HONGZE YU

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EDUCATION

University of Michigan, Ann Arbor, USA *Aug. 2023 – Present*
Ph.D. Candidate in Electrical and Computer Engineering (GPA: 4.00/4.00)
Advisors: Prof. Yun Jiang and Prof. Jeffrey A. Fessler

University of Michigan, Ann Arbor, USA *Aug. 2021 – Apr. 2023*
M.S. in Electrical and Computer Engineering (GPA: 4.00/4.00)

University of Glasgow, UK *Sep. 2017 – Jun. 2021*
B.E. in Electronics and Electrical Engineering, First Class Honours (GPA: 19/22)

University of Electronic Science and Technology of China, China *Sep. 2017 – Jun. 2021*
B.S. in Electronic Information Engineering (GPA: 3.97/4.00)

RESEARCH INTERESTS

My research focuses on optimization and machine learning algorithms for solving inverse problems, with an emphasis on MRI reconstruction. In particular, I work on implicit neural representation and score-based diffusion models for efficient, clinically feasible accelerated and quantitative MRI. My work combines MRI physics with deep learning priors and is carried out in close collaboration with clinical researchers.

RESEARCH EXPERIENCE

Bilevel-Optimized Implicit Neural Representation for Accelerated MR Reconstruction
Aug. 2023 – Present

- Developed a self-supervised implicit neural representation (INR) framework for accelerated MRI reconstruction (e.g., 8× Cartesian, 20× Poisson) with fast per-scan runtime (< 5 s for 2D).
- Designed a bilevel optimization scheme for tailored scan-specific reconstruction that jointly tunes hyperparameters and network weights for both model-based and INR-based methods using only per-scan k-space data.
- Demonstrated sharper anatomy, reduced noise and residual aliasing, and improved NRMSE/SSIM compared with compressed sensing and state-of-the-art self-supervised deep learning across multiple anatomies, field strengths, and sampling patterns.
- Deployed on Microsoft Azure using Tyger framework, achieved 2× speedup compared to on-scanner hardware
- Related IP: Invention disclosure filed with the University of Michigan Tech Transfer office; patent application currently being drafted.

Joint Implicit Neural Representation for Fast Magnetic Resonance Fingerprinting
Aug. 2025 – Present

- Developed a joint scan-specific INR that learns a shared anatomical representation for all MRF subspace coefficient images, suppressing subspace-inconsistent aliasing.
- Built a fully image-domain reconstruction pipeline (no iterative k-space data-consistency) that produces accurate, low-variance T_1/T_2 maps from highly undersampled acquisitions.
- Demonstrated improved T_1/T_2 map quality over low-rank dictionary-based and iterative locally low-rank reconstructions, with similar runtime to low-rank, ∼25× speedup vs. LLR, and 3D whole-brain MRF reconstruction in ∼30 s.

· Related IP: Invention disclosure accepted by the University of Michigan; preparing for patent application.

Patch-Based Diffusion Models for Prostate MRI Reconstruction
Aug. 2025 – Present

· Adapted a patch-based diffusion inverse solver for accelerated prostate T_2-weighted MRI at both 3T and 0.55T.
· Coupled patch-wise diffusion scores with multi-coil k-space data consistency to match whole-image diffusion performance with $\sim 3\times$ faster training and $\sim 2\times$ lower GPU memory usage.
· Achieved improved SNR and reduced aliasing artifacts over parallel imaging and compressed sensing, and collaborated with radiologists on blinded reader studies.

PUBLICATIONS

Preprint

[1] **H. Yu**, J. A. Fessler, Y. Jiang, "Bilevel Optimized Implicit Neural Representation for Scan-Specific Accelerated MRI Reconstruction", *submitted to IEEE Transactions on Medical Imaging*, revision, 2025. [arXiv]

In preparation

[2] **H. Yu**, C. Keen, K. Jin, J. A. Fessler, Y. Jiang, "Joint Implicit Neural Representation for Fast Scan-Specific Magnetic Resonance Fingerprinting", manuscript in preparation, 2026.

CONFERENCES & WORKSHOPS

[1] **H. Yu**, J. Hu, M. Jaroszewicz, H. K. Hussain, V. Gulani, J. A. Fessler, Y. Jiang,
"Patch-Based Diffusion Inverse Solver for T2-Weighted Prostate Imaging Reconstruction."
ISMRM Workshop on Data Sampling and Image Reconstruction, Sedona, 2026. **(Traditional Poster)**
Accepted to the *2026 ISMRM Annual Meeting.* **(Digital Poster)**

[2] **H. Yu**, C. Keen, K. Jin, J. A. Fessler, Y. Jiang,
"Joint Implicit Neural Representation for Fast Scan-Specific Magnetic Resonance Fingerprinting."
ISMRM Workshop on Data Sampling and Image Reconstruction, Sedona, 2026. **(Traditional Poster)**
Accepted to the *2026 ISMRM Annual Meeting.* **(Oral Presentation)**

[3] **H. Yu**, J. A. Fessler, Y. Jiang,
"Bilevel Optimized Implicit Neural Representation for Scan-Specific Accelerated MRI Reconstruction."
33rd Annual Meeting of the ISMRM, Hawaii, 2025. **(Oral Presentation, Summa Cum Laude Award)**

HONORS & AWARDS

Outstanding Graduates of Sichuan Province, UESTC *2021*
Outstanding Students Scholarship, UESTC *2018-2021*
Academic Scholarship of Glasgow College, UESTC *2019-2021*

SKILLS

Deep learning, implicit neural representation, diffusion models, medical imaging, MRI reconstruction, inverse problems, signal processing, optimization, PyTorch, Python, CUDA, MATLAB, Julia

STUDENT MENTORING

Kaixuan Jin, "Bilevel Optimized INR for 3D Cartesian MRF reconstruction", now a B.S. student at University of Michigan *Jul. 2025 – Present*

Yun Jiang [Homepage]
Jeffrey A. Fessler [Homepage]