to maintain the task accuracy, while at the same time trying to reduce the muscle efforts.

Human Perception of Exoskeleton Actuation Timing *May 2020 - August 2021*
Advisor: Prof. Leia Stirling, University of Michigan *Research Assistant*

- Designed human subject study to measure human perception of changes in exoskeleton actuation timing, which gives information on people's comfort, coordination, and trust in using devices, as well as providing foundations on how the sensorimotor system detects the exoskeleton behavior changes.
- Developed boot algorithm to present desired torque timing during each gait cycle.
- Designed an Android app to minimize potential distractions that could influence people's perception, and developed a Python GUI to control the device following pre-determined human study protocols.

Instability phenomenon on Soft Manipulator *February 2018 - July 2019*
Advisor: Prof. Guoying Gu, Shanghai Jiao Tong University *Research Assistant*

- Investigated a common instability phenomenon existed in soft continuum manipulator and studied the effect of Length to Diameter Ratio (LDR) on manipulators' workspace through Finite Element Analysis.
- Designed and fabricated a novel two-section soft continuum manipulator combining three fiber-reinforced actuators in each section and carried out experiments to validate simulation results.
- Proposed the concept of Instability and a new measure variable, workspace ratio, to analyze soft manipulator's performance regarding to its workspace, which can guide design for future application.

AWARDS AND HONORS

NIOSH PPRT award ($20,000)	2023
Robotics PhD Fellowship	2021
Rackham International Student Fellowship (nominated)	2020
Excellent Undergraduate in Shanghai	2019
Honors degree for outstanding scholastic and scientific research performances in SJTU	2019
Design Excellent Award – 2^{nd} Place for Capstone Design Project EXPO	2019
Hongyi Overseas Research Scholarship (Top 10%)	2018
1^{st} Prize NPIC Scholarship	2016, 2017
Excellent Student of SJTU selected with overall performance (Top 5%)	2016, 2017

OTHERS

Membership	IEEE Student Member, 2021
	EMBS Graduate Student Member, 2021
Reviewer	IEEE Robotics and Automation Letters (RA-L), 2022
	IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE), 2022
	Human Factors and Ergonomics Society Annual Meeting (HFES), 2023
Outreach	Discover Engineering Camp, 2022
	WISE Camp, 2022, 2023
	Wines Elementary School, 2022
	Allen Elementary School Robotics Visit, 2023
	Pittsfield Elementary School, 2023