

# YIXIAO WANG

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## 🎓 EDUCATION

### University of California, Berkeley

California, USA

PhD student in Mechanical Engineering, GPA: 4.0/4.0

Sept. 2022 – Present

- Research Interests: Behavior representation and prediction, Planning and optimization, Diffusion model
- Research Advisor: Prof. Masayoshi Tomizuka, Member of the National Academy of Engineering

### Northwestern University

Illinois, USA

Master in Mechanical Engineering, GPA: 4.0/4.0

Sept. 2019 – June 2021

### Shanghai Jiao Tong University

Shanghai, China

Master in Mechanical Engineering

Sept. 2018 – Mar. 2021

B.S. in Mechanical Engineering, GPA: 3.8/4.3 Rank: 5%

Sept. 2014 – June 2018

## 📖 SELECTED PUBLICATIONS

- **Yixiao Wang\***, Yifei Zhang\*, Mingxiao Huo\*, Ran Tian, Xiang Zhang, Yichen Xie, Chenfeng Xu, Pengliang Ji, Wei Zhan, Mingyu Ding, Masayoshi Tomizuka, *Sparse Diffusion Policy: A Sparse, Reusable, and Flexible Policy for Robot Learning*, Under Review.
- **Yixiao Wang**, Chen Tang, Lingfeng Sun, Simone Rossi, Yichen Xie, Chensheng Peng, Thomas Hannagan, Stefano Sabatini, Nicola Poerio, Masayoshi Tomizuka, Wei Zhan, *Optimizing Diffusion Models for Joint Trajectory Prediction and Controllable Generation*, ECCV 2024.
- Haotian Lin, **Yixiao Wang**<sup>†</sup>, Mingxiao Huo, Chensheng Peng, Zhiyuan Liu, Masayoshi Tomizuka, *Optimizing Diffusion Models for Joint Trajectory Prediction and Controllable Generation*, IROS 2024.

## 🏢 SELECTED RESEARCH EXPERIENCE

### Distributed Multi-agent Interaction with Imagined Potential Games

Mar. 2024 – Present

- Formulate a distributed multi-agent interactive policy as an imagined potential game solution, imagine negotiation between agents, and solve it in an imagined centralized setting. It can plan multi-agent actions, especially when other distributed planners do not have a solution, such as in a deadlock situation.

### Efficient and Reusable Diffusion Policy for Multi-task Learning

Dec. 2023 – Present

- Design a sparse and computationally efficient vision encoder and diffusion policy network as well as training strategy for multi-task learning to extract shared knowledge across tasks and prevent forgetting in continuous learning. Test multi-task and continuous learning in Robomimic, showing enhanced performance, few-shot ability, and fast fine-tuning on new tasks.

### Towards Efficient and Explainable Representation in Diffusion

Oct. 2023 – Present

- Compress and extract features in diffusion model, and investigate diminishing mechanism. Test in semantic correspondence datasets including SPair-71K and rank 1st.

### Optimizing Diffusion Model for Controllable Joint Trajectory Prediction

Aug. 2023 – Feb. 2024

- Optimize the diffusion model with an explicit solution in a conditional multi-agent setting and propose a computationally effective gradient-based sampling method. Test on the Argoverse 2 dataset, showing enhanced performance with fewer diffusion steps compared to the vanilla diffusion model and previous guided sampling methods.

### Socially-compliant MCTS-based Interactive Planning

Oct. 2022 – Feb. 2023

- Formulate a socially-compliant behavior model as a Nash Game for a distributed multi-agent setting and utilize Monte Carlo Tree Search (MCTS) to solve for interactive planning for each agent. Test in a closed-

loop autonomous driving simulator, demonstrating controllable, safe, and diverse trajectory simulations.

### **Imitating Human Driver through Trajectory Prediction**

Jan. 2022 – Aug. 2022

- Decouple the imitation learning objectives into priors learned as trajectory prediction tasks, and injected human-defined objectives learned as lightweight plug-in modules. It provides a customized warm start for the planning module, accelerating the optimization process. Test on closed-source data, demonstrating reliable and rapid adaptability when transferring to unseen scenarios or new traffic rules.

### **Toolpath Designing for Hub Surface Grinding**

Oct. 2020 – Mar. 2021

- Proposed an boundary detection method based on Delaunay triangulation and Depth First Search, increasing the detection efficiency.
- Formed a sweeping surface segmentation module for arbitrary geometry.
- Calculated feed velocity and path spacing to minimize average residual volumes.
- Converted grinding interval movement designing into a TSP and solved it to decrease the production time.

### **Manufacturing Analysis and Toolpath Designing**

Jan. 2020 – Mar. 2021

- Analyzed heat transfer process and residual stress distribution in the manufacturing procedure, determined and validated the key factors influencing the final product property, designed a toolpath to improve the mechanical property of the product based on above analysis results.

### **Large Cylinder Machining Process and Mechanism Analysis**

Mar. 2017 – June 2018

- Analyzed the structural stiffness of the large cylinder using finite element method and simulated the distortion during the machining process.
- Designed the support structure for machining to decrease the distortion in the machining area and compensate it into feed length.

## SKILLS

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**Languages** English - Fluent, Chinese - Native

**Technical Skills** Pytorch, Python, C++, Matlab, Abaqus, UG

## SELECTED SCHOLARSHIP & HONOR

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Outstanding Graduates of Shanghai Jiao Tong University	Dec. 2020
Outstanding Graduates of Shanghai City (21/415)	June 2018
Scholarship of Shanghai City (9/415)	Dec. 2017
First Prize of SGMW Scholarship (Top 10%)	Oct. 2016
INESA Scholarship (Top 20%)	Dec. 2015