

# WEIHUA DU

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## EDUCATION

Ph.D. Student in Language Technologies Institute

Carnegie Mellon University

📅 Aug. 2024 – Ongoing

📍 Pittsburgh, US

- Co-advised by Prof. Yiming Yang and Prof. Sean Welleck.

Bachelors of Engineering in Computer Science (Yao Class)

Tsinghua University

📅 Sep. 2020 – Jun. 2024

📍 Beijing, China

- GPA 3.94 / 4.00;
- Gold medalist at the 2018 China National Olympiad in Informatics (NOI), leading to direct admission into Tsinghua University.

Visiting Student

Massachusetts Institute of Technology

📅 Feb. 2023 – Aug. 2023

📍 Boston, US

- Advised by Prof. Joshua B. Tenenbaum and Prof. Chuang Gan.
- Specializing in Language Models as Agents and Embodied AI.

## PUBLICATION (SORT BY PUBLICATION DATE IN DESCENDING ORDER. \*DENOTES EQUAL CONTRIBUTION)

Optimizing Temperature for Language Models with Multi-Sample Inference [link] arXiv

Authors: Weihua Du, Yiming Yang, Sean Welleck

Constrained Human-AI Cooperation: An Inclusive Embodied Social Intelligence Challenge [link] NeurIPS D&B 2024

Authors: Weihua Du\*, Qiushi Lyu\*, Jiaming Shan, Zhenting Qi, Hongxin Zhang, Sunli Chen, Andi Peng, Tianmin Shu, Kwonjoon Lee, Behzad Dariush, Chuang Gan

- We built up an inclusive embodied social intelligence challenge designed to test social perception and cooperation in embodied agents with various ability scopes and rich scenes.

T-Eval: Evaluating the Tool Utilization Capability of Large Language Models Step by Step [link] ACL 2024

Authors: Zehui Chen\*, Weihua Du\*, Wenwei Zhang\*, Kuikun Liu, Jiangning Liu, Miao Zheng, Jingming Zhuo, Songyang Zhang, Dahua Lin, Kai Chen, Feng Zhao

- We built a comprehensive Tool-calling Capacity Evaluation benchmark, pinpointing the main bottlenecks of current LLMs in tool learning. This provides a new perspective on tool utilization in LLM evaluation.

Building Cooperative Embodied Agents Modularly with Large Language Models [link] ICLR 2024

Authors: Hongxin Zhang\*, Weihua Du\*, Jiaming Shan, Qinhong Zhou, Yilun Du, Joshua B. Tenenbaum, Tianmin Shu, Chuang Gan.

- We developed cooperative embodied agents by leveraging LLM, named CoELA, focusing on communicating and reasoning in multi-agent embodied environments. CoELA can cooperate effectively with both AI agents and humans.

HAZARD Challenge: Embodied Decision Making in Dynamically Changing Environments [link] ICLR 2024

Authors: Qinhong Zhou\*, Sunli Chen\*, Yisong Wang, Haozhe Xu, Weihua Du, Hongxin Zhang, Yilun Du, Joshua B. Tenenbaum, Chuang Gan.

- We created HAZARD, a novel benchmark for evaluating the decision-making abilities of intelligent embodied agents within high-fidelity virtual environments that undergo dynamic changes, like fire, flood, and wind.

Iteratively Learn Diverse Strategies with State Distance Information [link] NeurIPS 2023

Authors: Wei Fu, Weihua Du, Jingwei Li, Sunli Chen, Jingzhao Zhang, Yi Wu.

- We developed a diversity-driven RL algorithm, State-based Intrinsic-reward Policy Optimization (SIPO). SIPO consistently produces strategically diverse and human-interpretable policies that surpass existing baselines.

Automatic Truss Design with Reinforcement Learning [link]

IJCAI 2023

Authors: Weihua Du\*, Jinglun Zhao\*, Chao Yu, Xingcheng Yao, Zimeng Song, Siyang Wu, Ruifeng Luo, Zhiyuan Liu, Xianzhong Zhao, Yi Wu.

- We built *AutoTruss*, a two-stage framework addressing the complex combinatorial optimization challenge of truss layout design in the building industry, which outperforms the previous baselines on both 2D and 3D truss design tasks.

## SELECTED PRIZES

Outstanding Graduate of Yao Class	Top 20% graduates in Yao Class	Jun. 2024
SenseTime Scholarship	Top 30 undergraduates in AI within China	Dec. 2023
Zheng Geru Scholarship	Comprehensive Excellent Award in Tsinghua University, top 20%	Oct. 2023
Andrew C. Yao Award (Recognition Prize)	Scholarship in Yao Class, top 20%	Sep. 2023
Mr. and Mrs. Qu Yuzhi Scholarship	Academic & Sport Award in Tsinghua University	Oct. 2022
China Collegiate Programming Contest (CCPC), Weihai Site	Rank 4, Gold Medal	Nov. 2021
Mr. and Mrs. Huang Yicong Scholarship	Comprehensive Excellent Award in Tsinghua University, top 20%	Oct. 2021
China National Olympiad in Informatics (NOI) 2018	Rank 32, Gold Medal	Aug. 2018

## EXPERIENCE

Research Intern

MIT-IBM Watson AI Lab, Massachusetts Institute of Technology

Feb. 2023 – Jun. 2024

Boston, US / Remote

- Advised by Prof. Joshua B. Tenenbaum and Prof. Chuang Gan;
- Developed cooperative embodied agents by leveraging Large Language Models (LLMs), focusing on communication and reasoning in complex embodied multi-agent environments.

Research Intern

Shanghai Artificial Intelligence Laboratory

Aug. 2023 – Jul. 2024

Shanghai, China

- Advised by Dr. Wenwei Zhang and Dr. Kai Chen;
- Involved in the iterating of InternLM, focusing on improving tool calling capabilities.

Research Intern

IIIS, Tsinghua University

Jun. 2022 – Jan. 2023

Beijing / Shanghai, China

- Advised by Prof. Yi Wu;
- Developed *AutoTruss*, a two-stage framework addressing the complex combinatorial optimization challenge of truss layout design in the building industry;
- Another work aimed to optimize rewards and discover diverse strategies, developing a diversity-driven RL algorithm, State-based Intrinsic-reward Policy Optimization (SIPO).

## SERVICE

- Reviewer of ICML 2025.
- Program Chair of LTI-SRS 2025.

## RESEARCH INTERESTS

- LLM-Based Agent
- Embodied AI
- Reinforcement Learning
- Cognitive Science

## OTHERS

- Member of Tsinghua University Volleyball Team.
- Volunteer at the Student Development Center of Tsinghua University.
- Accumulated 187.0 hours of officially documented volunteer work during my undergraduate studies.

## LANGUAGES

- Chinese: Native Speaker
- English: TOEFL 105