

# XIANGYU PENG

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## EDUCATION

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**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

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- [1] **Xiangyu Peng** and Leia Stirling, “Examination of Biofeedback to Support the Usage of EMG-Based Upper-Extremity Exoskeletons”, *In Preparation*, 2022
- [2] **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
- [3] **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
- [4] **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

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**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

Advisor: Prof. Leia Stirling, University of Michigan

May 2020 - August 2021

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

Advisor: Prof. Guoying Gu, Shanghai Jiao Tong University

February 2018 - July 2019

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

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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 <sup>nd</sup> Place for Capstone Design Project EXPO	2019
Hongyi Overseas Research Scholarship (Top 10%)	2018
3 <sup>rd</sup> Prize in the 4 <sup>th</sup> Qian Xuesen Innovative Competition in SJTU	2017
1 <sup>st</sup> Prize NPIC Scholarship	2016, 2017
Excellent Student of SJTU selected with overall performance (Top 5%)	2016, 2017
2 <sup>nd</sup> Prize NPIC Scholarship	2015

## OTHERS

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<b>Membership</b>	IEEE Student Member, 2021 EMBS Graduate Student Member, 2021
<b>Reviewer</b>	IEEE Robotics and Automation Letters (RA-L), 2022 IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE), 2022
<b>Outreach</b>	Discover Engineering Camp, 2022 WISE Camp, 2022 Wines Elementary School, 2022