

Zhongnan Liu

Personal Website

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EDUCATION

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- **University of Michigan, Ann Arbor** Ann Arbor, MI, USA
Aug. 2024 - Present
• *Ph.D. in Electrical and Computer Engineering (GPA: 3.9/4.00)*
 - **University of Michigan, Ann Arbor** Ann Arbor, MI, USA
Aug. 2022 - Apr. 2024
• *M.S. in Electrical and Computer Engineering (GPA: 3.9/4.00)*
 - **Beijing Forestry University** Beijing, China
Aug. 2018 - Jun. 2022
• *B.Eng. in Electronics and Information Technology (GPA: 91.1/100.0)*

RESEARCH INTERESTS

My research focuses on optimization and machine learning based methods for **MR Fingerprinting** sequence design and image reconstruction. I am particularly interested in **quantitative cardiac MRI** and imaging on **low-field (0.55T)** systems to enable efficient, accelerated, and high-quality image acquisition. My work aims to advance data-driven optimization strategies that improve image fidelity, accelerate scan time, and enhance quantitative reliability. These efforts are closely integrate with clinical collaborations to ensure translational impact and real-world applicability in patient care.

RESEARCH EXPERIENCE

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- University of Michigan, Ann Arbor** Jul. 2023 - Present
 - Combined DIP reconstruction with meta-learning to enable 2D cardiac MRF reconstruction in 3 minutes at 1.5T, achieving over 10× acceleration compared to previous methods.
 - Designed a 2D cardiac MRF sequence and applied Deep Image Prior-based reconstruction for 0.55T cardiac MRF imaging.
 - Developed a cardiac MRF sequence optimization framework enabling 5× faster acquisition at 1.5T.

PUBLICATIONS

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1. **Zhongnan Liu**, Zexuan Liu, Imran Rashid, Mauricio Stanzione Galizia, Christopher Scoma, William Truesdell, Prachi Agarwal, Nicole Seiberlich, Liyue Shen, Jesse Hamilton. "Cardiac MR Fingerprinting at 0.55T Using a Deep Image Prior for Joint T1, T2, and M0 Mapping". *Journal of Magnetic Resonance Imaging (JMRI)*, in press (accepted), 2025.

CONFERENCES & WORKSHOPS

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1. **Zhongnan Liu**, Nicole Seiberlich, Liyue Shen, Jesse Hamilton. "A Fast Deep Image Prior Reconstruction for Cardiac MR Fingerprinting Using Meta-Learning Acceleration". In: *29th Annual Meeting of the SCMR, Rio De Janeiro, Brazil, Feb. 2026. (Oral)*.
 2. **Zhongnan Liu**, Calder D. Sheagren, Zexuan Liu, Nicole Seiberlich, Liyue Shen, Jesse Hamilton. "An Accelerated Deep Image Prior Reconstruction for Cardiac MR Fingerprinting Using Meta-Learning". In: *ISMRM Workshop on Data Sampling and Image Reconstruction, Sedona, USA, Jan. 2026. (Oral)*.
 3. **Zhongnan Liu**, Imran Rashid, Prachi Agarwal, Nicole Seiberlich, Liyue Shen, Jesse Hamilton. "Deep Image Prior Denoising of Cardiac FISP-MRF T1, T2, and M0 Maps at 0.55T". In: *33rd Annual Meeting of the ISMRM, Hawaii, USA, May 2025*.
 4. **Zhongnan Liu**, Prachi Agarwal, Nicole Seiberlich, Liyue Shen, Jesse Hamilton. "Cardiac MRF T1, T2, and M0 mapping at 0.55T with a Low-rank Deep Image Prior Reconstruction". In: *28th Annual Meeting of the SCMR, Washington, D.C., USA, Feb, 2025*

5. Zhongnan Liu, Jacob Richardson, Nicole Seiberlich, Jesse Hamilton. "Pattern Search Pulse Sequence Optimization for Cardiac MR Fingerprinting". In: *32nd Annual Meeting of the ISMRM, Singapore, May 2024. (Oral)*.
6. Calder D. Sheagren, Zhongnan Liu, Zexuan Liu, Gastao Lima Da Cruz, Jesse Hamilton. "A Single-TR-Resolved Deep Image Prior Reconstruction for Cardiac MR Fingerprinting". In: *29th Annual Meeting of the SCMR, Rio De Janeiro, Brazil, Feb. 2026*.
7. Zexuan Liu, Gastao Lima Da Cruz, Zhongnan Liu, Calder D. Sheagren, Nicole Seiberlich, Jesse Hamilton. "Ensemble Averaging to Improve the Precision and Repeatability of Deep Image Prior Lung MR Fingerprinting at 0.55T". In: *29th Annual Meeting of the SCMR, Rio De Janeiro, Brazil, Feb. 2026*.
8. Ana Cecilia Saavedra Bazan, Sydney Kaplan, Zhongnan Liu, Jacob Richardson, Chaitanya Madamanchi, Jesse Hamilton, Nicole Seiberlich. "Spiral Trajectory Design and DIP Reconstruction for High-Resolution Cardiac MRF of the Atria". In: *ISMRM Workshop on Data Sampling and Image Reconstruction, Sedona, USA, Jan. 2026*.
9. Rudy Rizzo, Zhongnan Liu, Jesus Ernesto Fajardo Freites, Tom Griesler, Jesse Hamilton, Yun Jiang, Nicole Seiberlich. "Accelerating 3D High-Resolution Brain MR Fingerprinting at 0.55T: Balanced Free-Precession meets Deep Learning". In: *33rd Annual Meeting of the ISMRM, Hawaii, USA, May 2025. (Oral)*.
10. Sydney Kaplan, Zhongnan Liu, Jesse Hamilton, Shaikan Malik, Nicole Seiberlich. "Quantitative Magnetization Transfer Mapping using Cardiac MR Fingerprinting at 0.55T". In: *33rd Annual Meeting of the ISMRM, Hawaii, USA, May 2025*.

HONORS & AWARDS

2024 ISMRM Summa Cum Laude Merit Award	2024
National Scholarship, BJFU	2020
Outstanding Students Scholarship, BJFU	2019-2021
Excellent Academic Scholarship, BJFU	2019-2021

SKILLS

- Deep Learning, MRI reconstruction, MRI Sequence Optimization, IDEA Sequence Programming, Inverse Problem, Signal Processing, Optimization, TensorFlow, Python, MATLAB.

REFERENCES

Liyue Shen	[Homepage]
Jesse Hamilton	[Homepage]