

# QIUSHI LYU

## Peking University

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AlfredLyu

## EDUCATION

Bachelors of Computer Science and Technology (Turing Class)

### Peking University

Sept. 2021 – Present

Beijing, China

- GPA 3.92/4.00, **Rank 1/121**
- Gold medalist at the 2020 China National Olympiad in Informatics (NOI), leading to direct admission into Peking University.
- Entered Peking University for preparatory studies from Mar. 2021 to Aug. 2021.

### Visiting Student

#### Massachusetts Institute of Technology

Mar. 2024 – Aug. 2024

Boston, US

- Advised by Prof. Joshua B. Tenenbaum and Prof. Chuang Gan.
- Specialized in Computer Vision, Multimodal Learning and Embodied AI.

## PUBLICATIONS (\*DENOTES EQUAL CONTRIBUTION)

### Constrained Human-AI Cooperation: An Inclusive Embodied Social Intelligence Challenge [link]

NeurIPS 2024 D & B Track

Authors: Weihua Du\*, **Qiushi Lyu\***, Jiaming Shan, Zhenting Qi, Hongxin Zhang, Sunli Chen, Andi Peng, Tianmin Shu, Kwongjoon Lee, Behzad Dariush, Chuang Gan

- We created a new benchmark, named CHAIC, to test embodied agents' ability to actively perceive human partners' intents and constraints from egocentric visual observations. We designed new agents with real physical constraints and some long-horizon tasks featuring both indoor and outdoor scenes.

### COMBO: Compositional World Models for Embodied Multi-Agent Cooperation [link]

ICLR 2025

Authors: Hongxin Zhang\*, Zeyuan Wang\*, **Qiushi Lyu\***, Zheyuan Zhang, Sunli Chen, Tianmin Shu, Yilun Du, Chuang Gan

- We introduced an embodied multi-agent planning framework that leverages a compositional world model to empower the agents to imagine how different actions may affect the world in the long run and used a tree search algorithm to plan more cooperatively. The compositional world model can be learned as a video diffusion model by factorizing joint actions of agents and compositionally generating the future frames of the world state.

### 2.5D video-audio generation from single image

In Progress

Authors: Sunli Chen\*, **Qiushi Lyu\***, Haotian Yuan\*, Kaizhi Qian, Yang Zhang, Chuang Gan

- We created a pipeline to generate stereo sound from silent videos and used it to generate a high-quality video dataset with stereo sound. We trained a model on this dataset that jointly generates video and stereo sound given an initial frame and text instruction.

### MagnifierSketch: A Unified Data Structure for Efficient Aggregate and Per-Flow Latency Quantile Estimation

Submit to WWW 2025

Authors: Jiarui Guo\*, **Qiushi Lyu\***, Yuhan Wu\*, Haoyu Li\*, Tong Yang, Zhaoqian Yao, Yuqi Dong, Peiqing Chen, Xiaolin Wang

- We proposed MagnifierSketch, an efficient algorithm for per-flow latency quantile estimation, which is unbiased and significantly better than the state-of-the-art algorithms.

## RESEARCH INTERESTS

Computer Vision

Multimodal Learning

Embodied AI and Robotics






Cognitive AI

## LANGUAGES

Chinese: Native Speaker

English: TOEFL 105(MyBest 106, Speaking 23), GRE 320

## SELECTED PRIZES

	<b>May 4th Scholarship</b> The best scholarship in Peking University, has equivalent status to National Scholarship	Dec. 2023
	<b>POSCO Asia Fellowship</b> Comprehensive Excellent Award sponsored by POSCO	Dec. 2022
	<b>International Collegiate Programming Contest (ICPC) Asia-East Continent Final Contest</b> Rank 4, Gold Medal	Jul. 2022
	<b>International Collegiate Programming Contest (ICPC) Shenyang Regional Contest</b> <b>Rank 1</b> , Gold Medal, beat the ICPC World Final Champion	Nov. 2021
	<b>China National Olympiad in Informatics (NOI) 2020</b> Rank 45, Gold Medal	Aug. 2020

## EXPERIENCES

### Research Intern

#### MIT-IBM Watson AI Lab, Massachusetts Institute of Technology

📅 Aug. 2023 – Present

📍 Boston, US / Remote

- Advised by Prof. Joshua B. Tenenbaum and Prof. Chuang Gan.
- Developed *COMBO*, an embodied multi-agent planning framework that leverages a compositional world model to empower the agents to imagine future states and plan more cooperatively.
- Also Developed *CHAIC*, a new benchmark to test embodied agents' ability to actively perceive human partners' intents and constraints from egocentric visual observations and cooperate with them more efficiently.
- Another ongoing work aimed to generate a high-quality video dataset with stereo sound and train a model on this dataset that jointly generates video and stereo sound given an initial frame and text instruction.

### Research Intern

#### Peking University

📅 Jan. 2023 – July. 2023

📍 Beijing, China

- Advised by Prof. Tong Yang.
- Focused on sketch algorithms, introduced *MagnifierSketch*, an efficient algorithm for per-flow latency quantile estimation.

## TEACHING EXPERIENCE

**Teaching Assistant:** Discrete Mathematics and Structures(I)

Fall 2023

## SKILLS & INTERESTS

**Programming Languages:** proficient in Python, C, C++; experienced in Java, Haskell, MATLAB.

**Hobbies:** the game of Go (5 Dan), soccer, swimming