QIUSHI LYU

University of Illinois, Urbana-Champaign

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Champaign, US alfredlyu.github.io AlfredLyu

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 Video agents and Long Video Understanding.

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.

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.

RESEARCH INTERESTS

Computer Vision
Multimodal Learning
Video Agents
Embodied AI and Robotics

LANGUAGES

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

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 Ladia, 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.

SELECTED PRIZES

May 4th Scholarship Dec. 2023
The best scholarship in Peking University, has equivalent status to National Scholarship

POSCO Asia Fellowship Dec. 2022
Comprehensive Excellent Award sponsored by POSCO

International Collegiate Programming Contest (ICPC) Asia-East Continent Final Contest Jul. 2022
Rank 4, Gold Medal

International Collegiate Programming Contest (ICPC) Shenyang Regional Contest Nov. 2021
Rank 1, Gold Medal, beat the ICPC World Final Champion

China National Olympiad in Informatics (NOI) 2020 Aug. 2020
Rank 45, Gold Medal

EXPERIENCES

Ph.D. Research Assistant

University of Illinois, Urbana-Champaign

Aug. 2025 – Present | Champaign, US

- Advised by Prof. Yuxiong Wang.
- Currently working on developing challenging streaming long video benchmarks, and develop video agents that can cope with long 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

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