Yihan Li

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I aim to develop adaptive, efficient, robust and safe robotic systems capable of interaction with dynamic physical environments and smooth human–robot collaboration.

Education

University of Pennsylvania *August 2024 – Present*
M.Eng, Robotics
GPA: 3.67/4.0
Courses: Machine Perceprion, Control and Optimization with Applications in Robotics, Vision-based Robot Learning, Learning and Control for Adaptive and Reactive Robots, etc.

Xi'an Jiaotong Univerity *September 2020 – July 2024*
B.Eng, Automation Engineering, Qian Xuesen Honors College (**Selective Honors Program**)
GPA: 86/100 (Ranking **1/10**)
Courses: Operations Research, Automatic Control Theory, Machine Learning, Numerical Analysis, Circuit, Analog and Digital Electronic Technology, etc.

University of California, Berkeley *August 2022 – December 2022*
Visiting Student, EECS
GPA: 3.78/4.0
Courses: Signals and Systems, Data Structures, Introduction to Control of Unmanned Aerial Vehicles, Introduction to Embedded and Cyber Physical Systems.

Publications   * and † denote equal contribution

[1] Tianyu Li*, **Yihan Li***, Zizhe Zhang, and Nadia Figueroa, Flow with the Force Field: Learning 3D Compliant Flow Matching Policies from Force and Demonstration-Guided Simulation Data, *Under Review, Early version accepted by IROS CIM Workshop, E-RLC Workshop*, 2025. [**Website**]

[2] Yifan Zeng*, **Yihan Li***, Suiyi He, Koushil Sreenath, and Jun Zeng, IteraOptiRacing: A Unified Planning-Control Framework for Real-time Autonomous Racing for Iterative Optimal Performance, *Under Review of IEEE Transactions on Control Systems Technology (**TCST**)*, 2025.

[3] George Jiayuan Gao*, Tianyu Li*, Junyao Shi, **Yihan Li**†, Zizhe Zhang†, Nadia Figueroa, and Dinesh Jayaraman, VLMGINEER: Vision Language Models as Robotic Toolsmiths, *Under Review, Early version accepted as Oral Spotlight at RSS Workshop on Robot Hardware-Aware Intelligence*, 2025. [**Website**]

[4] Yifan Zeng*, Suiyi He*, Han Hoang Nguyen, **Yihan Li**, Zhongyu Li, Koushil Sreenath, and Jun Zeng, i2LQR: Iterative LQR for Iterative Tasks in Dynamic Environments, *IEEE Conference on Decision and Control (**CDC**)*, 2023.

Research Experience

University of Pennsylvania, Figueroa Lab *September 2024 – Present*
Advisor: Prof. Nadia Figueroa @Upenn GRASP Lab
Focused on contact-rich manipulation, force-informed policy learning, and compliant control for dynamic real-world robot tasks.

- Proposed *Flow with the Force Field*, a framework that enables smooth and compliant Sim2Real transfer in force-sensitive tasks with minimum human effort. Designed a lightweight, training-free strategy to synthesize diverse, force-informed datasets from a single human demonstration in simulation. Achieved zero-shot transfer of visuomotor policies by integrating passive impedance control, significantly enhancing system smoothness and adaptivity during real-world deployment.

- Led a research project on agile, multi-contact robotic manipulation challenge through hockey-puck tasks. Designed a hierarchical manipulation policy that combines behavior cloning for high-level planning with safe reinforcement learning for low-level compliance, enabling environment-conditioned behavior adaptation and robust execution of contact-rich skills such as hitting, dribbling, and scoring.

ETH Zurich, Robotics Student Fellow in Robotic Systems Lab *June 2025 – August 2025*
Advisor: Prof. Marco Hutter, Dr. Vaishakh Patil @ETH
Developed a multimodal, injury-adaptive in-hand manipulation policy for the Allegro hand on the repose task. Proposed a teacher–student framework where a privileged teacher policy (with access to ground-truth object and injury states) supervises a student trained from real-world sensory inputs for run-time injury recovery.

UC Berkeley, Hybrid Robotics Group *September 2022 – June 2024*
Advisor: Prof. Koushil Sreenath @UC Berkeley
Research on unified planning–and–control frameworks for dynamic and stochastic environments.

- Proposed Iterative Learned Linear Quadratic Regulator (I2LQR) strategy that unifies planning and control for dynamic environments and applied it in car-racing scenarios. I2LQR outperforms other demonstrated state-of-the-art methods (such as Learning-based MPC) in in stochastic, dynamic car-racing tasks with flexible and adaptive overtaking behaviors.

- Built an iterative Model Predictive Path Integral Control (MPPI) framework that integrates scenario generation, trajectory planning, and real-time control through regrouping–resampling. It enables autonomous overtaking behavior in car-racing environments by integrating the planning stage with the generation of executable trajectories.

Southern University of Science and Technology, CLEAR Lab *March 2024 – June 2024*
Advisor: Prof. Wei Zhang @SUSTech
Built a diffusion-policy-based imitation learning framework on ARX5 with UMI grippers for data collection, and explored Gaussian Splatting for synthetic data generation.

Projects

Whole-body Control for Force-attending Mobile Manipulation *Master's Independent Study, Dec. 2024*
Presented a Hierarchical MPPI (Model Predictive Path Integral) framework for whole-body control. It integrates MPPI components at both higher-level decision makers and lowerlevel interactive controllers, enabling the shared cost function information between levels to enhanceoverall system performance.

Adapting to Injuries for Dexterous In-Hand Manipulation *ETH RSF Project, Aug. 2025*
Developed a multimodal, injury-adaptive in-hand manipulation policy for the Allegro hand on the repose task.

Iterative-Regrouping MPPI: A United Framework of Controller and Behavior Planner
Undergraduate Thesis, Jun. 2024
Presented an iterative MPPI framework with regrouping–resampling that unifies scenario generation, planning, and control.

Awards

Third prize in 2022 China Robot Competition	*April 2022*
Xi'an Jiaotong University Scholarship (**Top 30%**)	*October 2021*
QianXuesen Honor College Outstanding Student of the Year (**Top 10%**)	*October 2021*

Professional Service

Reviewer for International Conference on Robotics and Automation (ICRA)	*2023*
Volunteer for Robotics: Science and Systems (RSS)	*2025*

Skills

Programming Language: C/C++, Python, Java, Matlab
Tools: PyTorch, ROS, Pybullet, IsaacLab, Isaacgym, ManiSkill
Hardware: Franka, FACTR Teleop, Arduino, Raspberry Pi