

# QIUSHI LYU

University of Illinois, Urbana-Champaign

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## EDUCATION

Ph.D. Student in Computer Science

**University of Illinois, Urbana-Champaign**

⌚ Aug. 2025 – Present

📍 Champaign, US

- Advised by Prof. Yuxiong Wang.
- Currently working on VLM agents and Long Video Understanding.

Bachelors of Computer Science and Technology (Turing Class)

**Peking University**

⌚ Sept. 2021 – July. 2025

📍 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.

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, Kwonjoon 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.

**Virtual Community: An Open World for Humans, Robots, and Society** [link]

**Submitted to ICLR 2026**

Authors: Qinhong Zhou\*, Hongxin Zhang\*, Xiangye Lin\*, Zheyuan Zhang\*, Yutian Chen, Wenjun Liu, Zunzhe Zhang, Sunli Chen, Lixing Fang, **Qiushi Lyu**, Xinyu Sun, Jincheng Yang, Zeyuan Wang, Bao Chi Dang, Zhehuan Chen, Daksha La-dia, Jiageng Liu, Chuang Gan

- We introduced Virtual Community, an open-world simulation platform that unifies humans and robots in large-scale, realistic environments generated from real-world data and generative models. Based on this platform, we introduced new planning and robot collaboration challenges, and show that existing methods struggle in these complex social and physical open-world settings, highlighting the need for more advanced approaches and demonstrating the value of Virtual Community.

## RESEARCH INTERESTS

Computer Vision

Multimodal Learning

VLM Agents

Embodied AI and Robotics

## LANGUAGES

Chinese: Native Speaker

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

## SELECTED PRIZES

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

## EXPERIENCES

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### Ph.D. Research Assistant

#### **University of Illinois, Urbana-Champaign**

-  Aug. 2025 – Present  Champaign, US
- Advised by Prof. Yuxiong Wang.
  - Currently working on the development of challenging benchmarks for streaming long videos, and on building video agents that can handle long-horizon or even infinite video understanding in a streaming manner.

### Research Intern

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

-  Aug. 2023 – Sept. 2025  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 work is *Virtual Community*, a new simulation platform that unifies humans and robots in large-scale, realistic environments generated from real-world data and generative models.

### 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

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

Fall 2023

## SKILLS & INTERESTS

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

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