

HAN MENG

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EDUCATION

Michigan State University, USA

- M.S. Computer Science and Engineering (GPA: 3.89/4.0) *Jan 2022 - Present*
Area: AI4Science; Advisor: Prof. Jiayu Zhou & Prof. Bin Chen.
Expected graduation date: April 2024.
- M.S. Materials Science and Engineering (GPA: 3.91/4.0) *Aug 2019 - April 2021*

University of Science and Technology Beijing, China

- B.E. Nanomaterials and Nanotechnology (GPA: 3.85/4.0) *Sept 2014 - Jun 2018*
National Scholarship (5/360 for 4 years);
Chinese Academy of Sciences Scholarship for Undergraduates (2015).

RESEARCH INTERESTS

Han's main research interest is **AI4Science**. She cares about **drug discovery** and **chemical-related** problems. She has researched **active learning**, **meta-learning**, **graph neural networks**, **contrastive learning**, and **federated learning**. Besides, Han holds a passion for Large Language Models (LLMs). She is interested in 1) applying **LLM** to analyze **EHR data** and 2) building LLM-based **agents** to solve field-specific problems.

RESEARCH EXPERIENCES

Predictive Model for Drug-induced Gene Expression

Research Assistant

Jan 2022 - Present
Michigan State University

- Explored LINCS L5 dataset and used drug-induced gene reverse to calculate drug efficacy;
- Explored graph neural network to learn chemical structure presentation (GNN fingerprints) and researched meta-learning and pre-trained models to solve label scarcity problems in most cell lines;
- To improve labeling efficiency, I customized active learning to select anchor drugs based on gene profile data of landmark genes. Results show that models trained using data of anchor drugs have better predictive performance than those trained using data from knowledge-base or cluster-base selection. **First author** paper[1] was submitted to **KDD 2024 ADS track**.
- Read and search advanced powerful model structures for building foundation models.

Federated Model Soup

Research Assistant

Sep 2023 - Present
Michigan State University

- To fill the gap between few-round federated learning and model merging, I did experiments on ViT models, explored model linearization, and designed a disentangle loss.

Chatbot for Dementia Treatment

Research Assistant

Jan 2023 - Present
Michigan State University

- Get familiar with project code quickly in several days and helped to meet a submission due.
- Fine-tuned digit twins from GPT to mimic patients with dementia and evaluated digit twins.
- Researched fine-tuning GPT and different prompts about how they can improve chatbot performance to mitigate dementia symptoms.
- A collaborative paper [2] was submitted to **KDD 2024 ADS track**.

LLM for Cancer Diagnosis

Research Assistant

Sep 2023 - Present
Michigan State University

- Applied Bard API for cancer diagnosis based on discharge summary from MIMIC-IV dataset. A collaborative paper[4] was accepted to **AMIA 2024 Informatics Summit**.
- For the same task, finetuned Falcon, an open source LLM, to get better prediction with the aid of different prompts. A collaborative paper[5] is under review.

Generative Model for Drug Design

Research Assistant

Jan 2022 - Feb 2022

Michigan State University

- Implemented several molecule optimization baselines ranging from genetic algorithm, reinforcement learning, Q-learning, and Markov sampling and delivered results in ten days.
- A collaborative paper[3] was accepted to KDD Health Day 2022 as **Best Paper**.

TEACHING EXPERIENCES

CSE440: Introduction to AI

Jan 2024 - Present

- Selected as lead TA because of positive feedback on my communication ability from students;
- Responsible for answering questions, holding office hours, and coordinating grading assignments.

PUBLICATIONS

- [1] **Han Meng***, Ruoqiao Chen*, Jiayu Zhou, Bin Chen. **AnchorDrug: A Pipeline for Drug-induced Gene Expression Prediction in New Contexts through Active Learning**. (*Under Review*)
- [2] Junyuan Hong*, Wenqing Zheng*, **Han Meng**, Siqi Liang, Anqing Chen, Hiroko H. Dodge, Jiayu Zhou, Zhangyang Wang. **A-CONNECT: Designing AI-based Conversational Chatbot for Early Dementia Intervention**. (*Under Review*)
- [3] Mengying Sun, Jing Xing, **Han Meng**, Huijun Wang, Bin Chen, Jiayu Zhou. **Molsearch: Search-based Multi-objective Molecular Generation and Property Optimization**. *Proceedings of the 28th ACM SIGKDD conference on knowledge discovery and data mining (KDD 2022)*.
- [4] Xiaodan Zhang, Sandeep Vemulapalli, Nabasmita Talukdar, Sumyeong Ahn, Jiankun Wang, **Han Meng**, Sardar Mehtab Bin Murtaza, Aakash Ajay Dave, Dmitry Leshchiner, Dimitri F Joseph, Martin Witteveen-Lane, Dave Chesla, Jiayu Zhou, Bin Chen. **Large Language Models in Medical Term Classification and Unexpected Misalignment Between Response and Reasoning**. *AMIA 2024 Informatics Summit (AMIA 2024)*.
- [5] Xiaodan Zhang, Sandeep Vemulapalli, Nabasmita Talukdar, Sumyeong Ahn, Jiankun Wang, **Han Meng**, Sardar Mehtab Bin Murtaza, Aakash Ajay Dave, Dmitry Leshchiner, Dimitri F. Joseph, Martin Witteveen-Lane, Dave Chesla, Jiayu Zhou, and Bin Chen. **Large Language Models In Medical Term Classification And Unexpected Misalignment Between Response And Reasoning**. (*Under Review*)

REFERENCES

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