

Lulu Zhao

Robotics Enthusiast

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Interests

Manipulation | Lifelong Learning | Human-Robot Collaboration | Software Development

Education

Beijing Normal University, Beijing

09/2021 – 07/2025

B.Eng. in Artificial Intelligence

> **GPA:** 90.3/100, **Ranking:** 2/41 (Recent Academic Year 1/41).

> **Featured Courses:** Introduction to AI 93, Math Foundations of AI 92, Software Engineering 96, Computer Vision 91, Natural Language Processing 93, Brain-Inspired and Cognitive Computing 95, Game Theory 95, ML for Science 96.

The Chinese University of Hong Kong, Hong Kong

09/2024 – 01/2025

Exchange @ International Asian Studies Program (IASP)

Publications and Preprints

- [1] **T1 and T2 Mapping Reconstruction Based on Conditional DDPM** 📄
Yansong Li, [Lulu Zhao](#), Yun Tian, Shifeng Zhao
International Conference on Medical Image Computing and Computer-Assisted Intervention [MICCAI 2023 CMRxRecon]
- [2] **Self-Supervised Composed Image Retrieval with Large Multi-Modal Model** 📄🔄🎥
[Lulu Zhao](#), Ting Zhang, Jiayu Sun, Jianyang Zhang, Yuhui Yuan
ACM Special Interest Group on Information Retrieval Conference, submitted. [SIGIR 2025]
- [3] **Enhancing Deformable Linear Object Manipulation With Language-conditioned Physical Pretraining** 📄🔄🎥
Yunxi Tang, [Lulu Zhao](#), K. W. Samuel Au
Robotics: Science and Systems Conference, submitted. [RSS 2025]
- [4] **T1Diff: Cardiac T1 Mapping Synthesis from Cine MRI based on Diffusion Model** 📄
Yansong Li, [Lulu Zhao](#), Yun Tian, Shifeng Zhao
Association for the Advancement of Artificial Intelligence Conference, under review. [AAAI 2024]
- [5] **Manipulating Elasto-plastic Objects with 3D Occupancy and Learning-based Predictive Control** 📄🎥
Zhen Zhang, Xiangyu Chu, Yunxi Tang, [Lulu Zhao](#), K. W. Samuel Au
IEEE Robotics and Automation Letter, submitted. [RA-L 2025]
- [6] **Dexterous Manipulation of Foam Hand via Diffusion Policy** 📄🔄🎥
[Lulu Zhao](#), Dominik Bauer, Arjun Lakshminpathy, Nancy Pollard
Carnegie Mellon University Computer Science Department Summer Research for International Students

Projects and Collaborations

Manipulation of Deformable Liner Objects (DLOs) and Elasto-plastic Objects

09/2024 – Present

Advised by [Prof. Kwok Wai Samuel Au](#), [Prof. Xiangyu Chu](#)

The Chinese University of Hong Kong

- > Transferring well-trained models to new DLOs often fails due to the diverse material properties of DLOs.
- > Proposed DLO Transformer: A pretraining framework for learning material-aware latent representations of DLOs.
- > Designed a teleoperation interface based on Meta Quest 3 using Unity for efficient data collection.
- > Refined state representation of elasto-plastic objects, developing a multi-camera system, and applying 3D occupancy.

Dexterous Manipulation of Foam Hand via Diffusion Policy

06/2024 – 08/2024

Advised by [Prof. Nancy Pollard](#)

Carnegie Mellon University

- > Building a general policy for an anthropomorphic soft Foam Hand is difficult: Involves 23 degrees of freedom.
- > Customized a teleoperation system with Gello (XArm) and Manus (Hand), integrating ROS2 for real-time control.
- > Formulated diffusion-based policies with action chunking conditioned on visual and joint state inputs.
- > Developed an imitation learning-based manipulation system for Foam Hand with robustness and generalization.

Self-supervised Composed Image Retrieval (CIR)

Advised by [Prof. Ting Zhang](#)

01/2024 – 05/2024

Beijing Normal University

- › Performing image retrieval based on a reference image and text describing modifications.
- › Presented a dataset-building scheme that uses vision-and-language pre-trained (VLP) models on the fly.
- › First to create a generic dataset of 1.74 million triplets to advance visiolinguistic reasoning research.
- › First to introduce a generic benchmark of 5,000 triplets to promote research in CIR .
- › Proposed a self-supervised learning pipeline: contrasting paired query targets against other targets in a training batch.

Safety Certification of Deep Reinforcement Learning (RL) for Humanoid Robots

06/2023 – 08/2023

Advised by [Prof. Hao Su](#)

North Carolina State University

- › Developed effective locomotion policies for humanoid robots using actor-critic deep RL in simulators.
- › Conducted safety certification of stability and robustness under conditions like lateral forces and friction changes.

Denoising Diffusion Probabilistic Model (DDPM)-based Cardiac MRI Analysis and Synthesis

01/2023 – 12/2023

Advised by [Prof. Yun Tian](#)

Beijing Normal University

- › Proposed T1Diff: First to synthesize T1 mapping from Cine MRI using disentangled conditional DDPM.
- › Extracted modality and morphokinetic features from Cine MRI to ensure alignment of the synthesis.
- › Participated in CMRxRecon Challenge, employing conditional DDPM with accelerated mappings as conditions to enhance T1 and T2 reconstructions from degraded data.

Establishment of New Benchmark of Scene Text Recognition (STR)

09/2023 – 12/2023

Advised by [Prof. Yu Zhou](#)

University of Chinese Academy of Sciences

- › Formulated correction rules for STR benchmarks, and applied reinforcement learning to optimize the process.
- › Led an open-source initiative to evaluate STR algorithms on the new benchmark, promoting progress in community.

EduXR: AI-Powered VR/AR Learning Platform

08/2022 – 08/2023

National Innovation and Entrepreneurship Training Program

- › Developed an interactive virtual learning environment using Unity for immersive educational experiences.
- › Created 3D models and animations to enhance the interactivity and realism of virtual classroom settings.
- › Working with schools and training institutions to test and deploy custom models for user-specific services.

Tongue-based Intelligent Anxiety Detection Robot

01/2022 – 07/2022

Advised by [Prof. Qingqiong Deng](#)

Beijing Normal University

- › Partnered with colleges and hospitals to collect a dataset of over 2,000 tongue images for anxiety diagnosis.
- › Developed tongue image classifiers, achieving over 98% accuracy in metal assessment.
- › Enhanced the robot by integrating pedestrian detection, automatic navigation, and speech recognition and synthesis.

Skills and Services

Languages	Python, JS (Node), C, C++, CUDA, C#, SQL, \LaTeX , Git
Frameworks	PyTorch, Jax, OpenCV, Django, ReactJS
Robotic Tools	ROS2, Universal Robots 5e, UFactory XArm 7, Foam Hand, Meta Quest 3, Manus Glove, Vicon MoCap
Simulators	MuJoCo, IsaacSim, Raisim, PyBullet, Unity
Operating Systems	Ubuntu, macOS, Windows, Android, HarmonyOS
Community	Volunteered as a mentor in Guizhou and Xinjiang.
Skating	Served as the Vice President of the Figure Skating Association at BNU.

Awards and Honors

First Prize @ Beijing Normal University Scholarship

Outstanding Student Award @ Huawei OpenHarmony Innovation Contest 2023

Second Prize @ Beijing Division, China Undergraduate Mathematical Contest in Modeling 2023

Exchange Program Award @ Beijing Normal University - The Chinese University of Hong Kong

First Prize @ 20th World-Wide Chinese Students Essay Writing Competition