

# Guanxiong Luo

PhD Candidate in Computer Science ☎ +49 17634523929 ✉ luoguanxiong@outlook.com

## Areas of Specialization

- MR image reconstruction
- Computational imaging
- Generative modeling
- Machine learning
- Bayesian inference
- Optimization
- Inverse problems
- Image/Signal processing
- My projects @ [ggluo.github.io](https://github.com/ggluo)

## Research Experiences

<b>Generative image priors for MRI reconstruction trained from magnitude-only images</b>		<b>2022, 2023</b>
Summary	Presented a workflow to train the generic and robust generative image priors for MRI reconstruction and evaluated them	
Highlight	Performed distributed training on HPC across multiple GPUs by data parallelism using <b>spreco</b> (~100k MRI images)	
Code	Language: Python, Shell and C <a href="https://github.com/mrirecon/image-priors">https://github.com/mrirecon/image-priors</a>	
<b>Bayesian MRI reconstruction with joint uncertainty estimation using diffusion models</b>		<b>2021, 2022</b>
Summary	Presented an efficient framework for sampling the posterior probability distributions for MRI reconstruction	
Highlight	Developed a machine learning library <b>spreco</b> for training generative models for MRI reconstruction based on TensorFlow, which can handle a large dataset	
Code	Language: Python and Shell <a href="https://github.com/mrirecon/spreco">https://github.com/mrirecon/spreco</a>	
<b>Deploy generative image priors for image reconstruction using BART</b>		<b>2020, 2021</b>
Summary	Integrated neural networks into BART (a MRI reconstruction toolbox) using TensorFlow C API	
Highlight	Developed a practical way to deploy deep learning models for MRI reconstruction	
Code	Language: C, Python and TensorFlow <a href="#">Try it with Colab!</a>	

## Technical Skills

<b>Open source projects:</b>	pypi: <b>spreco</b> ; huggingface: <b>image priors</b>
<b>Development environment:</b>	VS Code + Shell + Git on Debian
<b>Use often:</b>	Python, TensorFlow, NumPy, Shell, <a href="#">BART</a> , PyTorch
<b>Use less often:</b>	C/C++, Matlab, R
<b>Other tools:</b>	LaTeX, PyPI, SLURM, Docker

## Academic Records

<b>Education</b>	
10/2020–09/2023	PhD in Computer Science, University of Göttingen, Göttingen, Germany
09/2017–10/2019	M.Phil in Radiology, The University of Hong Kong, HKSAR, China
09/2013–07/2017	B. Eng in Biomedical Engineering, Xi'an Jiaotong University, Xi'an, China

<b>Award &amp; Honor</b>	
2017	Postgraduate Scholarship awarded by The University of Hong Kong
2017	Outstanding Graduate of Class 2017 awarded by Xi'an Jiaotong University
2015	National Encouragement Scholarship awarded by Xi'an Jiaotong University

### Thesis

- [1] Guanxiong Luo. *Development of Advanced Generative Priors for MRI Reconstruction*, PhD thesis, University of Göttingen, 2023.
- [2] Guanxiong Luo. *The application of generative networks in MR image reconstruction*, M.Phil thesis, The University of Hong Kong, 2019.

## Journal Paper

- [1] **Guanxiong Luo**, Xiaoqing Wang, Moritz Blumenthal, Martin Schilling, Erik Hans Ulrich Rauf, Raviteja Kotikalapudi, Niels Focke, Martin Uecker. *Generative Image Priors for MRI Reconstruction Trained from Magnitude-Only Images*, arXiv preprint arXiv:2308.02340, Aug 2023.
- [2] **Guanxiong Luo**, Mengmeng Kuang, Peng Cao. *Generalized Deep Learning-based Proximal Gradient Descent for MR Reconstruction*, proceeding of 21st International Conference on Artificial Intelligence in Medicine, Portoroz, Slovenia, June 2023.
- [3] **Guanxiong Luo**, Moritz Blumenthal, Martin Heide, Martin Uecker. *Bayesian MRI Reconstruction with Joint Uncertainty Estimation Using Diffusion Priors*, Magn Reson Med. 2023; 90: 295-311.
- [4] Moritz Blumenthal, **Guanxiong Luo**, Martin Schilling, H. Christian M. Holme, Martin Uecker *Deep, deep learning with BART*, Magn Reson Med. 2023; 89: 678- 693.
- [5] **Guanxiong Luo**, Na Zhao, Wenhao Jiang, Edward S. Hui, Peng Cao. *MRI reconstruction using deep Bayesian estimation*, Magn Reson Med. 2020; 84: 2246-2261.

## Conference Proceeding

- [1] **Guanxiong Luo**, Martin Heide, Martin Uecker. *Using data-driven Markov chains for MRI reconstruction with Joint Uncertainty Estimation*, Power Pitch Session, ISMRM 2022.
- [2] Moritz Blumenthal, **Guanxiong Luo**, Martin Schilling, Markus Haltmeier, Martin Uecker. *NLINV-Net: Self-Supervised End-2-End Learning for Reconstructing Undersampled Radial Cardiac Real-Time Data*, Oral Scientific Session, ISMRM 2022.
- [3] **Guanxiong Luo**, Moritz Blumenthal, Xiaoqing Wang, Martin Uecker. *All you need are DICOM images*, Poster Session, ISMRM 2022.
- [4] **Guanxiong Luo**, Xiaoqing Wang, Volkert Roeloffs, Zhengguo Tan, Martin Uecker. *Joint estimation of coil sensitivities and image content using a deep image prior*, Oral Scientific Session, ISMRM 2021.

## Talk

- 09/2023 About *Bayesian MRI reconstruction with joint uncertainty estimation using diffusion priors* at 11th Applied Inverse Problems Conference, Göttingen, Germany
- 01/2023 About *Estimate the uncertainty for MRI reconstruction with learned Bayesian models* at Institute for Numerical and Applied Mathematics, University of Göttingen
- 07/2022 About *Data Driven Methods for Fast MRI reconstruction* at Cardiac MRI Lab, Shanghai Jiaotong University
- 05/2021 About *Using image priors with BART* at ISMRM 2021 Software Session on BART

## Teaching

- WS 2021 Teaching assistant for a course on the application of data science to smart city
- WS 2021 Tutorials for undergraduates and graduates, teaching assistant for a course on deep learning

## Service to the Profession

Reviews for IEEE Transactions on Medical Imaging, IEEE Transactions on Computational Imaging, Artificial Intelligence in Medicine

## Other

---

**Languages** Mandarin , English

**Hobbies** Soccer, Tennis, Photography, Calligraphy

**Citizenship** Chinese