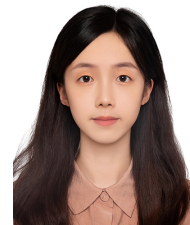


Junyu Zhang

✉ junyuz6@seas.upenn.edu | 🌐 jyzhang1208 | 🏠 Homepage | 🎓 Google Scholar



EDUCATION

University of Pennsylvania

Ph.D. in Computer and Information Science

◦ **Research Advisor:** Prof. Jiayuan Mao

Pennsylvania, US

Aug 2026 - Present

University of Illinois Urbana-Champaign

M.S. in Computer Science (Research Track), Siebel Scholar (Class of 2026)

◦ **GPA:** 4.0/4.0

◦ **Research Advisor:** Prof. Huan Zhang, Prof. Tong Zhang

Illinois, US

Aug 2024 - May 2026

Huazhong University of Science and Technology

*B.E. in Artificial Intelligence, **Honor Class** of Artificial Intelligence*

◦ **GPA:** 3.89/4; **Rank:** 1/29 (selected from 360 students in the school)

◦ **English Proficiency:** TOEFL 105 (Speaking 24); GRE 325+3.5 (Verbal 156, Quantitative 169)

Hubei, China

Sept 2020 - June 2024

RESEARCH INTERESTS

In the era of large-scale foundation models, my research goal is to incentivize the capabilities of pre-trained models by empowering them to perform *long-term reasoning* and *learn from interaction*, thereby building scalable and generalizable AI for both the digital and physical world.

- **Foundation Models Reasoning:** video prediction as embodied chain-of-thought; embodied spatial reasoning for agentic decision-making; efficient and theoretically grounded reasoning.
- **Learning from Interactions:** empirical reinforcement learning algorithms and their applications in robotics, including morphology–behavior co-optimization and robotic manipulation.

PUBLICATIONS AND PREPRINTS

1. **Junyu Zhang***, Yifan Sun*, Tianang Leng*, Jingyan Shen*, Ziyin Liu[†], Paul Pu Liang[†], Huan Zhang[†], “When Reasoning Meets Its Laws”, in **NeurIPS 2026; NeurIPS 2025 Workshop on Efficient Reasoning (Best Paper Runner-Up)** [PDF] [Website]
2. **Junyu Zhang***, Runpei Dong*, Han Wang, Xuying Ning, Haoran Geng, Peihao Li, Xialin He, Yutong Bai, Jitendra Malik, Saurabh Gupta, Huan Zhang, “AlphaOne: Reasoning Models Thinking Slow and Fast at Test Time”, in **EMNLP 2025 Main** [PDF] [Website]
3. Rui Yang*, Hanyang Chen*, **Junyu Zhang***, Mark Zhao*, Cheng Qian, Kangrui Wang, Qineng Wang, Teja Venkat Koripella, Marziyeh Movahedi, Manling Li, Heng Ji, Huan Zhang, Tong Zhang, “EmbodiedBench: Comprehensive Benchmarking Multi-modal Large Language Models for Vision-Driven Embodied Agents”, in **ICML 2025 (Oral)** [PDF] [Website] [Dataset]
4. Chengke Zou*, Xingang Guo*, Rui Yang*, **Junyu Zhang**, Bin Hu, Huan Zhang, “DynaMath: A Dynamic Visual Benchmark for Evaluating Mathematical Reasoning Robustness of Vision Language Models”, in **ICLR 2025** [PDF] [Website] [Dataset]
5. Heng Dong*, **Junyu Zhang***, Chongjie Zhang, “Leveraging Hyperbolic Embeddings for Coarse-to-Fine Robot Design”, in **ICLR 2024** [PDF] [Website]

6. Heng Dong, **Junyu Zhang**, Tonghan Wang, Chongjie Zhang, “Symmetry-Aware Robot Design with Structured Subgroups”, in **ICML 2023** [PDF] [Website]
7. Jianhao Wang*, Jin Zhang*, Haozhe Jiang, **Junyu Zhang**, Liwei Wang, Chongjie Zhang, “Offline Meta Reinforcement Learning with In-Distribution Online Adaptation”, in **ICML 2023** [PDF]

HONORS AND AWARDS

- Siebel Scholar Award (top 1%) – 2025
- Facilitating Learning Excellence Award – 2026
- Outstanding Graduate Honor – 2024
- Outstanding Undergraduate Student Award (top 1%) – 2022
- Excellent Academic Scholarship – 2021
- Science and Technology Innovation Scholarship – 2022, 2023
- The Second Prize of the World Robot Contest-BCI Brain Control Robot Contest – 2021
- Honorable Mention in Mathematical Contest in Modeling – 2022

RESEARCH EXPERIENCE

Research Assistant - GRASP Lab

Supervisor: Prof. Jiayuan Mao

Pennsylvania, US

June 2026 - Present

Self-Improving Unified Models for Robotics

- Identified that world-action models can generalize to unseen manipulation tasks by scaling video-only supervision with few action-labeled data.
- Built a self-improvement pipeline for unified models that composes video generation, reward modeling, and action prediction to bootstrap unseen-task adaptation with minimal real-world interaction.

Research Intern - MIT Media Lab

Supervisor: Prof. Paul Pu Liang

Massachusetts, US

June 2025 - Sept 2025

Physics of Large Language Models Reasoning

- Formalized intrinsic reasoning patterns in large reasoning models (LRMs) via two fundamental laws.
- Introduced LoRe-Bench to evaluate whether current LRMs follow the laws, and proposed a simple yet effective fine-tuning approach that empirically validated our theory.
- Our project is accepted by NeurIPS 2026.

Research Assistant - Assured and Trustworthy AI Research Lab

Supervisor: Prof. Huan Zhang

Illinois, US

Aug 2024 - May 2026

Benchmarking Multimodal Large Language Models as Direct Robot Policies

- Developed a standardized, multifaceted evaluation platform for automatically quantifying the performance of task planning in MLLM-based embodied agents.
- Created capability-oriented task datasets from high-level rearrangement to low-level manipulation and performed extensive experimental evaluations to further understand MLLM-based planning.
- Our work is accepted by ICML 2025 Oral.

Test-Time Scaling of Large Reasoning Models

- Introduced a universal framework for modulating reasoning progress in LRMs at test time.
- Unified and generalized existing monotonic scaling methods by enabling flexible and dense slow-to-fast reasoning modulation, demonstrating superior reasoning capability and efficiency.
- Our work is accepted by EMNLP 2025 Main.

Dynamic Benchmark for Mathematical Reasoning in Vision-Language Models

- Investigated the mathematical reasoning robustness and revealed limitations of SOTA VLMs.
- Proposed a dynamic benchmark capable of generating a large number of question variants and conducted an extensive evaluation of both closed-source and open-source VLMs.
- Our work is accepted by ICLR 2025.

Research Intern - MIT-IBM Watson AI Lab

Massachusetts, US (remote)

Supervisor: Prof. Chuang Gan

April 2023 - Mar 2024

Sequential Decision Making for Robotic Manipulation

- Proposed a novel framework for efficient policy generalization across diverse robotic tasks.
- Incorporated mixture of experts layers into the transformer model that effectively harnesses the commonalities and discriminations of multimodal data.
- Evaluated our method on the RLBench benchmark that demonstrated great generalization ability.

Research Intern - IIIS, Tsinghua University

Beijing, China

Supervisor: Prof. Chongjie Zhang

July 2022 - Jan 2024

Offline Meta Reinforcement Learning

- Revealed theoretical insights for offline meta-RL with online adaptation.
- Generated in-distribution context using a given uncertainty quantification and performed effective task belief inference to address new tasks.
- Our work is accepted by ICML 2023.

Robot Design via Reinforcement Learning

- Designed robots with various functionalities in simulated environments by using symmetry to exploit the structure of the robot design space with symmetry.
- Proposed a novel plug-and-play transformation module to map any robot design into a learned symmetry space and provided theoretical analysis to verify its rationality.
- Our work is accepted by ICML 2023.

Multi-cellular Soft Robot Design

- Inspired from real multi-cellular organisms and developed a novel algorithm to co-design soft robots in behavior and morphology.
- Introduced coarse-to-fine robot design strategy and conducted a comprehensive analysis of its benefits in the evolution of intelligent collectives
- Our project is accepted by ICLR 2024.

SPEAKING ENGAGEMENTS

When Reasoning Meets Its Laws

- Invited Talk at NeurIPS 2025 Workshop on Efficient Reasoning – *Dec 2025*

AlphaOne: Reasoning Models Thinking Slow and Fast at Test Time

- Invited Talk at NVIDIA Applied Deep Learning Research – *Aug 2025*

Unlocking Reasoning in Foundation Models

- Invited Talk at Multisensory Intelligence Group, MIT Media Lab – *Aug 2025*

ACADEMIC SERVICE

Conference Reviewer

- International Conference on Learning Representations (ICLR) 2025–2027
- Conference on Neural Information Processing Systems (NeurIPS) 2025–2026

- ACL Rolling Review (ACL ARR) 2025
- IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2026
- ACL Conference on Language Modeling (COLM) 2026
- Conference on Robot Learning (CoRL) 2026

TEACHING EXPERIENCE

Teaching Assistant

- ECE598 Advanced Topics in Machine Learning and Formal Methods, University of Illinois Urbana-Champaign – *Fall 2024*.
- CS441 Applied Machine Learning, University of Illinois Urbana-Champaign – *Spring 2025*.
- CS107 Data Science Discovery, University of Illinois Urbana-Champaign – *Fall 2025, Spring 2026*.

SKILLS SUMMARY

- **Programming Languages** Python, C/C++, Matlab, SQL, Bash
- **Languages** Chinese, English
- **Frameworks** PyTorch, vLLM, LLaMA-Factory, DeepSpeed, TensorFlow, etc.
- **Tools** VS Code, Markdown, Jupyter Notebook, MobaXterm, Kubernetes, Git, Slurm