Xiaojian Xu

URL: https://xuxiaojian.github.io/
✉xiaojianxu@wustl.edu +1 314-203-8568

Education

Washington University in St. Louis (WUSTL), St. Louis, MO, USA *9/2017–Present*
- Ph.D student in Computer Science (GPA: 3.87/4.00), advised by Dr. Ulugbek Kamilov

University of Electronic Science and Technology of China (UESTC), Chengdu, China *9/2014–6/2017*
- M.Eng in Communication & Information Engineering (GPA: 3.65/4.00)

University of Electronic Science and Technology of China (UESTC), Chengdu, China *9/2010–6/2014*
- B.Eng in Communication Engineering (GPA: 3.89/4.00)

Work Experience

Mitsubishi Electric Research Laboratories (MERL) *5/2019–8/2019*
Research intern *Boston*
- Investigated in 3D tomographic imaging problems and solved it with both model- and learning-based methods on both simulated and experimental data.

Research Experience

Plug-and-Play priors (PnP) *8/2018 – Present*
- Conduct mass of empirical experiments and theoretical analysis on the PnP research.
- Proved convergence of PnP with MMSE denoisers and proposed performance boosting techniques for different image denoisers.

Learning-based magnetic resonance imaging (MRI) / quantitative-MRI *7/2018 – Present*
- Developed various deep learning methods for fast MRI reconstruction and motion-correction.
- Implemented and modified various neural networks for different tasks.

Model and learning combined methods for image reconstruction *3/2018 – present*
- Conducted different image reconstruction tasks (i.e. deblur, super-resolution, Poisson/Gaussian denoising, compressive sensing, phase retrieval, MRI, CT, etc.) with methods such as dictionary learning, supervised/unsupervised deep learning, neural representation fields and model-based optimization approaches.

Compressed proximal algorithm for nonconvex stochastic optimization *9/2018 – 1/2019*
- Developed compressed proximal based algorithms for stochastic optimization problems and were the first to prove the convergence of two of such compressed algorithm.

Some earlier research experience *3/2014 – 6/2017*
- Development of Intelligent Home System.
- Design routing and resource scheduling algorithms for large-scale network SDN.

List of Publications

Preprints
- **X. Xu**, J. Liu, Y. Sun, B. Wohlberg, and U. S. Kamilov, "Boosting the Performance of Plug-and-Play Priors via Denoiser Scaling", arXiv preprint arXiv:2002.11546 (2020).
- **X. Xu**, Y. Sun, Z. Wu, B. Wohlberg, and U. S. Kamilov, "Scalable Plug-and-Play ADMM with Convergence Guarantees", arXiv preprint arXiv:2006.03224 (2020).
- J. Liu, Y. Sun, W. Gan, **X. Xu**, B. Wohlberg, and U. S. Kamilov, "SGD-Net: Efficient Model-Based Deep Learning with Theoretical Guarantees", arXiv preprint arXiv:2101.09379 (2021).
- J. Liu, Y. Sun, W. Gan, **X. Xu**, B. Wohlberg, and U. S. Kamilov, " Stochastic Deep Unfolding for Imaging Inverse Problems", accepted to ICASSP 2021.

Published

- **X. Xu**, Y. Sun, J. Liu, B. Wohlberg, and U. S. Kamilov, "Provable Convergence of Plug-and-Play Priors with MMSE denoisers", IEEE Signal Processing Letters 27, 1280 - 1284, 2020.
- **X. Xu**, O. Dhifallah, H. Mansour, P. Boufounos, and P. Orlik, "Robust 3D Tomographic Imaging of the Ionospheric Electron Density", IEEE IGARSS, 2020.
- **X. Xu** and U. S. Kamilov, "signProx: One-Bit Proximal Algorithm for Nonconvex Stochastic Optimization", IEEE ICASSP 2019.
- J. Liu, Y. Sun, **X. Xu**, and U. S. Kamilov, "Image Restoration using Total Variation Regularized Deep Image Prior", IEEE ICASSP 2019.

Invited talks

- SIAM Conference on Imaging Science 2020, 07/2020
- UCLouvain, Image and Signal Processing Group Seminar, 09/2020

Reviewer experience

- **Conferences**: International Symposium on Biomedical Imaging (ISBI)
- **Journals**: IEEE Transactions on Image Processing (TIP)

Teaching Experience

(Head) TA for Optimization *1/2019–Present*
Assistant Instructor *St. Louis*

- Workes as an assistant instructor for course "Optimization" and "Large-Scale Optimization for Data Science" for four semesters. Teach tutorial sessions, hold office hours, answer questions online, develop tests and solutions, and help grad exams and homeworks.

Students supervision *7/2018–Present*
Research Supervisor *St. Louis*

- E.Chandler, "Neural representation fields (NeRf) for MRI" (Spring 2021), BS, CSE, WUSTL
- Y.Li, "Nonlocal learning for image restoration" (Spring 2020), MS, CSE, WUSTL
- Y. Song, " Learning based focal plane selection for microscopy" (Spring 2020), MS, CSE, WUSTLL
- H.Tang, "Adversarially robust classifiers for image reconstruction" (Fall 2019), BS, CSE, WUSTL
- Ryogo Suzuki, "Unfolding RED for image restoration" (Fall 2019), now at Rakuten, Japan
- W.Gan, "Fast learning for MRI reconstruction" (Fall 2018), now is Ph.D, CSE, WUSTL
- Jiarui Xing, "Learning-based MRI artifacts correction" (Fall 2018), now is Ph.D, ECE, UV

Skills

- **Languages**: Python, Matlab, C, Java
- **Skills**: Optimization, Inverse problems, Tensorflow, Pytorch, Deep learning
- **Certifications**: National 3-tier computer certificate (China), National 4-tier computer certificate (Network Engineer, China)

Awards

Scholarship

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

Others

- Third-prize of 'Internet+' Entrepreneurship Competition in Sichuan Province 2016
- Great Award of Intelligent City Technology Competition 2016
- Award of Hackathon Programming Competition 2015
- Outstanding Graduate Student 2015
- Second Prize of Electronic Design Competition in UESTC 2011