Zhongnan Liu

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Education

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

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

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

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

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, Shaihan 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]