

Email: h.yuyang@wustl.edu Phone: (+1)314-309-9631 Homepage: https://huyuyang.github.io// Google Scholar: google scholar link

BIOGRAPHY

I am a **third-year Ph.D.** student at the Department of Electrical and System Engineering, **Washington Univer**sity in St. Louis (Wash U), working under the supervision of Dr. Ulugbek Kamilov. My research goal is to develop fast, efficient, and interpretable algorithms for solving large-scale imaging problems. My recent work is focusing on inverse problems, image restoration and large-scale optimization.

Research Interests: Computational Imaging, Signal and Image Processing, Optimization, Deep Learning

EDUCATION

Washington University in St. Louis, St. Louis, MO Ph.D. student in Electrical Engineering Advisor: Prof. Ulugbek Kamilov

Washington University in St. Louis, St. Louis, MO M.S. in Electrical Engineering Advisor: Prof. Ulugbek Kamilov

Nanjing Tech University, Nanjing, China B.S. in Electronic and Information Engineering Advisor: Prof. Yaping Bao

INTERSHIP

Mitsubishi Electric Research Laboratories (MERL), Boston, MA Research intern in MERL Computer Vision Group Advisor: Dr. Suhas Lohit

AWARDS

- WUSTL ESE Outstanding Master's Research, 2023
- WUSTL Dean's Select PhD Fellowship, 2021
- NJTECH U Outstanding Graduate (top 2%), 2020
- NJTECH U First-Class Scholarship (top 5%), 2016-2017, 2017-2018, 2018-2019

RESEARCH EXPERIENCE

- Reconstruction for Parallel MRI Without Groundtruth (WashU CIG)
 - Used deep learning for joint parallel MRI reconstruction and coil sensitivity calibration without using the ground-truth images [1], [b 6.].

Aug. 2022 - Expected 2026

Aug. 2020 – May 2022 GPA: 4.0/4.0

Sep. 2016 – Jun. 2020 GPA: 3.79/4.0

May 2024 – Aug. 2024

- Monotonically Convergent Regularization by Denoising (WashU CIG)
 - Proposed a new monotone RED (MRED) algorithm [b 5.] that can offer stable convergence for nonconvex data-fidelity terms and expansive deep image denoisers. MRED is the first RED method which is guaranteed to converge for any denoiser—irrespective of its expansiveness.
- A Restoration Network as an Implicit Prior (WashU CIG & Google Research)
 - Image denoisers have been shown to be powerful priors for solving inverse problems in imaging. In this
 work, we introduce a generalization of these methods that allows any image restoration network to beused
 as an implicit prior. This work offers a step forward for solving inverse problems by enabling the use of
 powerful pre-trained restoration models as priors.

PUBLICATIONS

Pre-print: ('*' indicates equal contribution)

- [3] **Y. Hu**, A. Peng, W. Gan, and U. S. Kamilov, "ADOBI: Adaptive Diffusion Bridge For Blind Inverse Problems with Application to MRI Reconstruction." **arXiv:2411.16535**, **preprint**, **2024**
- [2] Y. Hu, A. Peng, W.Gan, P. Milanfar, M. Delbracio and U. S. Kamilov "Stochastic Deep Restoration Priors for Imaging Inverse Problems." arXiv:2410.02057, preprint, 2024
- C. Park*, W. Gan*, Z. Zou, Y. Hu, Z. Sun, U. S Kamilov "A Structured Pruning Algorithm for Model-based Deep Learning." arXiv:2311.02003, preprint, 2023
- **Published:** ('*' indicates equal contribution)
- [b 9.] Y. Hu, M. Delbracio, P. Milanfar, and U. S. Kamilov, "A Restoration Network as an Implicit Prior." Proc. Int. Conf. Learn. Represent. (ICLR 2024)
- [b 8.] Y. Hu*, W. Gan*, C. Ying, T. Wang, C. Eldeniz, J. Liu, Y. Chen, H. An, and U. S. Kamilov, "SPICER: Self-Supervised Learning for MRI with Automatic Coil Sensitivity Estimation." Magn. Reson. Med., vol. 92, no. 3, pp. 1048-1063, September 2024.
- [b 7.] Y. Hu, S. V. Kothapalli, W. Gan, A. Sukstanskii, G. F. Wu, M. Goyal, D. Yablonskiy, U. S. Kamilov, "DiffGEPCI: 3D MRI Synthesis from mGRE Signals using 2.5D Diffusion Model." Proc. Int. Symp. Biomedical Imaging 2021. (ISBI 2024)
- [b 6.] W. Gan, S. Shoushtari, Y. Hu, J. Liu, H. An, and U. S. Kamilov, "Block Coordinate Plug-and-Play Methods for Blind Inverse Problems," Proc. Ann. Conf. Neural Information Processing Systems (NeurIPS 2023).
- [b 5.] S. Shoushtari, J. Liu, Y. Hu, and U. S. Kamilov, "Deep Model-Based Architectures for Inverse Problems under Mismatched Priors." IEEE J. Sel. Areas Inf. Theory
- [b 4.] H. An, U. S. Kamilov, **Y. Hu**, W. Gan, J. Liu, C. Eldeniz, Y. Chen, "Self-supervised joint image reconstruction and coil sensitivity calibration in parallel mri without ground truth,"**US Patent App. 17/968,541**
- [b 3.] W. Gan, C. Ying, P. Eshraghi, T. Wang, C. Eldeniz, Y. Hu, J. Liu, Y. Chen, H. An, and U. S. Kamilov, "Self-Supervised Deep Equilibrium Models for Inverse Problems with Theoretical Guarantees," IEEE Trans. Comput. Imag., vol. 9, pp. 796-807, 2023.
- [b 2.] Y. Hu, J. Liu, X. Xu, and U. S. Kamilov, "Monotonically Convergent Regularization by Denoising." Proc. IEEE Int. Conf. Image Proc. (ICIP 2022) (Bordeaux, France, October 16-19), pp. 426-430.
- [b 1.] Y. Hu*, W. Gan*, C. Eldeniz, J. Liu, Y. Chen, H. An, and U. S. Kamilov, "SS-JIRCS: Self-Supervised Joint Image Reconstruction and Coil Sensitivity Calibration in Parallel MRI without Ground Truth," Proc. IEEE Int. Conf. Comp. Vis. Workshops (ICCVW 2021)(Oct 11-17), pp. 4048-4056.

PROFESSIONAL SERVICE

Reviewer:

- IEEE Transaction on Image Processing (TIP).
- IEEE Transaction on Medical Imaging (TMI).
- IEEE Transaction on Computational Imaging (TCI).
- IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR).
- International Symposium on Computational Sensing (ISCS)
- International Conference on Learning Representations (ICLR)

Course Grader:

- ESE 417 Introduction to Machine Learning and Pattern Classification, Wash U. 2021 Fall.
- ESE 415 Optimization, Wash U. 2022 Spring.

Assistant instructor:

- ESE 513 Large-Scale Optimization, Wash U. 2022 Fall.
- ESE 415 Optimization, Wash U. 2023 Spring.