

Ruoqi Wang

Ph.D. Candidate

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Education

The Hong Kong University of Science and Technology (Guangzhou), Ph.D. Student. Aug. 2022 – Jun. 2026 (Expected)

- **Program:** Ph.D. in Data Science and Analytics
- **Thesis Topic:** Robust and Efficient ML for Radio Interferometric Data Reconstruction and Analysis

Sun Yat-sen University, B.Eng.

Sept. 2018 – Jun. 2022

- **Major:** Computer Science and Technology
- **Thesis Topic:** Deep-Learning-Based Survival Analysis with Multimodal Medical Data
- **Awards and Honors:**
 - Academic Excellence Scholarship, Sun Yat-sen University, 2020 & 2021
 - Student Elite Representative, School of Computer Science and Engineering, Sun Yat-sen University, 2021
 - Excellent Undergraduate Thesis (**rank 1/444**), Sun Yat-sen University, 2022

Research Interests

- **Foundation & Multimodal Models for Science:** multimodal learning, vision–language models; cross-domain alignment
- **Trustworthy & Efficient Learning:** robustness/generalization; domain adaptation; semi-/self-/weak supervision
- **Scientific & Physics-Guided ML:** inverse problems; data reconstruction; physical priors; computational imaging
- **ML, LLM & AI Agent Applications:** AI for science, healthcare, and industry

Publications

Conference Proceedings:

- Ruoqi Wang, Haitao Wang, Qiong Luo, "GalaxAlign: Mimicking Citizen Scientists' Multimodal Guidance for Galaxy Morphology Analysis", Proceedings of the 33rd ACM International Conference on Multimedia (ACM MM), pages 8636 - 8644, 2025.
- Ruoqi Wang, Haitao Wang, Qiong Luo, Feng Wang, Hejun Wu, "VisRec: A Semi-Supervised Approach to Radio Interferometric Data Reconstruction", Proceedings of the AAAI Conference on Artificial Intelligence (AAAI), Vol. 39. No. 1. 2025.
- Ruoqi Wang, Zhuoyang Chen, Jiayi Zhu, Qiong Luo, Feng Wang, "PolarRec: Improving Radio Interferometric Data Reconstruction Using Polar Coordinates", Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), pages 12841-12850, 2024.
- Ruoqi Wang, Zhuoyang Chen, Qiong Luo, Feng Wang, "A Conditional Denoising Diffusion Probabilistic Model for Radio Interferometric Image Reconstruction", 26th European Conference on Artificial Intelligence (ECAI), pages 2499 - 2506, 2023.
- Ruoqi Wang, Ziwang Huang, Haitao Wang, Hejun Wu, "AMMASurv: Asymmetrical Multi-Modal Attention for Accurate Survival Analysis with Whole Slide Images and Gene Expression Data", IEEE International Conference on Bioinformatics and Biomedicine (BIBM), pages 757-760, 2021.
- Ziwang Huang, Hua Chai, Ruoqi Wang, Haitao Wang, Yuedong Yang and Hejun Wu, "Integration of Patch Features through Self-Supervised Learning and Transformer for Survival Analysis on Whole Slide Images", International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), pages 561–570, 2021.

Under Review:

- Ruoqi Wang, Haitao Wang, Shaojie Guo, Qiong Luo, "D-GAP: Improving Out-of-Domain Robustness via Dataset-Agnostic and Gradient-Guided Augmentation in Amplitude and Pixel Spaces", arXiv preprint arxiv.org/abs/2511.11286, under review.
- Kai Cheng, Ruoqi Wang, Qiong Luo, "VVTRec: Radio Interferometric Data Reconstruction by Turning Sparse Astronomical Observations into Visibility-Guided Visual and Textual Modality Enrichment", <https://arxiv.org/abs/2601.06475>, under review.
- Zhuoyang Chen, Ruoqi Wang, Qiong Luo, "ProtAug: Utilizing Self-Supervised Protein Language Models for Effective Protein Sequence Augmentation", under review.

Research Experience

Ph.D. Research

2022–Present

Topic: Robust and Efficient Machine Learning for Radio Interferometric Data Reconstruction and Analysis

- **Problem:** Sparse and noisy visibilities, artifact-prone imaging, label scarcity, and limited robustness and generalization in astronomical imaging pipelines.
- **Methods:** Multimodal conditioned generative modeling (**VIC-DDPM**); efficient visibility encoding in polar coordinates (**PolarRec**); label-efficient reconstruction via semi-supervised learning (**VisRec**); multimodal galaxy morphology analysis inspired by citizen scientists (**GalaxAlign**); dataset-agnostic augmentation against instrument/domain shifts (**D-GAP**).
- **Contribution:** Delivering a machine learning pipeline from low-level reconstruction to high-level analysis; supporting trustworthy scientific data processing and analysis by improving reconstruction fidelity, computational efficiency, label efficiency and out-of-domain robustness.

Undergraduate Research

2020–2022

Topic: Deep-Learning-Based Survival Analysis with Multimodal Medical Data

- **Problem:** Prior WSI + gene expression survival models ignore whole-slide context, assume equal modality importance, and are sensitive to noisy gene expression.
- **Method:** **AMMASurv** with **AMMA**—heterogeneous directed graphs; WSI-guided attention induces gene-expression features.
- **Contribution:** Achieved more reliable and clinically relevant survival prediction with improved robustness to noisy modalities on multiple public cancer datasets.

Teaching & Mentoring

Teaching Assistant:

- *Deep Learning in Data Science*, The Hong Kong University of Science and Technology (Guangzhou). Spring 2025
- *Physical Education – Tennis*, The Hong Kong University of Science and Technology (Guangzhou). Fall 2024

Invited Speaker:

- *Artificial Intelligence Practice 2025*, Sun Yat-sen University. Summer 2025

Skills

- **Programming:** Python; C/C++; MATLAB; JavaScript.
- **Libraries/Tools:** Includes PyTorch; OpenCV; NumPy; Scipy; Torchvision; Pandas; Scikit-learn; Matplotlib; Seaborn.
- **Systems/HPC:** CUDA; DDP; Slurm; Docker/conda; OpenMP, Open MPI.
- **Astro:** Astropy; radio interferometry simulators; FFT pipelines; FITS/HDF5.
- **Languages:** Mandarin (native); English (fluent)

Service

- Conference Reviewer: ICML 2025, NeurIPS 2024-2025, ICLR 2025-2026, CVPR 2024-2026, ICCV 2025, AAAI 2024-2025, ACM MM 2025.
- Journal Reviewer: Publications of the Astronomical Society of Australia.

References

- **Prof. Qiong Luo**, Email: luo@ust.hk
Ph.D. advisor, Department of Computer Science and Engineering, The Hong Kong University of Science and Technology
- **Prof. Hejun Wu**, Email: wuhejun@mail.sysu.edu.cn
Undergraduate Advisor, School of Computer Science and Engineering, Sun Yat-sen University
- **Prof. Feng Wang**, Email: fengwang@gzhu.edu.cn
Collaborator, Center for Astrophysics and Great Bay Center of National Astronomical Data Center, Guangzhou University