

EDUCATION	National University of Singapore <i>B.Sc. with Honours (Highest Distinction) in Mathematics</i> • Minor in Computer Science • Research Interests: World Models, Robot Learning, Manipulation, Representation Learning	Singapore 2021 - 2025
	City University of Hong Kong <i>B.S. in Biomedical Sciences (transferred to NUS)</i>	Hong Kong, China 2020 - 2021
PUBLICATIONS	1. Chengyang Ying, Zhongkai Hao, Xinning Zhou, Xuezhou Xu , Hang Su, Xingxing Zhang, Jun Zhu. PEAC: Unsupervised Pre-training for Cross-Embodiment Reinforcement Learning. <i>NeurIPS 2024</i> [Project Page]	
PREPRINTS	1. Xuezhou Xu* , Chung-Pang Wang*, Zhenzhen Li, Benjamin Riviere. Vector-Quantized World Model: Latent Feedback Motion Planning for Robot Manipulation. [Project Page]	
	2. Xuezhou Xu* , Yutong Li*, Jinpeng Liu, Xingyu Liu. Toss2Reorient: Dynamic In-Air Object Reorientation via Toss-and-Catch with Dexterous Hand. [Project Page]	
	3. Hengkai Tan*, Xuezhou Xu* , Chengyang Ying, Xinyi Mao, Zeyuan Wang, Songming Liu, Xingxing Zhang, Zhizhong Su, Hang Su, Jun Zhu. ManiBox: Enhancing Embodied Spatial Generalization via Scalable Simulation Data Generations. [Project Page]	
RESEARCH EXPERIENCES	NYU Riviere Robot Lab New York, USA <i>Research Associate</i> Supervisor: Prof. Benjamin Riviere	Apr 2026 - Oct 2026
	• Developed VQ-WM, a latent feedback motion planning framework combining discrete search over vector-quantized states with continuous visual feedback control. • Proposed first-passage-time-based state vector quantization using closed-loop rollouts in a learned world model to align planning abstractions with controller reachability.	
	NUS Xingyu's Group Singapore <i>Supervisor: Prof. Xingyu Liu</i>	Mar 2025 - Feb 2026
	• Developed a dynamic in-air object reorientation framework with coordinated tossing and catching using a dexterous hand-arm system, integrating 6D force/torque sensing, multi-stage training, and perception-based pose estimation.	
	Tsinghua SAIL Group Beijing, China <i>Supervisors: Prof. Jun Zhu, Prof. Hang Su</i>	Jan 2024 - Dec 2024
	• Proposed <i>ManiBox</i> , a scalable simulation-driven framework for spatial generalization through bounding-box-guided policy learning and data generation. • Developed <i>PEAC</i> , an unsupervised pre-training method that learns embodiment-aware, task-agnostic priors through reward-free interaction for cross-embodiment transfer.	

RELATED PROJECTS

Trajectory-conditioned Vision–Language–Action

USC Geometry, Vision, and Learning Lab

Sep 2025 – Feb 2026

Supervisor: Prof. Yue Wang

- Developed a trajectory-conditioned Vision–Language–Action (VLA) framework that integrates continuous 2D end-effector trajectories into multimodal representations, improving domain invariance to tackle distribution shift in robotic manipulation.

Image Deconvolution Using Wavelet Transform

NUS Mathematics Capstone Project

Jan 2025 – Apr 2025

Supervisor: Prof. Hui Ji

- Designed and implemented a Haar wavelet transform framework for denoising periodic signals contaminated with additive Gaussian noise, incorporating both soft-thresholding and hard-thresholding schemes for signal reconstruction.
- Conducted a comparative analysis of convolution strategies, including zero-padding, valid convolution, and circular convolution to evaluate their effects on boundary handling and reconstruction fidelity in the context of wavelet-based denoising.

Simulator-Driven Policy Learning for Robotics

AI Planning and Decision Making Course Project

Aug 2024 – Nov 2024

Supervisor: Prof. Leong Tze Yun

- Extended the Isaac Lab simulator to support custom RL algorithm integration, enabling seamless switching between A2C, SAC, TD3, DDPG, and PPO for large-scale policy benchmarking across diverse robotic tasks.
- Designed and trained a "Throw a Dice" manipulation task using the Franka arm, applying hierarchical reward shaping and curriculum learning to teach precise grasp-and-throw behavior.
- Applied domain randomization across object type, scale, and position to improve policy robustness and simulation data diversity, facilitating better generalization in robotic grasping scenarios.

Safe Policy Modification via Control Barrier Functions

UROPS Project

Aug 2023 – Nov 2023

Supervisor: Prof. Tong T. Xin

- Investigated safety guarantees in reinforcement learning by integrating Lyapunov-like Control Barrier Functions (LCBFs) into nominal control policies to ensure forward invariance within nonlinear systems.
- Designed and analyzed a safeguarding controller capable of modifying arbitrary policies to preserve safety, with formal theorems and simulation results validating its effectiveness across constrained dynamical systems.

TEACHING EXPERIENCES

CS4246/5446: AI Planning and Decision Making | National University of Singapore

Jan 2025 - Apr 2025

Supervisor: Prof. Akshay Narayan, Prof. Chun Kai Ling

- Led tutorials and assessed assignments for 100+ undergrad and grad students; contributed to assignment design and provided forum support.

AWARDS AND HONORS

- **A*STAR Graduate Scholarship (Computing)**, A*STAR Apr 2026
- **Exchange Scholarship**, Heidelberg University Feb 2024
- **Hong Kong Tech Seed Fund**, City University of Hong Kong Oct 2021
- **Dean's List AY20/21 Sem 2**, City University of Hong Kong Jun 2021
- **Dean's List AY20/21 Sem 1**, City University of Hong Kong Jan 2021

Co-CURRICULAR ACTIVITY

NUS Mathematics Society | Exco Member Aug 2022 - Jun 2023

- Developed comprehensive worked solutions for past mathematics exam papers and published them on the society's website to support students' academic preparation.
- Served as a teaching assistant in the LaTeX Workshop, guiding participants in document preparation and mathematical typesetting for academic writing.

NUS Chinese Calligraphy Club | President Aug 2022 - Jun 2023

- Led the organization of the *National Youth Calligraphy Competition*, the first nationwide student event after the pandemic, attracting over 100 participants and featuring judges from the Singapore Calligraphy Society and Ms. Rachel Ong Sin Yen, Member of Parliament, as Guest of Honour.
- Organized hands-on cultural workshops, including traditional seal carving and fan calligraphy, promoting appreciation of Chinese arts among NUS students.
- Oversaw weekly and summer training programs guided by professional instructors, fostering a vibrant learning community for calligraphy enthusiasts.
- Directed public outreach initiatives such as the NUS CCA Fair and Lantern Festival booths, engaging the campus community through interactive calligraphy activities.

King Edward VII Hall Chinese Drama | Actor Jan 2022 – Mar 2022

- Performed as a lead actor in the student production *I Am the Moon*, staged at the National Library Building, contributing to script interpretation and stage performance.

King Edward VII Hall Badminton Team | Member Aug 2022 – Jun 2023

- Represented the hall in the Inter-Hall Games (IHG) badminton competition, fostering teamwork and competitive spirit.
- Participated in structured weekly training sessions to enhance technical skills and match performance.

Yishun Community Hospital | Volunteer Aug 2024 - Nov 2024

- Provided weekly companionship to elderly residents through conversation, emotional support, and recreational activities such as gardening and puzzle games to enhance their mental well-being.
- Assisted healthcare staff in preparing and distributing meals, and helped care for elderly residents by accompanying them on walks and providing general assistance.

SKILLS

Programming: Python, PyTorch, JAX, Java, R, MATLAB, LaTeX.

Simulation Platforms: MuJoCo, MuJoCo Playground, Isaac Lab, BEHAVIOR-1K, Man-iSkill, RoboTwin.

Hardware: Mobile ALOHA, LEAP Hand, xArm, Trossen Arm.

Languages: Chinese (Native), English (Proficient).