

Xiaoxiao He

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EDUCATION

Rutgers University

Sept. 2021 – Expected 2026

- Ph.D. in Computer Science, GPA: 3.935/4.0
- 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)

RESEARCH EXPERIENCE

DICE: Discrete Inversion Enabling Controllable Editing for Masked Generative Models

PhD Student, Rutgers University

- Proposed **DICE**, 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 representation.
- We enable text-to-image discrete diffusion models to perform image editing **without masks** and utilize masked language models to adjust the semantics of a sentence while maintaining its structure and topic.
- Our method resulted in an **87.6%** reduction in image structure similarity compared to masked image generation methods, along with a **4.6x** improvement in sentence sentiment accuracy compared to masked language generation methods. The paper is accepted in **CVPR 2025** with reviewer scores of **5,4,4** (5 is the highest).

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.
- The proposed method lowered the communication cost by up to **15.5x** and also improved the accuracy by **9.6%** compared to local 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 controlled reconstruction that synthesizes high-resolution 2D images and corresponding 3D reconstructed volumes.
- Enhanced the image generation quality and accuracy by **35%** in SSIM metric.

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**. With our method, the accuracy of segmentation improved by **10.7%** compared to local training and also **5.7%** compared to previous FL methods.

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.

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. Dice: Discrete inversion enabling controllable editing for masked generative models. *CVPR*, 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. *2025 IEEE 22th international symposium on biomedical imaging (ISBI)*, 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. Quan Dao, Ligong Han, **He, Xiaoxiao**, Khanh Doan, Ngan Hoai Nguyen, Phong Ha Nguyen, Viet Anha Nguyen, and Dimitris N. Metaxas. Discrete noise inversion for visual autoregressive text-to-image editing. *In submission*, 2025
8. 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 [\[PDF\]](#)
9. 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 [\[PDF\]](#)
10. 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 [\[PDF\]](#)
11. 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 [\[PDF\]](#)

HONORS AND AWARDS

Departmental Honors: Mathematics, Computer Science
Dean’s List (2017-2020)

Rutgers SAS Excellence Award (2017-2020)
SAS Honor Student (2018-2021)