

# ZHAO HAITENG

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## RESEARCH INTEREST

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As a fifth-year Ph.D. student in machine learning, my primary interests lie in the realm of **Natural Language Processing** (NLP), encompassing a range of areas such as **Language Model Design and Training**, **Knowledge Reasoning**, **Model Reliability**, and **Language Agents**. Additionally, I'm also interested in the application of NLP in the context of **AI for Science**.

## EDUCATION

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**Peking University**, Beijing, China 2020 – Present

*Ph.D. student* in Intelligent Science and Technology, Advisor: Zhihong Deng, expected July 2025

**Peking University**, Beijing, China 2016 – 2020

*B.S. in Psychology*, Advisor: Hang Zhang

## EXPERIENCE

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**Shanghai AI Lab** 2024.11 – Present

Research Intern

Mentor: Zhiyong Wu

Conducting research on O1-like reasoning and planning for LLMs, with a particular focus on controlling the tree search behavior of LLM agents.

Focusing on analyzing the post-training generalization challenges of LLMs for interactive agent tasks and exploring feasible methods to address these challenges.

**Tencent AI Lab NLP** 2024.3 – 2024.10

Research Intern

Conducting research to improve the planning capacity and reliability of language models through reinforcement learning on search trees.

By expanding the multi-turn planning task trajectory in a step-level policy, the model's planning tree space is detected and optimized using reinforcement learning.

**ByteDance Data-AML-US** 2023.8 – 2024.2

Research Intern

Mentor: JingJing Xu

Enable language agents to iteratively acquire and improve skills through interactions with their environment.

Explore frameworks for language models to devise tools for solving mathematical and reasoning challenges.

**The University of Hong Kong** 2022.12 – 2023.6

Research Intern

Advisor: Lingpeng Kong and Qi Liu

Investigate the application of instruction-based zero-shot learning for language models in the chemistry and biological domains.

Examine the feasibility of replacing MSA augmentation in protein language models with a general retrieval method.

**Microsoft Research Asia** 2022.1 – 2022.10

Research Intern

Mentor: Shuming Ma

Explore multilingual continue learning for language model pre-training, enabling pre-training on dynamically increasing corpora.

Design innovative transformers that can take advantage of model depth when working with graph data.

Work on the certified robustness of language models against perturbations in language forms by causal interventions.

Investigate the models' reasoning robustness, particularly in relation to their reliability against knowledge perturbations.

## PUBLICATIONS

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### **Benchmarking and Enhancing Large Language Models for Biological Pathway Reasoning**

**Haiteng Zhao**, Chang Ma, Lingpeng Kong, Zhi-Hong Deng.

**Under Review**

### **Empowering Large Language Model Agents through Action Learning**

**Haiteng Zhao**, Chang Ma, Guoyin Wang, Jing Su, Lingpeng Kong, Jingjing Xu, Zhi-Hong Deng, Hongxia Yang.

**COLM 2024**

### **Exploring the Reasoning Abilities of Multimodal Large Language Models (MLLMs): A Comprehensive Survey on Emerging Trends in Multimodal Reasoning**

Yiqi Wang, Wentao Chen, Xiaotian Han, Xudong Lin, **Haiteng Zhao**, Yongfei Liu, Bohan Zhai, Jianbo Yuan, Quanzeng You, Hongxia Yang.

**arXiv preprint 2024**

### **GIMLET: A Unified Graph-Text Model for Instruction-Based Molecule Zero-Shot Learning**

**Haiteng Zhao**, Shengchao Liu, Chang Ma, Hannan Xu, Jie Fu, Zhi-Hong Deng, Lingpeng Kong, Qi Liu.

**NeurIPS 2023**

### **ChatPathway: Conversational Large Language Models for Biology Pathway Detection**

Yanjing Li, Hannan Xu, **Haiteng Zhao**, Hongyu Guo, Shengchao Liu

**NeurIPS 2023 AI for Science Workshop**

### **Retrieved Sequence Augmentation for Protein Representation Learning**

Chang Ma, **Haiteng Zhao**, Lin Zheng, Jiayi Xin, Qintong Li, Lijun Wu, Zhihong Deng, Yang Lu, Qi Liu, Lingpeng Kong.

**arXiv preprint 2023**

### **Are More Layers Beneficial to Graph Transformers?**

**Haiteng Zhao**, Shuming Ma, Dongdong Zhang, Zhi-Hong Deng, Furu Wei.

**ICLR 2023**

### **Certified Robustness Against Natural Language Attacks by Causal Intervention**

**Haiteng Zhao**<sup>‡</sup>, Chang Ma<sup>‡</sup>, Xinshuai Dong<sup>‡</sup>, Anh Tuan Luu, Zhi-Hong Deng, Hanwang Zhang.

**ICML 2022**

### **Domain Adaptation via Mutual Information Maximization**

**Haiteng Zhao**, Chang Ma, Qinyu Chen, Zhihong Deng.

**IJCAI 2022 (Long presentation)**

## SKILLS

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- Programming Languages: Python(Pytorch,Tensorflow) > C++ == C
- Platform: Linux
- Development: Web
- Others: LaTeX, Markdown

## HONORS AND AWARDS

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Award of Scientific Research	Dec. 2018
Award of Merit Student	Dec. 2022
Guorui Scholarship	Dec. 2022