Xiaoxiao He

hexiaoxiao-cs.github.io hexiaoxiao33@gmail.com Hidden for Privacy

EDUCATION

Rutgers University Sept. 2021 – Expected 2026

- Ph.D. in Computer Science, GPA: 3.913/4.0
- Advisor: Dimitris Metaxas

Rutgers University Sept. 2021 – May. 2023

- M.S. in Computer Science, GPA: 3.944/4.0

Rutgers University Sept. 2017 – Jun. 2021

- B.S. in Computer Science and Mathematics with Honors, 3.926 of 4.0 (Summa Cum Laude)

PUBLICATIONS

1. **He, Xiaoxiao**, Ligong Han, Quan Dao Minh, Song Wen, Minhao Bai, Di Liu, Han Zhang, Felix Juefei Xu, Tan Chaowei, Bo Liu, Li Kang Min, Martin Renqiang, Faez Ahmed, Akash Srivastava, Hongdong Li, Junzhou Huang, and Dimitris N. Metaxas. Discrete inversion: A controllable latent space for multinomial diffusion and masked generative models. ***ICML 2025 In submission***, 2025 [PDF] [Website]

2. **He, Xiaoxiao**, Haizhou Shi, Ligong Han, Chaowei Tan, Bo Liu, Zihao Xu, Meng Ye, Leon Axel, Kang Li, and Dimitris Metaxas. Rate-my-lora: Efficient and adaptive federated model tuning for cardiac mri segmentation. ***WACV 2025 In Submission***, 2025

3. **He, Xiaoxiao**, Chaowei Tan, Ligong Han, Bo Liu, Kang Li, Shaoting Zhang, and Dimitris N. Metaxas. DMCVR: Morphology-Guided Diffusion Model for 3D Cardiac Volume Reconstruction. In ***Medical Image Computing and Computer Assisted Intervention–MICCAI 2023***, 2023 [PDF]

4. **He, Xiaoxiao**, Chaowei Tan, Bo Liu, Liping Si, Weiwu Yao, Liang Zhao, Di Liu, Qilong Zhangli, Qi Chang, Kang Li, and Dimitris N. Metaxas. Dealing With Heterogeneous 3D MR Knee Images: A Federated Few-Shot Learning Method With Dual Knowledge Distillation. In ***2023 IEEE 20th international symposium on biomedical imaging (ISBI)***, 2023 [PDF] [Demo]

5. **He, Xiaoxiao**, Chaowei Tan, Yuting Qiao, Virak Tan, Dimitris Metaxas, and Kang Li. Effective 3D humerus and scapula extraction using low-contrast and high-shape-variability MR data. In Barjor Gimi and Andrzej Krol, editors, *Medical Imaging 2019: Biomedical Applications in Molecular, Structural, and Functional Imaging*, volume 10953, pages 118 – 124. International Society for Optics and Photonics, **SPIE**, 2019 [PDF]

6. **He, Xiaoxiao**, Chaowei Tan, Virak Tan, and Kang Li. Recursive 3d segmentation of shoulder joint with coarse-scanned mr image. *arXiv preprint arXiv:2203.07846*, 2022 [PDF]

7. Ligong Han, Song Wen, Qi Chen, Zhixing Zhang, Kunpeng Song, Mengwei Ren, Ruijiang Gao, Anastasis Stathopoulos, **He, Xiaoxiao**, Yuxiao Chen, Di Liu, Qilong Zhangli, Jindong Jiang, Zhaoyang Xia, Akash Srivastava, and Dimitris Metaxas. Proxedit: Improving tuning-free real image editing with proximal guidance. In ***IEEE Winter Conference on Applications of Computer Vision (WACV)***, 2024 [PDF]

8. Qi Chang, Zhennan Yan, Mu Zhou, Hui Qu, **He, Xiaoxiao**, Han Zhang, Lohendran Baskaran, Subhi Al'Aref, Hongsheng Li, Shaoting Zhang, and Dimitris N. Metaxas. Mining Multi-Center Heterogeneous Medical Data with Distributed Synthetic Learning. In ***Nature Communications***, 2023 [PDF]

9. Qilong Zhangli, Jingru Yi, Di Liu, **He, Xiaoxiao**, Zhaoyang Xia, Qi Chang, Ligong Han, Yunhe Gao, Song Wen, Haiming Tang, He Wang, Mu Zhou, and Dimitris N. Metaxas. Region proposal rectification towards robust instance segmentation of biological images. In ***Medical Image Computing and Computer Assisted Intervention–MICCAI 2022****: 25th International Conference, Singapore, September 18–22, 2022, Proceedings, Part IV*, pages 129–139. Springer Nature Switzerland Cham, 2022 [PDF]

10. Di Liu, Yunhe Gao, Qilong Zhangli, Ligong Han, **He, Xiaoxiao**, Zhaoyang Xia, Song Wen, Qi Chang, Zhennan Yan, Mu Zhou, and Dimitris N. Metaxas. Transfusion: multi-view divergent fusion for medical image segmentation with transformers. In ***Medical Image Computing and Computer Assisted Intervention–MICCAI 2022****: 25th International Conference, Singapore, September 18–22, 2022, Proceedings, Part V*, pages 485–495. Springer Nature Switzerland Cham, 2022 [PDF]

RESEARCH EXPERIENCE

Discrete Inversion: A Controllable Latent Space for Multinomial Diffusion and Masked Generative Models
PhD Student, Rutgers University

- Proposed **Discrete Inversion**, the **first** inversion algorithm for **discrete diffusion models** to the best of our knowledge. This method enables the inversion of discrete diffusion processes by recording and utilizing noise sequences or masking patterns, facilitating **accurate reconstruction and controlled editing** of discrete data.
- The effectiveness of our approach is demonstrated through comprehensive experiments on **three models** (VQ-Diffusion, Paella, and RoBERTa) **across two modalities** (images and text).
- We show that our approach can **transform** a weak generative model, such as **RoBERTa** – which is primarily trained for understanding rather than generation – into a c**ompetitive generative model**.

Rate-My-LoRA: Efficient and Adaptive Federated Model Tuning for Cardiac MRI Segmentation
PhD Student, Rutgers University

- Proposed a novel **Federated Learning** aggregation method, Rate-My-LoRA, that leverages the distributed client dataset performance on aggregated model to improve the overall segmentation accuracy.
- Leveraged **Low-Rank Adaptation** (LoRA) for improving communication efficiency, regularizing the model weight update and reducing the training parameters for lowering the barrier of the federated training.

DMCVR: Morphology-Guided Diffusion Model for 3D Cardiac Volume Reconstruction
PhD Student, Rutgers University

- Proposed a morphology-guided **diffusion model** for 3D cardiac volume reconstruction that synthesizes high-resolution 2D images and corresponding 3D reconstructed volumes.
- Enhanced the image generation quality and accuracy by utilizing global semantics and local cardiac morphology priors from seperate encoders for guidance during inference stage.

Federated Few-shot Learning with Dual Knowledge Distillation for 3D MR Knee Segmentation
PhD Student, Rutgers University

- Developed a novel **federated** few-shot **learning** method for medical image segmentation. Emphasizes the focus on cutting-edge techniques in healthcare.
- Incorporated dual knowledge distillation (response-based and feature-based) to enhance **knowledge transfer** in **federated learning**. Demonstrates the use of multiple techniques for improved outcomes.

Recursive 3D MRI segmentation with low-contrast and high-shape-variability data
Undergraduate Student, Rutgers University

- Developed a 3D **recursive** multi-class learning algorithm that iteratively obtains fine-grained humerus and scapula segments with low-contrast and high-shape-variability medical images.
- Improved the initial segmentation network by augmenting the training dataset on-the-fly, and got better results.

HONORS AND AWARDS

- Departmental Honors: Mathematics, Computer Science
- Rutgers SAS Excellence Award (2017-2020)
- Dean's List (2017-2020)
- SAS Honor Student (2018-2021)