Yifan Sun

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EDUCATION

Carnegie Mellon University **Pittsburgh, PA**
Doctor of Philosophy in Robotics(*Advisor: Prof. Changliu Liu*) *Sept. 2024-Present*
Research Interests: Motion Planning and Control, Safe Reinforcement Learning, Dexterous Manipulation, Safe Human–Robot Interaction, Humanoid Whole-Body Control

Carnegie Mellon University **Pittsburgh, PA**
Masters of Science in Mechanical Engineering - Research (*GPA: 3.98/4.0*) *Sept. 2021-May. 2023*
Related Courses: Planning and Decision-making in Robotics, Deep Reinforcement Learning for Robot Decision Making, Robot Localization and Mapping, Machine Learning and AI for Engineers, Engineering Optimization

Xi'an Jiaotong University **Xi'an, CN**
Bachelor of Science in Mechanical Engineering (*GPA: 3.87/4.3*) *Sept. 2016-Jun. 2020*
Related Courses: Foundation of Computer System, Microcomputer Principle and Interface Technology, Intelligent Control

PUBLICATIONS

CONFERENCE

C1. Continual Learning and Lifting of Koopman Dynamics for Linear Control of Legged Robots
F. Li, A. Abuduweili, ***Y. Sun****, R. Chen, W. Zhao and C. Liu*
Learning for Dynamics and Control Conference (***L4DC***), *2025*

C2. Learn with imagination: Safe set guided state-wise constrained policy optimization
Y. Sun*, F. Li*, W. Zhao*, R. Chen, T. Wei, and C. Liu*
Learning for Dynamics and Control Conference (***L4DC***), *2025*

C3. Hybrid task constrained planner for robot manipulator in confined environment
Y. Sun*, W. Zhao, and C. Liu*
American Control Conference (***ACC***), *2024*

C4. A Lightweight and Transferable Design for Robust LEGO Manipulation
R. Liu, ***Y. Sun****, C. Liu*
International Symposium on Flexible Automation (***ISFA***), *2024*

C5. Absolute Policy Optimization: Enhancing Lower Probability Bound of Performance with High Confidence
W. Zhao, F. Li*,* ***Y. Sun****, R. Chen, T. Wei, and C. Liu*
International Conference on Machine Learning (***ICML***), *2024*

C6. Jerk-bounded Position Controller with Real-Time Task Modification for Interactive Industrial Robots
R. Liu, R. Chen, ***Y. Sun****, Y. Zhao and C. Liu*
International Conference on Advanced Intelligent Mechatronics (***AIM***), *2022*

JOURNAL

J1. GUARD: A Safe Reinforcement Learning Benchmark
W. Zhao,* ***Y. Sun****, R. Chen, R. Liu, T. Wei, and C. Liu*
Transactions on Machine Learning Research (***TMLR***)

J2. State-wise Constrained Policy Optimization
W. Zhao, R. Chen, ***Y. Sun****, R. Liu, T. Wei, and C. Liu*
Transactions on Machine Learning Research (***TMLR***)

WORKSHOP

W1. Robotic LEGO Assembly and Disassembly from Human Demonstration
*R. Liu, **Y. Sun**, C. Liu*
ACC'23 Workshop on Recent Advancement of Human Autonomy Interaction and Integration

W2. NeSyPack: A Neuro-Symbolic Framework for Bimanual Logistics Packing
*B. Li, P. Yu, Z. Tang, H. Zhou, **Y. Sun**, R. Liu, C. Liu*
RSS'25 Workshop on Benchmarking Robot Manipulation: Improving Interoperability and Modularity

PREPRINTS

P1. SPARK: A Modular Benchmark for Humanoid Robot Safety
***Y. Sun**, R. Chen, KS. Yun, Y. Fang, S. Jung, F. Li, B. Li, W. Zhao, C. Liu*

P2. Dexterous Safe Control for Humanoids in Cluttered Environments via Projected Safe Set Algorithm
*R. Chen, **Y. Sun**, C. Liu*

P3. Absolute State-wise Constrained Policy Optimization: High-Probability State-wise Constraints Satisfaction

*W. Zhao, F. Li, **Y. Sun**, Y. Wang, R. Chen, T. Wei, C. Liu*

EXPERIENCE

Intelligent Control Lab, Robotic Institute, CMU — **Pittsburgh, PA**
Research Assistant — *Sept. 2021-Present*
Developed a wide range of novel approaches in safe planning, learning and control using **C++**, **Python** and **ROS.**

Instinct Robotics, Inc. — **Princeton, NJ**
Robotics Research Intern — *May. 2025-Aug. 2025*
Developed **ROS2** modules, simulation, and motion-planning algorithms for industrial grinding pipelines, accounting for physical constraints and system dynamics.

Siemens, Inc. | **Future of Automation Team** — **Princeton, NJ**
Automation Runtime Systems Intern — *Jul. 2023-Oct. 2023*
Developed an **AR**-enhanced real-time human–robot collaboration system integrating **Apple Vision** Pro with industrial robots, leveraging Siemens' latest industrial network middleware, **OIE**.

Zoox, Inc. | **Motion Planning and Control Team** — **Foster City, CA**
Software Engineer Intern — *May. 2022-Aug. 2022*
Delivered a new feature to the **collision avoidance system** for autonomous vehicles using **C++**, **Protocol Buffers**, **Bazel** and **GTest**. Tested the performance of the feature on **7K+** miles of data.

SKILLS

Programming Language:	C/C++, Python, Matlab, Swift, Java
Software & Tools:	Git, ROS, Pytorch, Gazebo, Isaac Sim, Mujoco, Webots, Solidworks
Domain Knowledge:	Robot Planning and Control, Reinforcement Learning, SLAM, Machine Learning

HONORS AND AWARDS

Outstanding graduates	2020
Outstanding student leaders	2019
Robot Skills World Champions of VEX Robotics World Competition	2019
The First Prize Scholarship(top 5%)	2019
National Scholarship(top 1%)	2018
National Scholarship(top 1%)	2017