

# XIAOJIAN XU

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## EDUCATION

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**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

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**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

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**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 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

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### *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

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

## REVIEWER EXPERIENCE

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

## TEACHING EXPERIENCE

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

- Worked 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 field(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, WUSTL
- 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

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- **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

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### 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