Junyu Zhang

junyuz6@illinois.edu | jyzhang1208 | Homepage | Google Scholar

Education

- **University of Illinois Urbana-Champaign (UIUC)** Illinois, US
  M.S. in Computer Science *Aug 2024 - May 2026*
  - **GPA: 4.0**/4.0
  - **Research Interest:** Reinforcement Learning, LLMs, Embodied AI, Trustworthy Machine Learning
  - **Research Advisor:** Prof. Huan Zhang
- **Huazhong University of Science and Technology (HUST)** Hubei, China
  *B.E. in Artificial Intelligence, **Honor Class** of Artificial Intelligence* *Sept 2020 - June 2024*
  - **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, Writing 3.5)

Publications and Preprints

- **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", *arXiv preprint* [PDF] [Website]
- 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]
- 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]
- Heng Dong*, **Junyu Zhang***, Chongjie Zhang, "Leveraging Hyperbolic Embeddings for Coarse-to-Fine Robot Design", in **ICLR 2024** [PDF] [Website]
- Heng Dong, **Junyu Zhang**, Tonghan Wang, Chongjie Zhang, "Symmetry-Aware Robot Design with Structured Subgroups", in **ICML 2023** [PDF] [Website]
- 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]

Research Experience

- **Research Assistant - Assured and Trustworthy AI Research Lab** Illinois, US
  Supervisor: Prof. Huan Zhang *Aug 2024 - Present*

  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.

Vision-Driven Embodied Agent Benchmark of Multi-modal Large Language Models

- 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.

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 submitted to EMNLP 2025.

Visual Preference Optimization (in progress)

- Proposed a learning framework that applies explicit, dense supervision to LVLMs by jointly optimizing both visual prior and language posterior representations.
- Distilled knowledge from contextualized to non-contextualized vision language models to enhance their alignment and performance.

- **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 that enabled efficient policy generalization in the offline multi-task and imitation learning settings.
- 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.

- **Research Assistant - School of AI, HUST** Hubei, China
  Supervisor: Prof. Dongrui Wu *May 2021 - May 2022*

  Epilepsy Seizure Detection and Automatic Classification Project
  - Cooperated with Wuhan Children's Hospital Affiliated to Tongji Medical College.
  - Integrated transfer learning to deal with the lack of epileptic seizure data.
  - Utilized manually extracted features to regularize and initialize neural network.

  World Robot Contest - BCI Brain Control Robot Contest
  - Completed Event-Related Potential experiments to figure out the position of target images in the sequence and determine their categories by analyzing the EEG signals.
  - Introduced Euclidean-Space Alignment to deal with the differences of EEG signals between users and XDawn spatial filter to maximize the signal-to-noise ratio.
  - Our project won the Second Prize.

- **Innovation Project Member - School of AI, HUST** Hubei, China
  Supervisor: Prof. Wenbing Tao *Mar 2022 - July 2022*

  Innovation and Entrepreneurship Training Program
  - Aimed to build a complete football analysis system from football player detection, player identification to real-time position tracking and action recognition.
  - Applied TinaFace based on RetinaNet to achieve face recognition due to the high degree of blurriness in facial images and the difficulty in capturing faces in videos.

Honors and Awards

- Outstanding Graduate Honor - *2024*
- Outstanding Undergraduate Student Award (top 1%) - *2022*
- Freshman Self-improvement Scholarship - *2021*
- Excellent Academic Scholarship - *2021*
- The Second Prize of the World Robot Contest-BCI Brain Control Robot Contest - *2021*
- The First Prize for Individual Events in the School Spring Sports Meeting - *2021*
- Science and Technology Innovation Scholarship - *2022*
- Honorable Mention in Mathematical Contest in Modeling - *2022*
- Third Prize of the Seventeenth C Programming Language Contest - *2022*
- The Second Prize in the Badminton event at the Fourth Sports Teaching Class Student Sports Skills Competition - *2022*
- Science and Technology Innovation Scholarship - *2023*

Academic Service

- **Conference Reviewer**
  - International Conference on Learning Representations (ICLR) 2025
  - Conference on Neural Information Processing Systems (NeurIPS) 2025
  - ACL Rolling Review (ACL ARR) 2025

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.

SKILLS SUMMARY

- **Programming Languages** Python, C/C++, Matlab, SQL, Bash
- **Languages** Chinese, English
- **Frameworks** PyTorch, TensorFlow, Keras, OpenCV, Scikit, etc.
- **Tools** PyCharm, VS Code, Markdown, Jupyter Notebook, Mobaxterm, Kubernetes, Git