

# Yinong He

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## EDUCATION

### UM-SJTU Joint Institute

*B.S.E. in Data Science and Electrical and Computer Engineering*

Ann Arbor, Michigan / Shanghai, China

*Sept. 2021 – May 2025*

- Completed the program with two years at the University of Michigan and two years at Shanghai Jiao Tong University.

### University of Michigan

*B.S.E in Data Science*

Ann Arbor, Michigan

*Sept. 2023 – May 2025*

### Shanghai Jiao Tong University

*B.S.E. in Electrical and Computer Engineering*

Shanghai, China

*Sept. 2021 – Aug. 2023*

## RESEARCH INTERESTS

Embodied AI, Human-Robotics Interaction, Planning, Robotic Manipulation, Large Language Model

## WORKING PAPER AND PUBLICATION

- Teaching Embodied Reinforcement Learning Agents: Informativeness and Diversity of Language Use

**Yinong He\***, **Jiajun Xi\***, Jianing Yang, Yinpei Dai, Joyce Chai

Accepted at EMNLP 2024 Main Conference (\* indicates equal contribution) [\[Paper\]](#)

- Implicit Contact Diffuser: Sequential Contact Reasoning with Latent Point Cloud Diffusion

Zixuan Huang, **Yinong He\***, Yating Lin\*, Dmitry Berenson

Under review at ICRA 2025 (\* indicates equal contribution) [\[Paper\]](#)

**Best Technical Contribution Award at Michigan AI Symposium**

## PATENT

- Knowledge-Graph based Question-Answer System for Geology Dataset

Ze Zhao, Bin Lu, Jinwen Wu, **Yinong He**, Xiaoying Gan, Luoyi Fu, Xinbing Wang

## RESEARCH EXPERIENCE

### Autonomous Robotic Manipulation Lab

May 2024 – Present

*Advisor: Dmitry Berenson, Associate Professor in Robotics & EECS Department*

*Ann Arbor, Michigan*

- Developed a cable routing task within the Mujoco environment, and created a scripted policy for data collection.
- Designed embodied grounding tasks for rope manipulation, and trained the 3D-aware LLM to ground the 3D scene, interpret user commands, and predict the final states of deformable ropes with the latent diffusion model.
- Trained a Neural Descriptor Field (NDF) incorporating both color rendering and geometric information for encoding the rope representations and improved the LLM's grounding accuracy from 68% to 97.5% when judging how the rope interacted with the hooks.
- Fine-tuned the diffusion model using geometry-centric NDF supervision to differentiate ropes with similar Euclidean distances but distinct spatial relationships to hooks.

### Situated Language and Embodied Dialogue Lab

Aug. 2023 – Present

*Advisor: Joyce Chai, Professor in EECS Department*

*Ann Arbor, Michigan*

- Designed and developed an offline reinforcement learning algorithm to build embodied agents capable of functioning effectively with human-provided language feedback.
- Conducted empirical studies across four RL benchmarks, demonstrating that agents trained with diverse and informative language feedback achieved enhanced in-domain performance and effective transfer to new tasks with human language instructions.
- Investigated which task settings allow language inputs to most effectively aid agents, and analyzed agent performance under adversarial attacks or varying language frequency scenarios.

SELECTED PROJECTS

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**Reasoning-Guided Video Generation for Robotic Manipulation**

*Course Project for EECS692 Advanced Artificial Intelligence.*

*Instructor: Joyce Chai*

- Applied the diffusion model for video generation, leveraged foundation models for interpreting the robots' behaviors and providing instructions, and used the image-editing model for generating corrected subgoals. The pipeline significantly improved the robot's performance in the simulation.

**Enhance Distilled Feature Field for Compositional Language Query**

*Course Project for ROB498 Deep Learning for Robot Perception*

*Instructor: Xiaoxiao Du*

- Trained a distilled feature field with CLIP and NeRF for interpreting and rendering the scene.
- Designed a pipeline leveraging the DBSCAN clustering algorithm and GPT4 to overcome the bag-of-word problems with CLIP representations and handle complex language queries when grounding the scene.

**Empowering VLM with Spatial Reasoning Ability**

*Course Project for EECS498 Large Language Model*

*Instructor: Samet Oymak*

- Reproduced the SpatialVLM pipeline for augmenting data by lifting 2D images to 3D point clouds and extracting spatial relationships. Finetuned the LLaVA model with the generated data.
- Calibrated LLaVA's bias towards trusting the given spatial relationships.

AWARDS

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| <b>Best Technical Contribution Award @ Michigan AI Symposium</b>        | Oct. 2024 |
| <b>Dean's Honor List</b>  | Apr. 2024 |
| <b>Dean's Honor List</b>  | Dec. 2023 |
| <b>Silver Medal in University Physics Competition</b>                   | Nov. 2022 |
| <b>Shanghai Jiao Tong University Science and Technology Scholarship</b> | May 2023  |

LANGUAGE PROFICIENCY

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- TOEFL: 113 (Reading: 30, Listening: 28, Speaking: 26, Writing: 29)
- GRE: 331 (Verbal: 161, Quant: 170)

TEACHING EXPERIENCE

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| <b>Grader for EECS498 Large Language Models</b>             | Aug. 2024 – Dec. 2024 |
| <b>Instruction Assistant for MATH186 Honors Calculus II</b> | Aug. 2022 – Jan. 2023 |

SELECTED COURSEWORK

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- Advanced Artificial Intelligence (A)
- Large Language Models (A+)
- Deep Learning for Robot Perception (A)
- Introduction to Machine Learning (A)
- Data structure and Algorithms (A+)
- Discrete Stochastic Process (A)
- Combination and Graph Theory (A+)
- Differential Equation (A+)

EXTRA CURRICULUM

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|---|-----------------------|
| <b>Minister of Student Science, Technology and Innovation Association</b>   | Aug. 2022 – Jun. 2023 |
| <ul style="list-style-type: none"><li>• Prepared for workshops intended for students in the department.</li><li>• Organized the Robotics Competition in the department.</li></ul> |                       |
| <b>Class Advisor</b>  | Aug. 2022 – Present   |
| <ul style="list-style-type: none"><li>• Assisted class students in their coursework, research, and future plans.</li></ul>  |                       |