

XIAOJIAN XU

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✉ xiaojianxu@wustl.edu ☎ +1 314-203-8568 🏠 Bellevue, WA, 98004

Foundation AI Team ◊ GE HealthCare

ABOUT ME

Research

- My research is in the area of AI-driven and ML-empowered imaging algorithms. My work lies at the intersection of LLM, NLP, (3D) computational imaging, deep learning, computer vision, large-scale optimization, image processing, and image analysis. I am enthusiastic about incorporating cross-domain knowledge to develop and apply the state-of-the-art **Computer Vision, Generative AI, and Multimodal AI models** to efficiently and robustly solve the real-world challenging problems for various imaging systems.

Expertise

- Computational imaging/sensing, Multimodal models, Vision-Language models, Foundation models, Transformers, Diffusion models, Generative AI, Computer vision, Large-scale optimization, Image analysis, Signal/Image processing, Neural rendering, Inverse problems

EDUCATION

Washington University in St. Louis (WashU), USA 08/2017–08/2022

- Ph.D. in Computer Science (GPA: 3.87/4.00)

University of Electronic Science and Technology of China (UESTC), China 09/2014–06/2017

- M.E. in Communication & Information Engineering (Graduated with honors)

University of Electronic Science and Technology of China (UESTC), China 09/2010–06/2014

- B.E. in Communication Engineering (GPA: 3.89/4.00)

WORK EXPERIENCE

GE HealthCare (GEHC) 05/2024 – present
AI research scientist Bellevue/Seattle

- Working on developing LLM/Foundation/Multimodal models and algorithms for medical and healthcare applications.

University of Michigan (UMich) 08/2022 – 05/2024
Postdoctoral research fellow Ann Arbor

- Developed an efficient 3D deep learning network for various imaging applications.
- Designed a state-of-the-art learning-based feature extraction DL network with subpixel level accuracy.
- Designed a powerful deep learning diffusion-model-based image prior for imaging.
- Collaborated on the development of the pytorch-based medical image reconstruction toolbox ([open source](#)).

Meta Reality Labs Research (MRLR) 05/2021 – 08/2021
Research intern Seattle

- Programed the end-to-end ray-tracing model for peripheral display system in Oculus AR/VR devices.
- Developed multiple optimization algorithms for solving the display calibration problem in Oculus.
- Designed a novel and efficient eye-movement-based camera-to-display mapping for its real-time rendering and view synthesis using implicit neural representation (NeRF).

Mitsubishi Electric Research Laboratories (MERL) 05/2019 – 08/2019
Research intern Boston

- Developed two distinct methods, optimization and deep learning method, for solving the 3D tomographic imaging problem, respectively.

RESEARCH EXPERIENCE

Multimodal Foundation AI Models 05/2024 – Present

- Developed multimodal models for AI applications (Representative publication: [KDD 2025 \(Research Track\)](#)).
- Developed foundation models and downstream applications for various healthcare modalities including MRI, CT, X-Ray.

Physics-Informed Machine Learning Algorithms 08/2020 – 05/2024

- Developed various physics-informed deep learning methods for different imaging tasks. (Representative publication: [NeurIPS 2022](#)).
- Extensively investigated and developed variants of learning-based optimization algorithms for various imaging tasks by combining the imaging models with the deep-learning priors, in both theory and practice.

Compressed and Stochastic AI Algorithms for Large-Scale Optimization 07/2018 – 05/2024

- Developed stochastic/compressed variants of optimization- and deep learning algorithms with convergence guarantee.
- Designing memory-efficient networks architectures for 3D imaging applications.

Other Earlier Research Experience 03/2014 – 06/2017

- Routing and resource scheduling algorithms for large-scale software defined networks (SDN).

AWARDS & HONORS

Honors

- Honored Ph.D student in Computer Science & Engineering Department, WashU 2021
- Outstanding Graduate Student, UESTC 2017

Scholarship

- Graduate Student First-Rank Academic Scholarship, UESTC 2016
- Graduate Student Second-Rank Academic Scholarship, UESTC 2015
- Graduate Student First-Rank Academic Scholarship, UESTC 2014
- National Inspirational Scholarship, UESTC 2013
- People's First-Rank Scholarship, UESTC 2012
- National Inspirational Scholarship, UESTC 2011

INVITED TALKS

- Washington State University 03/2024
- Johns Hopkins University 02/2024
- SIAM Conference on Imaging Science, Deep Learning for Imaging Science 05/2024
- Michigan State University 12/2023
- Los Alamos National Lab 11/2023
- Stanford University, Laboratory of AI in Medicine and Biomedical Physics 01/2022
- University of Michigan, Image and Signal Processing Group 12/2021
- UCLouvain, Image and Signal Processing Group Seminar 09/2020

PROFESSIONAL SERVICE

- **Committee member:** IEEE Bio Imaging and Signal Processing Technical Committee (BISP TC)
- **Conference reviewer:** NeurIPS, CVPR, ICCV, ECCV, WACV, BMVC, ICASSP, ISBI

- **Journal reviewer:** IEEE Transactions on Image Processing (TIP), IEEE Transactions on Computational Imaging (TCI), IEEE Transactions on Medical Imaging (TMI), IEEE Signal Processing Letters (SPL), IEEE Open Journal of Signal Processing (OJSP), Signal, Image and Video Processing, Nuclear Instruments and Methods in Physics Research-A (NIM-A), Applied Mathematical Modelling, Optics Communications, Scientific Reports, Signal Processing

TEACHING EXPERIENCE

(Head) Teaching Assistant

- ESE 415 Optimization, WashU, 2019 Spring, 2021 Spring
- CSE 534A/ESE 513 Large-Scale Optimization, WashU, 2020 Fall

PUBLICATIONS

Highlights

(* indicates equal contribution)

- [1] L. Da, R. Wang, **X. Xu**, P. Bhatia, T. Hout, H. Wei, and C. Xiao. "FlanS - A Foundation Model for Free-Form Language-based Segmentation in Medical Images." 31st SIGKDD Conference on Knowledge Discovery and Data Mining - Research Track (KDD 2025). [Paper] (Acceptance rate of 19%)
- [2] J. Hu, B. Song, **X. Xu**, L. Shen, J. Fessler, "Learning Image Priors through Patch-based Diffusion Models for Solving Inverse Problems", Advances in Neural Information Processing Systems (NeurIPS 2024) [Paper] (Acceptance rate of 26.07%)
- [3] **X. Xu***, J. Liu*, W. Gan, S. Shoushtari, and U. S. Kamilov, "Online Deep Equilibrium Learning for Regularization by Denoising", Advances in Neural Information Processing Systems 35 (NeurIPS 2022): 25363-25376. [Paper] (Acceptance rate of 25.6%)

Preprints

(* indicates equal contribution)

- [4] Singla, N., Koos, K., Haddadpour, F., Shandiz, A. H., Chum, L., **Xu, X.**, ... & Bas, E. (2025). Multi Anatomy X-Ray Foundation Model. arXiv preprint arXiv:2509.12146.
- [5] Yang, Z., DSouza, N., Megyeri, I., **Xu, X.**, Shandiz, A. H., Haddadpour, F., ... & Bas, E. (2025). Decipher-MR: A Vision-Language Foundation Model for 3D MRI Representations. arXiv preprint arXiv:2509.21249.

Journals

(* indicates equal contribution)

- [6] **X. Xu**, M. Klasky, M. McCann, J. A. Fessler, "Swap-Net: A Memory-Efficient 2.5D Network for Sparse-View 3D Cone Beam CT Reconstruction", IEEE Trans. on Comp. Imag. (TCI), 2025.[Paper]
- [7] **X. Xu.**, Gan, W., Kothapalli, S.V.V.N. et al. CoRECT: A Deep Unfolding Framework for Motion-Corrected Quantitative R2* Mapping. J Math Imaging Vis 67, 20 (2025).
- [8] Z. Li, Y.Jia, **X. Xu**, J. Hu, J. A. Fessler, Y. Dewaraja, "Shorter SPECT Scans Using Self-supervised Coordinate Learning to Synthesize Skipped Projection Views" EJNMMI Physics, 2025. [Paper]
- [9] T. Hong, **X. Xu**, J. Hu, J. Fessler, "Provable preconditioned plug-and-play approach for compressed sensing MRI reconstruction". IEEE Trans. on Comp. Imag. (TCI 2024) [Paper]
- [10] D. Serino, B. Nadiga, M. Klasky, **X.Xu**, J. A. Fessler, "Reconstructing Richtmyer-Meshkov Instabilities from Noisy Radiographs Using Low Dimensional Features and Attention-based Neural Networks", Optics Express, 2024. [Paper]
- [11] Z. Li, **X. Xu**, J. Hu, J. A. Fessler, Y. Dewaraja, "Reducing SPECT Acquisition Time by Predicting Missing Projections with Single-Scan Self-Supervised Coordinate-based Learning", Journal of Nuclear Medicine, June 2023, 64 (supplement 1) P1014. [Paper]
- [12] A. Benfenati, P.Cascarano, U. S. Kamilov, **X. Xu**, "Constrained Regularization by Denoising with Automatic Parameter Selection", IEEE Signal Process. Lett. (SPL), 2023. [Paper]

- [13] Z. Li*, J. Hu*, **X. Xu**, L. Shen, and J. A. Fessler, "Accelerated Wirtinger Flow With Score-Based Image Priors for Holographic Phase Retrieval in Poisson-Gaussian Noise Conditions", IEEE Trans. on Comp. Imag. (TCI), 2024. [Paper]
- [14] S. Kahali, S.V.V.N. Kothapalli, **X. Xu**, U. S. Kamilov, and D. A. Yablonskiy, "Deep-Learning-Based Accelerated and Noise-Suppressed Estimation (DANSE) of quantitative Gradient Recalled Echo (qGRE) MRI metrics associated with Human Brain Neuronal Structure and Hemodynamic Properties", NMR Biomed. 2023 May;36(5):e4883. doi: 10.1002/nbm.4883. Epub 2022 Dec 18. PMID: 36442839.[Paper]
- [15] **X. Xu**, S. V. V. N. Kothapalli, S. Kahali and U. S. Kamilov, and D. A. Yablonskiy, "Learning-based motion artifact removal networks for quantitative R2* mapping", Magnetic Resonance in Medicine (MRM), vol. 88, no. 1, pp. 106–119, 2022. [Paper]
- [16] **X. Xu**, Y. Sun, J. Liu, B. Wohlberg, and U. S. Kamilov, "Provable Convergence of Plug-and-Play Priors with MMSE Denoisers", IEEE Signal Process. Lett. (SPL), vol. 27, pp. 1280–1284, 2020. [Paper]
- [17] **X. Xu***, Y. Sun*, Z. Wu*, B. Wohlberg, and U. S. Kamilov, "Scalable Plug-and-Play ADMM With Convergence Guarantees", IEEE Trans. on Comp. Imag. (TCI), vol. 7, pp. 849–863, 2021. [Paper]
- [18] J. Liu, Y. Sun, W. Gan, **X. Xu**, B. Wohlberg, and U. S. Kamilov, "SGD-Net: Efficient Model-Based Deep Learning with Theoretical Guarantees", IEEE Trans. on Comp. Imag. (TCI), vol. 7, pp. 598–610, 2021. [Paper]

Conferences

(* indicates equal contribution)

- [19] Z. Li*, J. Hu*, **X. Xu**, L. Shen, and J. A. Fessler, "Poisson-Gaussian Holographic Phase Retrieval with Score-based Image Prior", NeurIPS Workshop, 2023. [Paper]
- [20] **X. Xu**, J. Fessler, M. Klasky, S. GS, J. Schei, M. McCann, "An End-to-End Learning Approach for Subpixel Feature Extraction", Imaging Systems and Applications 2023. [Paper]
- [21] Y. Hu, J. Liu, **X. Xu**, and U. S. Kamilov, "Monotonically Convergent Regularization by Denoising", 2022 IEEE International Conf. on Image Processing (ICIP), Bordeaux, France, 2022, pp. 426-430. [Paper]
- [22] **X. Xu***, A. H. Al-Shabli*, I. Selesnick, and U. S. Kamilov, "Bregman Plug-and-Play Priors", 2022 IEEE International Conf. on Image Processing (ICIP), Bordeaux, France, 2022, pp. 241-245. [Paper]
- [23] **X. Xu**, J. Liu, Y. Sun, B. Wohlberg, and U. S. Kamilov, "Boosting the Performance of Plug-and-Play Priors via Denoiser Scaling", in 54th Asilomar Conf. on Signals, Systems, and Computers (ACSSC), 2020, pp. 1305–1312. [Paper] (Oral)
- [24] J. Liu, Y. Sun, W. Gan, **X. Xu**, B. Wohlberg, and U. S. Kamilov, "Stochastic Deep Unfolding for Imaging Inverse Problems", in IEEE Int. Conf. Acoustics, speech and signal process (ICASSP), 2021, pp. 1395–1399. [Paper]
- [25] **X. Xu**, O. Dhifallah, H. Mansour, P. T. Boufounos, and P. V. Orlik, "Robust 3D Tomographic Imaging of the Ionospheric Electron Density", in 2020 IEEE Int. Geoscience and Remote Sensing Symposium (IGARSS), 2020, pp. 437–440. [Paper] (Oral)
- [26] J. Liu, Y. Sun, **X. Xu**, and U. S. Kamilov, "Image Restoration Using Total Variation Regularized Deep Image Prior", in 2019 IEEE Int. Conf. Acoustics, speech and signal process (ICASSP), 2019, pp. 7715–7719. [Paper]
- [27] **X. Xu** and U. S. Kamilov, "SignProx: One-bit Proximal Algorithm for Nonconvex Stochastic Optimization", in IEEE Int. Conf. Acoustics, speech and signal process (ICASSP), Brighton, UK, May 2019, pp. 7800–7804. [Paper] (Oral)

STUDENT MENTORING

Undergraduates

07/2018 – 05/2022

- Eddie Chandler, "Inhomogeneity correction for MRI", now Ph.D. student at WashU
- Julia Zeng, "learning-based 3D image denoising", now at Atlassian

- Michael Kincheloe, "Reinforcement learning for MRI artifacts correction", now B.S. student at WashU
- Mingyang Xie, "Accelerated Newton method for CT reconstruction", now Ph.D. student at UMD
- Hao Tang, "Adversarially robust classifiers for image reconstruction", now M.S. student at WashU
- Gustavo Gratacós, "Image restoration with patch-wise sparse learning", now Ph.D. student at WashU
- Jhoan S. Hernandez, "Convolutional sparse learning", now M.S. student at Howard University

Graduates

07/2018 – 05/2024

- Ziyun Li, "Coordinate-based internal learning for medical imaging" (ongoing), now M.S. student at UMich
- Jason Hu, "Phase retrieval with score-based image priors" (ongoing), now Ph.D. student at UMich
- Yixuan Luo, "Deep-learning-based image segmentation", now Ph.D. student at UR
- Zhixin Sun, "Neural representation for image reconstruction", now Ph.D. student at WashU
- Yongcheng Song, "Focal-plane regression for autofocus", now at COMAC
- Weijie Gan, "Fast MRI reconstruction and artifacts correction", now Ph.D. student at WashU
- Jiaming Liu, "Total variation regularized deep image prior", now Ph.D. student at WashU
- Jiarui Xing, "Deep-learning-based image artifacts correction", now Ph.D. student at UVA
- Ryogo Suzuki, "Unfolding networks for image restoration", now at Rakuten Group, Inc.
- Yukun Li, "Single image denoising", now Ph.D. student at Tufts University
- Shiqi Xu, "Sparse Fourier ptychographic microscopy", now research scientist at ZEISS
- Fa Long, "Dictionary learning for image restoration", now at Tencent Inc.