Fan Yang

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Education

University of Michigan — Aug 2023 – Jun 2027(expected)
PhD in Robotics — *Ann Arbor, MI, US*

Carnegie Mellon University — Aug 2021 – Jun 2023
Master of Science in Robotics — *Pittsburgh, PA, US*

Tsinghua University — Aug 2016 – Jun 2020
Bachelor of Engineering in Engineering Mechanics (Honor program, Qian Class) — *Beijing, China*

Publications

Yang, Fan, Thomas Power, Sergio Aguilera Marinovic, Soshi Iba, Rana Soltani Zarrin, and Dmitry Berenson. "Multi-finger Manipulation via Trajectory Optimization with Differentiable Rolling and Geometric Constraints." arXiv preprint arXiv:2408.13229 (2024).

Yang, Fan, Wenxuan Zhou, Zuxin Liu, Ding Zhao, and David Held. "Reinforcement Learning in a Safety-Embedded MDP with Trajectory Optimization." In 2024 IEEE International Conference on Robotics and Automation (ICRA).

Huang, Zixuan, Yating Lin, **Fan Yang**, and Dmitry Berenson. "Subgoal Diffuser: Coarse-to-fine Subgoal Generation to Guide Model Predictive Control for Robot Manipulation." In 2024 IEEE International Conference on Robotics and Automation (ICRA).

Zhou, Wenxuan, Bowen Jiang, **Fan Yang**, Chris Paxton, and David Held. "HACMan: Learning Hybrid Actor-Critic Maps for 6D Non-Prehensile Manipulation." In 7th Annual Conference on Robot Learning. 2023.

Yang, Fan, Wenxuan Zhou, Harshit Sikchi, and David Held. "Self-Paced Policy Optimization with Safety Constraints.". ICML Safe Learning for Autonomous Driving Workshop, 2022

Yang, Fan, Chao Yang, Huaping Liu, and Fuchun Sun. "Evaluations of the Gap between Supervised and Reinforcement Lifelong Learning on Robotic Manipulation Tasks." In Conference on Robot Learning, pp. 547-556. PMLR, 2022.

Yang, Fan, Chao Yang, Di Guo, Huaping Liu, and Fuchun Sun. "Fault-aware robust control via adversarial reinforcement learning." In 2021 IEEE 11th Annual International Conference on CYBER Technology in Automation, Control, and Intelligent Systems (CYBER), pp. 109-115. IEEE, 2021.

Li, Jiachen, **Fan Yang**, Hengbo Ma, Srikanth Malla, Masayoshi Tomizuka, and Chiho Choi. "Rain: Reinforced hybrid attention inference network for motion forecasting." In Proceedings of the IEEE/CVF International Conference on Computer Vision, pp. 16096-16106. 2021.

Li, Jiachen*, **Fan Yang***, Masayoshi Tomizuka, and Chiho Choi. "Evolvegraph: Multi-agent trajectory prediction with dynamic relational reasoning." Advances in neural information processing systems 33 (2020): 19783-19794.

Research Experience

Graduate Research Assistant at *University of Michigan* Aug. 2023 – Present
Advisor: Dmitry Berenson *Ann Arbor, MI, US*

- Working on multi-finger dexterous manipulation with trajectory optimization for tool use. Designed a method to parameterize the geometry in a differentiable manner for trajectory optimization.
- Working on utilizing a diffusion model to plan contact modes in dexterous manipulation.

Graduate Research Assistant at *Carnegie Mellon University* Aug. 2021 – Jun. 2023
Advisor: David Held *Pittsburgh, PA, US*

- Designed a hierarchical framework for safe reinforcement learning that uses trajectory optimization as a low-level policy to ensure safety constraints. It achieves state-of-the-art performance for the Safety Gym benchmark tasks.
- Combined high-level motion planning with low-level policy in long-horizon manipulation tasks.
- Investigated extracting better representations of point cloud for manipulation tasks inspired by contact points and using it for RL.

Research Assistant at *Tsinghua University* Aug. 2020 – Jun. 2021
Advisor: Huaping Liu *Beijing, China*

- Developed an adversarial training method to make robots robust to joint damage.
- Developed a set of continual learning tasks and evaluated SOTA continual learning algorithm in RL domain. Demonstrated the gap of continual learning algorithm on RL tasks.

Research Assistant at *University of California, Berkeley* Sep. 2019 – Mar. 2020
Advisor: Masayoshi Tomizuka *Berkeley, CA, US*

- Developed an algorithm that extracts the relation between multiple agents and predict their trajectories with multi-modalities in a highly interactive and dynamical system, e.g. traffic, and physical particles.
- Designed a hybrid attention mechanism by using RL to prune unimportant edges in a graph and applying soft attention on the remaining graph in trajectory predictions.

Research Assistant at *Stanford University* Jun. 2019 – Aug. 2019
Advisor: Oussama Khatib *Stanford, CA, US*

- Developed an operational-space compliant control method with an optimization algorithm to select grasping points. The method was tested on an Allegro hand.

Awards & Honors

"Spark" Undergraduate Research Fellowship (Awarded to 50 out of 3000 students)
Tsinghua University *2019*

Specialized Skills

Technical Skills: Machine learning, trajectory optimization, RL, computer vision.
Programming Languages: Python, C, C++, MATLAB, Julia
Libraries: PyTorch, ROS, TensorFlow
Software: SolidWorks, Abaqus

Academic Services

- Reviewer of International Conference on Robotics and Automation (ICRA), Conference on Robotic Learning (CoRL), Intelligent Vehicles Symposium (IV).

Competition

- Fourth in MineRL Competition of NeurIPS 2020, advised by Prof. Lin Shao and Prof. Jiankun Wang