

# Qing Wu

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## Research Interests

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### Inverse Problems in Medical Imaging

- CT Metal Artifact Reduction, Under-sampling CT, Spectral CT, MRI Super-Resolution, etc.

### Unsupervised Learning for Medical Imaging

- Neural Representation, Deep Image Prior, Unrolling Networks, etc.

## Education

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### ShanghaiTech University

2020.09 - 2025.07 (Expected)

- Ph.D. student in Electronic Science and Technology
- Major GPA: 3.78/4.00
- Advisor: Prof. Yuyao Zhang

### China University of Geosciences, Wuhan

2016.09 - 2020.07

- B.Eng. in Communication Engineering

## Research Projects

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### CT Metal Artifact Reduction [1]

2022.12 - Now

- Proposed an unsupervised DL model to reduce CT metal artifacts.
- Formulated the metal artifact reduction problem as solving energy-independent densities.
- Defined a physical model to simulate the acquisition from densities to measurements.
- Our model outperforms supervised counterparts on in-domain and out-of-domain data.

### Sparse-view and Motion Rigid CT [2],[3]

2021.12 - 2022.11

- Proposed an unsupervised DL model to handle sparse-view and rigid-motion CT jointly.
- Leveraged implicit prior by neural representation to constraint the solution space of desired images.
- Formulated the rigid motion of subjects as learnable variables (rotation and translation).
- Our solution greatly outperforms the best traditional and unsupervised reconstruction algorithms.

### MRI Super-Resolution [4],[5],[6]

2020.09 - 2021.11

- Proposed an arbitrary-scale super-resolution (ArSSR) approach for high-resolution MRI.
- Leveraged neural implicit space to model the ArSSR task as a sampling operator of different scales.
- Our model achieves excellent performance on simulation and clinical data.

## Selected Publications

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### [1] Unsupervised Polychromatic Neural Representation for CT Metal Artifact Reduction

- Qing Wu, Lixuan Chen, Ce Wang, Hongjiang Wei, S Kevin Zhou, Jingyi Yu, Yuyao Zhang
- 37th Conference on Neural Information Processing Systems (NeurIPS 2023)

### [2] Self-Supervised Coordinate Projection Network for Sparse-View Computed Tomography

- Qing Wu, Ruimin Feng, Hongjiang Wei, Jingyi Yu, Yuyao Zhang • IEEE Transactions on Computational Imaging (IEEE TCI)

[3] **Joint Rigid Motion Correction and Sparse-View CT via Self-Calibrating Neural Field** • Qing Wu, Xin Li, Hongjiang Wei, Jingyi Yu, Yuyao Zhang • *IEEE 20th International Symposium on Biomedical Imaging (IEEE ISBI 2023)*

[4] **An Arbitrary Scale Super-Resolution Approach for 3D MR Images via Implicit Neural Representation** • Qing Wu, Yuwei Li, Yawen Sun, Yan Zhou, Hongjiang Wei, Jingyi Yu, Yuyao Zhang • *IEEE Journal of Biomedical and Health Informatics (IEEE J-BHI)*

[5] **IREM: High-Resolution Magnetic Resonance Image Reconstruction via Implicit Neural Representation** • Qing Wu, Yuwei Li, Lan Xu, Ruimin Feng, Hongjiang Wei, Qing Yang, Boliang Yu, Xiaozhao Liu, Jingyi Yu, Yuyao Zhang • *24th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2021)*

[6] **An Energy-Efficient Accelerator for Medical Image Reconstruction From Implicit Neural Representation** • Chaolin Rao\*, Qing Wu\*, Pingqiang Zhou, Jingyi Yu, Yuyao Zhang, Xin Lou • *IEEE Transactions on Circuits and Systems I: Regular Papers (IEEE TCAS-I)*

## Teaching Experience

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**CS270B: Advanced Digital Image Processing**

Spring 2023

ShanghaiTech University, Teaching Assistant

- Delivered tutorials and quizzes
- Designed assignments and projections
- Graded final scores.

## Academic Service

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- **Reviewer for Conferences:** MICCAI 2023, IEEE ISBI 2024
- **Reviewer for Journals:** IEEE J-BHI, Journal of Computational Design and Engineering
- **Volunteer:** ASSIST 2023

## Skills

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- **Programming Language:** Python, Matlab, C
- **Software & Framework:** Pycharm, VS Code, GitHub, L<sup>A</sup>T<sub>E</sub>X, ITK-SNAP, Pytorch
- **Language:** Mandarin (Native Speaker), English (CET-6, ONLY enough for research)