# Yifei He

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## EDUCATION

**University of Illinois Urbana-Champaign (UIUC)**　　　　　　　　　　Urbana, IL, USA
M.S. in Computer Science (Thesis Track)　　　　　　　　　　　Aug 2021 - May 2023 (expected)
Advisor: Prof. Han Zhao
GPA: 3.92/4.00

**University of Michigan (UM)**　　　　　　　　　　　　　　　　　Ann Arbor, MI, USA
B.S.E. in Data Science, minor in Mathematics　　　　　　　　　　　Aug 2019 - Apr 2021
GPA: 3.93/4.00

**Shanghai Jiao Tong University (SJTU)**　　　　　　　　　　　　　Shanghai, China
B.S.E. in Electrical and Computer Engineering　　　　　　　　　　Sept 2017 - Aug 2021

## RESEARCH EXPERIENCE

**Generative Gradual Domain Adaptation**　　　　　　　　　　　　Mar 2022 - Present
Advisor: Prof. Han Zhao, Department of Computer Science, UIUC
*The performance of one-off domain adaptation methods degrades when source and target distance is large. This work provides a novel framework to generate intermediate domains useful for gradual domain adaptation.*

- Estimate the Wasserstein geodesic connecting the source and target by solving the optimal transport problem
- Use generative models (VAEs and CLIP) to generate intermediate data along the geodesic
- Apply gradual self-training for sequential adaptation from source towards target

**Multimodal Learning**　　　　　　　　　　　　　　　　　　　Aug 2021 - Present
Advisor: Prof. Han Zhao, Department of Computer Science, UIUC
*Information is often conveyed by various modalities, such as texts and images. The project aims at theoretically answering how to select the most informative subset of modalities given computational constraints.*

- Propose a novel reduction-of-loss framework to quantify the utility of a set of modalities
- Prove that the defined utility function is approximately submodular under proper assumptions
- Implement a classical greedy maximization algorithm and prove the performance guarantee

**Reinforcement Learning (RL) for Sequential Conformer Search**　　　July 2020 - Apr 2021
Advisor: Prof. Ambuj Tewari, Department of Statistics, UM
*Conformer search is a computational chemistry problem aiming at finding the most stable physical structure of large molecules. We apply RL algorithms to efficiently tackle the problem of intractable searching space.*

- Improve model interpretability by visualizing the training process with NGLView
- Implement a transformer network to evaluate the sequence of actions performed by the RL agent

**Deep Learning for Multi-Event Survival Analysis**　　　　　　　　Apr 2020 - Sept 2020
Advisor: Prof. Jenna Wiens, Department of Computer Science and Engineering, UM
*Survival analysis models the probabilities of multiple events occurring at several time points. We apply multi-task and hierarchical learning to better model the inter- and intra-event relations.*

- Design a hierarchical multi-task neural network to learn survival curves of related events, which uses coarse predictions to iteratively guide predictions at finer time scales
- Conduct experiments on the ADNI dataset to evaluate model performance

## PUBLICATIONS (* denotes equal contribution)

[1] **Yifei He**\*, Haoxiang Wang\*, Han Zhao. "Generative Gradual Domain Adaptation with Optimal Transport." *Under review.*
[2] **Yifei He**\*, Runxiang Cheng\*, Gargi Balasubramaniam\*, Yao-Hung Hubert Tsai, Han Zhao. "Greedy Modality Selection via Approximate Submodular Maximization." In *Proceedings of the 38th Conference on Uncertainty in Artificial Intelligence.* (UAI 2022)
[3] Donna Tjandra, **Yifei He**, Jenna Wiens. "A Hierarchical Approach to Multi-Event Survival Analysis. " In *Proceedings of the 35th AAAI Conference on Artificial Intelligence.* (AAAI 2021)

## TEACHING EXPERIENCE

CS 357 Numerical Methods I (UIUC)　　　　　　　　　　　　　　　　2022 Spring
CS 441 Applied Machine Learning (UIUC)　　　　　　　　　　　　　　2021 Fall
EECS 445 Intro to Machine Learning (UM)　　　　　　　　　　　　　　2020 Fall

## HONORS & AWARDS

James B. Angell Scholar (UM), Dean's List (UM), University Honors (UM)

## SOFTWARE SKILLS

**Programming:** Python, Java, C++, Matlab, R, SQL, JavaScript, HTML, LaTeX, Mathematica
**Framework:** PyTorch, TensorFlow, Gym, Hadoop, Flask