Hejia Zhang

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Objective: Robotics and AI researcher with 8 years of experience in learning-based control and robot planning for complex manipulation in dynamic, human-centered environments. Currently a Staff Research Scientist at NIO USA, focusing on dexterous robotic manipulation.

Current Employment

NIO USA, San Jose, CA Dec 2025 - Present
Staff Research Scientist

Education

University of Southern California (USC) Jan 2020 - Aug 2024
Ph.D. in Computer Science
Focus: Robot Learning, Task-and-Motion Planning, Collaborative Manipulation, Foundation Models for Robotics
Advisor: Prof. Stefanos Nikolaidis

University of Southern California Jan 2018 - Dec 2019
M.S. in Computer Science
Focus: Reinforcement Learning, Imitation Learning, Differentiable Physics Engine
Advisor: Prof. Gaurav Sukhatme & Prof. Stefanos Nikolaidis

Zhejiang University (ZJU) Sept 2013 - July 2017
B.E. in Bioengineering

Work Experience

Skild AI, San Mateo, CA Sept 2024 - Oct 2025
Early Member of Technical Staff - Robotics Researcher (Robot Learning for Manipulation)
- **Bimanual Robot Behavior Learning**: Joined Skild AI in its early stage and helped build the initial robotics learning and manipulation stack for general-purpose robot policies.

Carnegie Mellon University (CMU) Jan 2025 - Oct 2025
Research Collaborator
- **Learning to Design and Control Dexterous Robot Hands** [14]: Co-lead the efforts to use machine learning techniques to improve dexterous robot hand design and control. Collaborate with Jianren Wang, Prof. Abhinav Gupta, and Prof. Deepak Pathak.

SLURM Lab, USC Dec 2023 - Jan 2025
Research Scientist, PI: Prof. Daniel Seita
- **Embodiment Foundation Models**[13]: Co-lead the efforts for benchmarking and fine-tuning vision-language models (VLMs) for generalist robotic manipulation tasks.
- **Deformable Object Manipulation leveraging Foundation Models** [12]: Prompt engineering for LLMs to generate robot actions for fabric smoothing and folding tasks.

ICAROS Lab, USC Jan 2019 - Sept 2024
Research Assistant, PI: Prof. Stefanos Nikolaidis
- **Combine Learning and Planning for Long-Horizon Manipulation Tasks** [7], [10]: (1) Developed an effective and efficient multi-robot task-and-motion planning framework to address long-horizon robot manipulation tasks where the robots have to collaborate intelligently to transfer objects to their target regions in the presence of movable obstacles. (2) Developed a modular framework that combines neural networks and hand-designed convolution kernels to improve the efficiency of the object placement sampling for efficient task-and-motion planning
- **Learning Hierarchical Robot Assistive Policy for Efficient Large-Scale Data Collecting** [8]: Participated in designing an effective robot data collection system that consists of a hierarchical robot assistive policy. During the data collection process, the data collection system only asks for human teleoperation input when the robot policy is uncertain about what task to do next and how to perform the task.
- **Automatic Human Semantic Manipulation Skill Annotation System** [3], [5]: Developed a modular system for extracting long-horizon human (collaborative) manipulation plans from online YouTube videos. Each manipulation plan consists of a sequence of human semantic manipulation action annotations along with hand trajectories. The system leverages deep learning-based object detectors and human pose detectors to detect what objects humans are manipulating and utilizes online language datasets to predict what actions humans are performing.

- **Evaluating Human-Robot Collaboration Systems** [6], [9]: (1) Developed a framework to generate video game levels that are aesthetically similar to human-authored examples, while satisfying playability constraints by combining GANs with a differentiable MIP program. (2) The GAN-MIP framework is then used to generate human-robot collaboration (HRC) environments. (3) Developed human models for HRC evaluation experiments.
- **Robotics for Real-world Applications** [2], [11]: (1) Participated in designing an autonomous robot-assisted roof-bolting system. Responsible for robot motion designing and programming. Responsible for human-robot interface designing and programming. (2) Participated in developing a robot-assisted hair brushing system.

RESL, USC March 2018 - April 2019

Research Assistant, PI: Prof. Gaurav Sukhatme

- **Garage: a Reinforcement Learning Framework**: Participated in developing Garage. Studied and implemented the DQN algorithm and DDPG algorithm.
- **System Identification via Differentiable Physics Engine** [1]: Developed a graph neural networks-based robot dynamics model as baselines for the project.
- **Simulation-to-Real Transfer via Learning a Latent Space of Robot Manipulation Skills** [4]: (1) Developed a Gym-2-ROS interface for real-world robot experiments. (2) Developed gym environments for training reinforcement learning agents to perform manipulation tasks. (3) Evaluated different reinforcement learning algorithms in the developed environments.

Seetatech Technology Co., Ltd, Beijing, China June 2017 - Dec 2017

ML Engineer

- Developed and maintained a face recognition cloud platform which accepts and processes face feature management and face recognition requests from hundreds of different organizations.
- Developed an online data annotation platform which allows non-technical users to clean and annotate unlabeled data.

Skills

Python, C/C++, PyTorch, PyBullet, ROS, TensorFlow, Raspberry Pi, Arduino, Docker, Reinforcement Learning, Imitation Learning, Motion Planning, Task Planning

Honors and Awards

Lambda's Research Grant Program	2025
OpenAI Researcher Access Program Grant	2024
Oral Presentation, Conference on Robot Learning (CoRL)	2023
CoRL Travel Award	2023
Oral Presentation, AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)	2020
Viterbi MS Best Research Award, USC	2019
NeurIPS Travel Award	2019

Selected Publications

‡ denotes equal contributions

14. Jianren Wang‡, **Hejia Zhang**‡, Jie Han, Xueyang Qi, Yang Zhang, Hang Zhao, Abhinav Gupta, Deepak Pathak. **Learning to Design and Control Hands with Human-Level Dexterity**. *Submitted to ICRA, 2026.*

13. Enyu Zhao‡, Vedant Raval‡, **Hejia Zhang**‡, Jiageng Mao, Zeyu Shangguan, Stefanos Nikolaidis, Yue Wang, Daniel Seita. **ManipBench: Benchmarking Vision-Language Models for Low-Level Robot Manipulation**. *In Conference on Robot Learning (CoRL), 2025.*

12. Vedant Raval‡, Enyu Zhao‡, **Hejia Zhang**, Stefanos Nikolaidis, Daniel Seita. **GPT-Fabric: Folding and Smoothing Fabric by Leveraging Pre-Trained Foundation Models**. *In International Symposium on Robotics Research (ISRR), 2024.*

11. Peter Kolapo, Steven Schafrik, **Hejia Zhang**, Stefanos Nikolaidis, Zach Agioutantis. **Integrating Robotic Systems in Underground Roof Support Machine**. *Journal of Industrial Safety, 2024.*

10. **Hejia Zhang**, Shao-Hung Chan, Jie Zhong, Jiaoyang Li, Peter Kolapo, Sven Koenig, Zach Agioutantis, Steven Schafrik, Stefanos Nikolaidis. **Multi-Robot Geometric Task-and-Motion Planning for Collaborative Manipulation Tasks**. *Autonomous Robots (AURO), 2023.*

9. Varun Bhatt, Heramb Nemlekar, Matthew C. Fontaine, Bryon Tjanaka, **Hejia Zhang**, Ya-Chuan Hsu, Stefanos Nikolaidis. **Surrogate Assisted Generation of Human-Robot Interaction Scenarios**. *In Conference on Robot Learning (CoRL), 2023.* (**Oral Presentation**; 6.6% acceptance rate).

8. Shivin Dass[‡], Karl Pertsch[‡], **Hejia Zhang**, Youngwoon Lee, Joseph J. Lim, Stefanos Nikolaidis. **PATO: Policy Assised TeleOperation for Scalable Robot Data Collection**. *In Robotics: Science and Systems (R:SS), 2023.*

7. **Hejia Zhang**, Shao-Hung Chan, Jie Zhong, Jiaoyang Li, Sven Koenig, Stefanos Nikolaidis. **A MIP-Based Approach for Multi-Robot Geometric Task-and-Motion Planning**. *In The 18th IEEE International Conference on Automation Science and Engineering (CASE), 2022.*

6. **Hejia Zhang**[‡], Matthew C. Fontaine[‡], Amy Hoover, Julian Togelius, Bistra Dilkina, Stefanos Nikolaidis. **Video Game Level Repair via Mixed Integer Linear Programming**. *In The 16th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-20), 2020.* (**Oral Presentation**; 25% acceptance rate).

5. **Hejia Zhang**, Jie Zhong, Stefanos Nikolaidis. **Zero-Shot Imitating Collaborative Manipulation Plans from YouTube Cooking Videos**. *In Robotics: Science and Systems (R:SS) Workshop on Emergent Behaviors in Human-Robot Systems, 2020.* (**Paper of the Month** by Kinova Robotics).

4. Ryan Julian, Eric Heiden, Zhangpeng He, **Hejia Zhang**, Stefan Schaal, Joseph J. Lim, Gaurav S. Sukhatme, Karol Hausman. **Scaling Simulation-to-Real Transfer by Learning a Latent Space of Robot Skills**. *International Journal of Robotics Research (IJRR), Vol 39, Issue 10–11, 2020.*

3. **Hejia Zhang**, Po-Jen Lai, Sayan Paul, Suraj Kothawade and Stefanos Nikolaidis. **Learning Collaborative Action Plans from Unlabeled Youtube Videos**. *In International Symposium on Robotics Research (ISRR), 2019.*

2. Eura Shin, **Hejia Zhang**, Rey J Pocius, Nathaniel Dennler, Heather Culbertson, Naghmeh Zamani and Stefanos Nikolaidis. **Robot-assisted hair-brushing**. *Demo for Neural Information Processing Systems (NeurIPS), 2019.*

1. Eric Heiden[‡], David Millard[‡], **Hejia Zhang** and Gaurav S. Sukhatme. **Interactive Differentiable Simulation**. *arXiv: 1905.10706.*