

# XIANYI CHENG

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Carnegie Mellon University  
Pittsburgh, PA 15213, USA

## EDUCATION

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### **Carnegie Mellon University**

Ph.D. in Mechanical Engineering 2019 - 2024 (expected)  
Advisor: Matthew T. Mason

### **Carnegie Mellon University**

M.S. in Robotics, School of Computer Science 2017 - 2019  
Advisor: Matthew T. Mason

### **Harbin Institute of Technology**

B.S. in Aerospace Engineering 2013 - 2017

## RESEARCH INTERESTS

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Robotic Manipulation; Robot Dexterity; Dexterous and In-hand Manipulation; Planning, Control, and Estimation with Contacts; Contact Mechanics; Force and Compliance Control

## PUBLICATIONS

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- [1] **Enhancing Dexterity in Robotic Manipulation via Hierarchical Contact Exploration**  
Xianyi Cheng, Sarvesh Patil, Zeynep Temel, Oliver Kroemer, Matthew T. Mason  
*IEEE Robotics and Automation Letter (RAL)*, 2023, *Accepted*
- [2] **Autogenerated Manipulation Primitives**  
Eric Huang, Xianyi Cheng, Yuemin Mao, Arnav Gupta, Matthew T. Mason  
*The International Journal of Robotics Research (IJRR)*, 2023
- [3] **Learning Preconditions of Hybrid Force-Velocity Controllers for Contact-Rich Manipulation**  
Jacky Liang, Xianyi Cheng, Oliver Kroemer  
*The Conference on Robot Learning (CoRL)*, 2022
- [4] **Extrinsic Dexterous Manipulation with a Direct-drive Hand: A Case Study**  
Arnav Gupta, Yuemin Mao, Ankit Bhatia, Xianyi Cheng, Jonathan King, Yifan Hou, Matthew T. Mason  
*International Conference on Intelligent Robots and Systems (IROS)*, 2022
- [5] **Contact Mode Guided Motion Planning for Quasidynamic Dexterous Manipulation in 3D**

Xianyi Cheng, Eric Huang, Yifan Hou, Matthew T. Mason  
*IEEE International Conference on Robotics and Automation (ICRA), 2022*

[6] **Contact Mode Guided Sampling-Based Planning for Quasistatic Dexterous Manipulation in 2D**

Xianyi Cheng, Eric Huang, Yifan Hou, Matthew T. Mason  
*IEEE International Conference on Robotics and Automation (ICRA), 2021*

[7] **Efficient Contact Mode Enumeration in 3D**

Eric Huang, Xianyi Cheng, Matthew T. Mason  
*International Workshop on the Algorithmic Foundations of Robotics (WAFR), 2020*

[8] **Manipulation with Suction Cups using External Contacts**

Xianyi Cheng, Yifan Hou, Matthew T. Mason  
*International Symposium on Robotics Research (ISRR), 2019*

[9] **Data-Efficient Process Monitoring and Failure Detection for Robust Robotic Screwdriving**

Xianyi Cheng, Zhengzhong Jia, Matthew T. Mason  
*IEEE International Conference on Automation Science and Engineering (CASE), 2019*

[10] **Sensor Selection and Stage & Result Classifications for Automated Miniature Screwdriving**

Xianyi Cheng, Zhengzhong Jia, Ankit Bhatia, Reuben M Aronson, Matthew T. Mason  
*IEEE/RSJ International Conference on Intelligent Robots (IROS), 2018*

[11] **WebArena: A Realistic Web Environment for Building Autonomous Agents**

Shuyan Zhou, Frank F. Xu, Hao Zhu, Xuhui Zhou, Robert Lo, Abishek Sridhar, Xianyi Cheng, Tianyue Ou, Yonatan Bisk, Daniel Fried, Uri Alon, Graham Neubig.  
*Agent Learning in Open-Endedness Workshop (ALOE), 2023*

## SELECTED HONORS & AWARDS

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<b>MIT EECS Rising Stars</b>	2021
- Selective workshop for graduate students and postdocs of historically underrepresented genders interested in pursuing academic careers in EE, CS, and AI	
<b>Foxconn Fellowship</b>	2018
<b>HIT Outstanding Engineering Leadership Program</b>	2016
- Selective program for distinguished undergraduate engineering students	
<b>First-class Scholarship (top 5%)</b>	2016

## INVITED TALKS

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**Broadening Robot Dexterity: Leveraging Various Elements in Manipulation Task Environments**

RoboGrads Seminar, Georgia Tech	2023
Intelligent Robot Lab, Brown University	2023

DAIR Lab, University of Pennsylvania 2023  
**Contact Mode Guided Motion Planning for Nonprehensile Dexterous Manipulation**  
The Machines in Motion Lab, New York University 2022  
R-PAD Lab, CMU 2022  
AIRLab, Lehigh University 2021

## TEACHING

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**Dynamics**, CMU 24-351, Undergraduate-level Fall 2022  
Teaching Assistant and Instructor for Weekly Recitations  
**Robot Dynamics and Analysis**, CMU 24-760, Graduate-level Fall 2021  
Teaching Assistant and Instructor for Weekly Recitations

## SERVICE

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Reviewer at RAL, IROS, ICRA, MRS  
Co-organizer of IROS Workshop on Leveraging Models for Contact-rich Manipulation 2023  
Panelist of Women in MechE, Graduate School Application 2021

## MENTORSHIP

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Undergraduate Students: Yuemin Mao (CMU ME, now PhD Student at CMU Robotics), Karen Li (CMU CS), Leo Nicolussi (CMU ME)  
Master Students: Tianxin Li (CMU ECE), Divya Aggarwal (CMU ECE), Elizabeth Amy Santoso (CMU ME), Yifu Jin (CMU ECE)

## INDUSTRY EXPERIENCE

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Applied Scientist Intern, **Amazon Robotics AI**, *Stow Team* 2022  
- Developed manipulation motion strategies for stowing processes in warehouse automation  
Research Intern, **ABB Robotics Research** 2020  
- Developed deep learning vision algorithms for grasp planning