

# Yifei He | Curriculum Vitae

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My research interest is centered around trustworthy machine learning. I currently work on: i) Improving the multi-task capabilities of foundation models (e.g, multilingual LLMs, model merging). ii) Enhancing the efficiency of LLMs (e.g., semi-supervised learning, MoE models). Previously, I have worked on multi-objective optimization, domain adaptation/generalization and multimodal learning.

## Education

### University of Illinois Urbana-Champaign (UIUC)

*Ph.D. in Computer Science*

*M.S. in Computer Science*

Advisor: Prof. Han Zhao

**Urbana, IL, USA**

*May 2023 - Present*

*Aug 2021 - May 2023*

### University of Michigan (UM)

*B.S.E. in Data Science, minor in Mathematics*

Summa Cum Laude

**Ann Arbor, MI, USA**

*Aug 2019 - Apr 2021*

### Shanghai Jiao Tong University (SJTU)

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

**Shanghai, China**

*Sept 2017 - Aug 2021*

## Industry Experience

### Microsoft

*Research Intern, GenAI*

Manager: Dr. Yang Liu

**Redmond, WA, USA**

*Aug 2024 - present*

- Worked on distillation of Mixture-of-Experts (MoE) models.

### Microsoft

*Applied Scientist Intern, Turing*

Manager: Dr. Alon Benhaim

**Redmond, WA, USA**

*May 2024 - Aug 2024*

- Worked on scaling law for multilingual language models.

### Amazon

*Applied Scientist Intern, Search Science and AI*

Manager: Dr. Alejandro Mottini

**Seattle, WA, USA**

*May 2023 - Aug 2023*

- Improved large-scale multi-task tuning of foundation models.
- Developed a vision-language retrieval foundation model with instruction tuning.

## Publications (\* denotes equal contribution)

### [1] Scaling Laws for Multilingual Language Models.

**Yifei He**, Alon Benhaim, Barun Patra, Praneetha Vaddamanu, Sanchit Ahuja, Parul Chopra, Vishrav Chaudhary, Han Zhao, Xia Song,  
*Under review.*

### [2] Localize-and-Stitch: Efficient Model Merging via Sparse Task Arithmetic.

**Yifei He**, Yuzheng Hu, Yong Lin, Tong Zhang, Han Zhao.  
*Under review.*

### [3] Semi-Supervised Reward Modeling via Iterative Self-Training.

**Yifei He\***, Haoxiang Wang\*, Ziyang Jiang, Alexandros Papangelis, Han Zhao

In *Findings of the Association for Computational Linguistics: EMNLP 2024*. (EMNLP 2024 Findings)

- [4] **Robust Multi-Task Learning with Excess Risks.**  
Yifei He, Shiji Zhou, Guojun Zhang, Hyokun Yun, Yi Xu, Belinda Zeng, Trishul Chilimbi, Han Zhao.  
In *Proceeding of the 41st International Conference on Machine Learning*. (ICML 2024)
- [5] **Gradual Domain Adaptation: Theory and Algorithms.**  
Yifei He\*, Haoxiang Wang\*, Bo Li, Han Zhao.  
In *Journal of Machine Learning Research*. (JMLR)
- [6] **Efficient Modality Selection in Multimodal Learning.**  
Yifei He\*, Runxiang Cheng\*, Gargi Balasubramaniam\*, Yao-Hung Hubert Tsai, Han Zhao.  
In *Journal of Machine Learning Research*. (JMLR)  
(Extended version of publication [7].)
- [7] **Greedy Modality Selection via Approximate Submodular Maximization.**  
Runxiang Cheng\*, Gargi Balasubramaniam\*, Yifei He\*, Yao-Hung Hubert Tsai, Han Zhao.  
In *Proceedings of the 38th Conference on Uncertainty in Artificial Intelligence*. (UAI 2022)
- [8] **Conformer-RL: A Deep Reinforcement Learning Library for Conformer Generation.**  
Runxuan Jiang, Tarun Gogineni, Joshua Kammeraad, Yifei He, Ambuj Tewari, Paul Zimmerman.  
In *Journal of Computational Chemistry*. (JCC)
- [9] **A Hierarchical Approach to Multi-Event Survival Analysis.**  
Donna Tjandra, Yifei He, Jenna Wiens.  
In *Proceedings of the 35th AAAI Conference on Artificial Intelligence*. (AAAI 2021)

## Professional Service

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**Reviewer:** UAI, NeurIPS, ICLR, AISTATS, ICML

## Teaching Experience

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Teaching assistant at UIUC

- CS 357 Numerical Methods I 2022 Fall, 2022 Spring
- CS 441 Applied Machine Learning 2021 Fall

Teaching assistant at UM

- EECS 445 Intro to Machine Learning 2020 Fall

## Skills

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**Programming:** Python, Java, C++, Matlab, R,  $\LaTeX$ , Mathematica

**Framework:** PyTorch, DeepSpeed, TensorFlow, Keras, Gym