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Xuanyu Tian

Curriculum Vitae (Nov. 2025)

Rearch Interest

Inverse Problems in Medical Imaging
CT/MRI Reconstruction, MRI motion correction, Dynamic Imaging, *etc.*

Un/Self-supervised Learning for Medical Imaging
Implicit Neural Representation, Diffusion Model, Plug-and-Play, *etc.*

Education

ShanghaiTech University — Shanghai, China
Ph.D. Candidate in Computer Science — Sep. 2021 - Exp. July 2026

- Advisor: Prof. Yuyao Zhang

Wuhan University of Technology — Wuhan, China
B.E. in Computer Science and Technology — Sep. 2017 - July 2021

Research

Unsupervised Dynamic Medical Imaging Reconstruction — Mar 2025 – Present

- Free-breathing cardiac MRI reconstruction with implicit motion modeling
- Unsupervised dynamic cone-beam CT reconstruction under sparse-view acquisitions

MRI Motion Correction — Sep 2024 – Present

- Non-rigid motion correction for abdominal MRI with complex physiological motion
- Unsupervised rigid motion correction for radial MRI acquisitions
- Joint estimation of time-varying coil sensitivities and rigid motion in parallel MRI using diffusion models

SNR-Robust Sparse-View CT Reconstruction — Sep 2024 – Present

- Proposed an iterative reconstruction framework integrating Plug-and-Play (PnP) priors with implicit neural representations (INR)
- Significantly improved image quality under **low-dose** and sparse-view CT acquisition settings

Self-Supervised Image Denoising — Sep 2021 – Oct 2024

- Integrated super-resolution techniques to preserve fine structural details and introduced a random sub-sampling strategy to disrupt spatial noise correlations
- **Representative applications:**
  1) Poisson–Gaussian denoising (*e.g.*, fluorescence imaging);
  2) High-dimensional medical imaging (*e.g.*, BOLD fMRI, DWI);
  3) Ultra-low SNR imaging (*e.g.*, transmission electron microscopy (TEM)).

Awards and Honors

National Scholarship (Ph.D. Graduate Student) — 2025
ShanghaiTech University

Outstanding Student (Top 5%) — 2024
ShanghaiTech University

Outstanding Student (Top 5%) — 2023
ShanghaiTech University

Publications

Journal Publications ('*' indicates equal contribution)

4. L. Chen*, **X. Tian***, J. Wu, R. Feng, G. Lao, Y. Zhang, H. Wei, "Joint Coil Sensitivity and Motion Correction in Parallel MRI with a Self-Calibrating Score-Based Diffusion Model." **Med. Image Anal.**, vol. 102, 103502, 2025.
3. **X. Tian**, J. Wu, G. Lao, C. Du, C. Jiang, Y. Li, J. Zhang, H. Wei, Y. Zhang, "Self-Supervised Denoising for High-dimensional Magnetic Resonance Image." **Biomed. Signal Process. Control**, vol. 104, 107451, 2025.
2. L. Chen*, **X. Tian***, J. Wu, G. Lao, Y. Zhang, H. Wei, "COLLATOR: Consistent Spatial-Temporal Longitudinal Atlas Construction via Implicit Neural Representation." **Med. Image Anal.**, vol. 100, 103396, 2024.
1. **X. Tian**, Z. Dong, X. Lin, Y. Gao, H. Wei, Y. Ma, J. Yu, Y. Zhang, "Zero-Shot Image Denoising for High-Resolution Electron Microscopy." **IEEE Trans. Comput. Imag.**, vol. 10, pp. 1462-1475, 2024.

Conference Publications ('*' indicates equal contribution)

8. **X. Tian**, L. Chen, Q. Wu, X. Wang, J. Feng, Y. Zhang, H. Wei, "Unsupervised Motion-Compensated Decomposition for Cardiac MRI Reconstruction via Neural Representation." Proc. of the AAAI Conf. on Artificial Intelligence (**AAAI 2026**), in press.
   ⋆ Poster [Acceptance Rate: 4167/23680 = 17.6%]
7. Q. Wu*, C. Du*, **X. Tian**, J. Yu, Y. Zhang, H. Wei, "Moner: Motion Correction in Undersampled Radial MRI with Unsupervised Neural Representation." Int. Conf. on Learning Representations (**ICLR 2025**).
   ⋆ Spotlight [Acceptance Rate: 587/11500 = 5.1%]
6. X. Li, **X. Tian**, X. Zhao, H. Wei, and Y. Zhang, "Accelerated 3D Thermometry Field Reconstruction from Tri-Planar Images via Cross-View Implicit Representation," Proc. IEEE Int. Symp. Biomed. Imag. (**ISBI 2025**), pp. 1–5.
   ⋆ Oral Presentation
5. **X. Tian**, L. Chen, Q. Wu, C. Du, J. Shi, H. Wei, Y. Zhang, "Unsupervised Self-prior Embedding Implicit Neural Representation for Iterative Sparse-View CT Reconstruction." Proc. of the AAAI Conf. on Artificial Intelligence (**AAAI 2025**).
   ⋆ Poster [Acceptance Rate: 3032/12957 = 23.4%]
4. X. Lin*, C. Du*, Q. Wu, **X. Tian**, J. Yu, Y. Zhang, H. Wei, "Zero-Shot Low-Field MRI Enhancement via Denoising Diffusion Driven Neural Representation." in Proc. Med. Image Comput. Comput. Assist. Interv. (**MICCAI 2024**), Marrakesh, 2024.
3. S. Lai, **X. Tian**, Q. Wu, C. Du, X. Xu, H. Wei, X. Guan, and Y. Zhang, "Reconstructing Knee CT Volumes from Biplanar X-Rays via Self-Supervised Neural Field." Proc. IEEE Int. Symp. Biomed. Imag. (**ISBI 2024**), pp. 1–5.
2. C. Jiang*, **X. Tian***, Y. Li, J. Wu, X. Mu, L. Zhang, and Y. Zhang, "Self-Supervised High-Dimensional Magnetic Resonance Image Denoising Using Super-Resolved Single Noisy Image." Proc. IEEE Int. Symp. Biomed. Imag. (**ISBI 2023**), pp. 1–5.
1. **X. Tian**, Q. Wu, H. Wei, Y. Zhang, "Noise2SR: Learning to Denoise from Super-resolved Single Noisy Fluorescence Image." in Proc. Med. Image Comput. Comput. Assist. Interv. (**MICCAI 2022**), pp. 334–343, Singapore, 2022.

Pre-prints ('*' indicates equal contribution)

2. T. Yu, **X. Tian**, J. Yang, D. He, J. Yu, X. Wang, Y. Zhang, "SPIDER: Structure-Preferential Implicit Deep Network for Biplanar X-ray Reconstruction." arXiv preprint, arXiv:2507.04684, 2025.
1. C. Du*, X. Lin*, Q. Wu, **X. Tian**, Y. Su, Z. Luo, H. Wei, S. Zhou, J. Yu, Y. Zhang, "DPER: Diffusion Prior Driven Neural Representation for Limited-Angle and Sparse-View CT Reconstruction." arXiv preprint, arXiv:2404.17890, 2024.

Teaching Experience

CS270B: Advanced Digital Image Processing Spring 2023
ShanghaiTech University

- Position: Teaching Assistant
- Instructor: Prof. Yuyao Zhang

Academic Services

Jounrals Reviewer: *IEEE TPAMI*; *IEEE TNNLS*; *Expert Systems with Applications*; *Scientific Reports*

Conference Reviewer: *MICCAI'24, 25*; *ISBI'24, 25*; *CVPR'26*

Skills

Languages: Mandarin (native), English.

Programming: `Python`, `MATLAB`, LaTeX.

References

Prof. Yuyao Zhang
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