Jiaming Liu

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RESEARCH INTERESTS

Computational Imaging, Deep Learning, Signal Processing, Large-scale Optimization, Sparsity and Compressive Sensing.

EDUCATION

Washington University in St. Louis, St. Louis, MO, USA Aug. 2019 – Expected 2024
Ph.D. student in Electrical & Systems Engineering
Advisor: Prof. Ulugbek Kamilov

Washington University in St. Louis, St. Louis, MO, USA Aug. 2017 – May 2019
M.S. in Electrical & Systems Engineering

University of Electronic Science and Technology of China, Chengdu, China Sep. 2013 – Jun. 2017
B.S. in Electronic and Information Engineering
Advisor: Prof. Zhiqin Zhao

AWARDS & HONORS

- NeurIPS 2019 Travel Award.
- Dean's Select PhD Fellowship, 2019

PUBLICATIONS

[1] **J. Liu**, M. S. Asif, B. Wohlberg and U. S. Kamilov, "Recovery Analysis for Plug-and-Play Priors using the Restricted Eigenvalue Condition" arXiv:2106.03668. **preprint**.

[2] Y. Sun, **J. Liu**, M. Xie, B. Wohlberg and U. S. Kamilov, "Coil: Coordinate-based internal learning for imaging inverse problem" arXiv:2102.05181. **preprint**.

[3] **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. Comput. Imag.**, vol 7, pp. 598-610, 2021.

[4] **J. Liu**, Y. Sun, W. Gan, X. Xu, B. Wohlberg and U. S. Kamilov, "Stochastic Deep Unfolding for Imaging Inverse Problems," Proc. IEEE Int. Conf. Acoustics, Speech and Signal Process. (**ICASSP 2021**).

[5] Y. Sun, **J. Liu**, Y. Sun, B. Wohlberg, and U. S. Kamilov, "Async-RED: A Provably Convergent Asynchronous Block Parallel Stochastic Method using Deep Denoising Priors" Proc. Int. Conf. Learn. Represent. (**ICLR 2021**), in press, [**Spotlight: 114/2997 = 4%**].

[6] M. Xie, Y. Sun, **J. Liu**, B. Wohlberg, and U. S. Kamilov, "Joint Reconstruction and Calibration using Regularization by Denoising". arXiv:2011.13391. **preprint**.

[7] 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.**, in press.

[8] W. Gan, C. Eldeniz, **J. Liu**, H. An, and U. S. Kamilov, "Image reconstruction for MRI using deep CNN priors trained without ground truth," **Proc. 54th Asilomar Conf. Signals, Systems, & Computers**, 2020, in press.

[9] X. Xu, **J. Liu**, Y. Sun, B. Wohlberg, and U. S. Kamilov, "Boosting the Performance of Plug-and-Play Priors via Denoiser Scaling" **Proc. 54th Asilomar Conf. Signals, Systems, & Computers**, 2020, in press.

[10] **J. Liu**, Y. Sun, C. Eldeniz, W. Gan, H. An, and U. S. Kamilov, "RARE: Image Reconstruction using Deep Priors Learned without Ground Truth." **IEEE J.sel.Topics Signal Process.** pp. 1–1, 2020.

[11] Z. Wu, Y. Sun, A. Matlock, **J. Liu**, L. Tian, and U. S. Kamilov, "SIMBA: Scalable Inversion in Optical Tomography using Deep Denoising Priors." **IEEE J.sel.Topics Signal Process.** pp. 1–1, 2020.

[12] Y. Sun*, **J. Liu***, and U. S. Kamilov, "Block Coordinate Regularization by Denoising," **IEEE Trans. Comput. Imag.**, vol 6, pp. 908-921, 2020. (* *contributed equally to this work*.)

[13] M. Torop, S. Kothapalli, Y. Sun, **J. Liu**, S. Kahali, D. A. Yablonskiy, and U. S. Kamilov, "Deep learning using a biophysical model for robust and accelerated reconstruction of quantitative, artifact-free and denoised images." **Magn. Reson. Med.**, vol 84, pp. 2932-2942, 2020.

[14] G. Song, Y. Sun, **J. Liu**, and U. S. Kamilov, "A New Recurrent Plug-and-Play Prior Based on the Multiple Self-Similarity Network." **IEEE Signal Process. Lett.**, vol.27, pp 451-455, 2020.

[15] **J. Liu**, Y. Sun, and U. S. Kamilov, "Infusing Learned Priors into Model-Based Multispectral Imaging," IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (**CAMSAP 2019**), **in press**.

[16] Y. Sun, **J. Liu**, and U. S. Kamilov, "Block Coordinate Regularization by Denoising," Proc. Ann. Conf. Neural Information Processing Systems (**NeurIPS 2019**), [**Acceptance rate: 1428/6743 = 21%**].

[17] Z. Wu, Y. Sun, **J. Liu**, and U. S. Kamilov, "Online Regularization by Denoising with Application to Phase Retrival," Workshop on Learning for Computational Imaging, **ICCV 2019**, in press. [**Oral**].

[18] **J. Liu**, Y. Sun, X. Xu, and U. S. Kamilov, "Image Restoration using Total Variation Regularized Deep Image Prior," Proc. IEEE Int. Conf. Acoustics, Speech and Signal Process. (**ICASSP 2019**), pp.7715-7719.

APPLICABLE COURSEWORK

- *Sparse Modeling for Imaging and Vision*
- *Machine Learning*
- *Probability and Stochastic Process*
- *Biological imaging Technology*
- *Algorithms for Nonlinear Optimization*
- *Mathematics of Imaging Science*
- *Topology*
- *Optimization*
- *Stochastic Process*
- *Digital Imaging processing*

TECHNICAL SKILLS

- Three years of experience in machine learning and image processing.
- Proficient with deep learning frameworks: Pytorch, TensorFlow, and Jax.
- Proficient with programming languages: Matlab, Java and Python.
- Fluency in imaging modality: Magnetic Resonance Imaging (MRI), Computed Tomography (CT), Intensity Diffraction Tomography (IDT).

PROFESSIONAL SERVICES

- **Reviewer** of Neurocomputing, Optical Communication, IEEE Transactions on Image Processing (**TIP**), IEEE Transactions on Signal Processing (**TSP**), IEEE Transactions on Computational Imaging (**TCI**), International Journal of Intelligent Systems (**IJIS**), IEEE International Symposium on Biomedical Imaging (**ISBI**), Conference on Neural Information Processing Systems (**NeurIPS**), International Conference on Computer Vision Workshops (**ICCVW**), International Conference on Learning Representations (**ICLR**).
- Student Member, IEEE (2019-present)

TEACHING SERVICE

As Course Teaching Assistant:

- ESE 415 Optimization, Wash U. 2020 Spring.
- CSE 534 Large-Scale Optimization, Wash U. 2020 Fall.
- ESE 415 Optimization, Wash U. 2021 Spring.

SUPERVISED STUDENTS

Former Students (Co-advised with Prof. Kamilov):

- Weijie Gan (M.S. CSE), *Now Ph.D student at Wash U.*
- Guangyu Meng (M.S. CSE), *Now Ph.D student at Uni. of Notre Dame*
- Jialu Wang (B.S. CSE)
- Peter Ming (B.S. CSE), *Now in Google*
- Max Trop (M.S. CSE), *Now Ph.D student at Northeastern U.*
- Mingyang Xie (B.S. CSE), *Now Ph.D student at University of Maryland*