Yu Sun Ph.D.

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: https://sunyumark.github.io/

Academic Position

Johns Hopkins University, *Assistant Professor* — Baltimore, USA
Electrical and Computer Engineering — 2024 - *Present*
- Joint appointment: Data Science and Artificial Intelligence Institute

Education And Training

California Institute of Technology — Pasadena, USA
Postdoctoral Research Associate — 2022 - 2024
- Advisor: Prof. Katherine L. Bouman
- Fellowship: Computing, Data, and Society Fellow

Washington University in St Louis — St Louis, USA
Ph.D. in Computer Science — 2018 - 2022
- Advisor: Prof. Ulugbek S. Kamilov
- Thesis: "Integrating Physical Models and Deep Priors for Computational Imaging." **—Turner Dissertation Award 2022—**

Washington University in St. Louis — St Louis, USA
M.S. in Data Analytics & Statistics — 2015 - 2017

Sichuan University — Chengdu, China
B.E. in Electronics and Information Engineering — 2011 - 2015
- Advisor: Prof. Qinggong Guo

Awards and Honors

Computing, Data, and Society Fellow — 2024
CMS Department, California Institute of Technology

Turner Dissertation Award — 2023
CS Department, Washington University in St. Louis
- Top in the class

Honor — 2019-2022
CS Department, Washington University in St. Louis
- Top 15% in the class

Student Travel Award — 2019
NeurIPS

Publications

Journal Publications ('∗' indicates equal contribution)

16. **Y. Sun**, Z. Wu, Y. Chen, B. T. Feng, and K. L. Bouman "Provable Probabilistic Imaging using Score-Based Generative Priors." **IEEE Trans. Comput. Imag.**, vol. 10, pp. 1290-1305, 2024.
15. Z. Wu, T. Yin, **Y. Sun**, R. Frost, A. V. D. Kouwe, A. V. Dalca, and K. L. Bouman "Learning Task-Specific Strategies for Accelerated MRI." **IEEE Trans. Comput. Imag.**, vol. 10, pp. 1040-1054, 2024.
14. P. Goyes-Peñafiel, E. Vargas, C. V. Correa, **Y. Sun**, U. S. Kamilov, B. Wohlberg, and H. Arguello, "Coordinate-Based Seismic Interpolation in Irregular Land Survey: A Deep Internal Learning Approach," **IEEE Trans. Geo. Rem. Sen.**, vol. 61, pp. 1-12, 2023.
13. R. Liu*, **Y. Sun***, J. Zhu, L. Tian, and U. S. Kamilov, "Recovery of Continuous 3D Refractive Index Maps from Discrete Intensity-Only Measurements using Neural Fields." **Nature Machine Intelligence**, vol. 4, pp. 781–791, 2022. **[Impact Factor = 26.4]**

12. W. Gan, **Y. Sun**, C. Eldeniz, J. Liu, H. An, and U. S. Kamilov, "Deformation-Compensated Learning for Image Reconstruction without Ground Truth," **IEEE Trans. Med. Imag.**, vol. 41, no. 9, pp. 2371-2384, 2022.

11. **Y. Sun**, J. Liu, M. Xie, B. Wohlberg, and U. S. Kamilov, "CoIL: Coordinate-based Internal Learning for Tomographic Imaging." **IEEE Trans. Comput. Imag**, vol. 7, pp. 1400-1412, 2021

10. 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, June 2021

9. **Y. Sun***, Z. Wu*, X. Xu*, B. Wohlberg, and U. S. Kamilov, "Scalable Plug-and-Play ADMM with Convergence Guarantees." **IEEE Trans. Comput. Imag.**, vol. 7, pp. 849-863, July 2021.

8. 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 (RoAR) of quantitative and artifact-free R2* images." **Magn. Reson. Med.**, vol. 84, pp. 2932-2942, 2020.

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.**, vol. 27, pp. 1280-1284, 2020.

6. 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.

5. 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.**, vol. 14, no. 6, pp. 1088-1099, 2020.

4. 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.**, vol. 14, no. 6, pp. 1163-1175, 2020.

3. **Y. Sun***, J. Liu*, and U. S. Kamilov, "Block Coordinate Regularization by Denoising," **IEEE Trans. Comput. Imag.**, vol. 6, pp. 908-921, 2020.

2. **Y. Sun**, B. Wohlberg, and U. S. Kamilov, "An Online Plug-and-Play Algorithm for Regularized Image Reconstruction." **IEEE Trans. Comput. Imag.**, vol.5, no.3, pp.395-408, 2019.

1. **Y. Sun**, Z. Xia, and U. S. Kamilov, "Efficient and accurate inversion of multiple scattering with deep learning," **Optics Express**, vol.26, no.11, pp.14678-14688, 2018.

Conference Publications ('∗' indicates equal contribution)

16. Z. Wu, **Y. Sun**, Y. Chen, B. Zhang, Y. Yue, and K. L. Bouman "Principled Probabilistic Imaging using Diffusion Models as Plug-and-Play Priors." Adv. in Neural Information Processing Systems (**NeurIPS 2024**), in press. **[Acceptance Rate: 4043/15671 = 25.8%]**

15. W. Shangguan*, **Y. Sun***, W. Gan, and U. S. Kamilov, "Learning Cross-Video Neural Representations for High-Quality Frame Interpolation." Proc. European Conference on Computer Vision (**ECCV**), pp. 511-528, Tel Aviv, Israel, October 23-27. **[Acceptance rate: 1492/5803 = 26%]**

14. W. Gan, **Y. Sun**, C. Eldeniz, J. Liu, H. An, and U. S. Kamilov, "Deep image reconstruction for MRI using unregistered measurement pairs without ground truth," Proc. Int. Soc. of Magnetic Resonance in Medicine (**ISMRM 2021**), p. 1959, May 15-20.

13. M. Xie*, J. Liu*, **Y. Sun**, B. Wohlberg, U. S. Kamilov "Joint Reconstruction and Calibration using Regularization by Denoising." Proc. IEEE/CVF Int. Conf. Comp. Vis. Workshops (**ICCVW 2021**), October 11-17.

12. 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**), pp. 1395-1399, Toronto, Canada, June 6-11.

11. **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**), Vienna, Austria, May 4-8. **[Spotlight: 114/2997 = 4%]**

10. W. Gan, **Y. Sun**, C. Eldeniz, H. An and U. S. Kamilov, "Deep Image Reconstruction using Unregistered Measurements without Groundtruth." Proc. Int. Symp. Biomedical Imaging 2021 (**ISBI 2021**), pp. 1531-1534, Nice, France, April 13-16.

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 (**ACSSC 2020**), pp. 1305-1312, Pacific Grove, CA, November 1–5.

8. J. Liu, C. Eldeniz, **Y. Sun**, W. Gan, S. Chen, H. An, and U. S. Kamilov, "RED-N2N: Image reconstruction for MRI using deep CNN priors trained without ground truth," Proc. Int. Soc. of Magnetic Resonance in Medicine (**ISMRM 2020**), p. 993, 8-14 August.

7. Z. Wu, **Y. Sun**, J. Liu, and U. S. Kamilov, "Online Regularization by Denoising with Application to Phase Retrieval," Proc. IEEE/CVF Int. Conf. Computer Vision Workshops (**ICCVW 2019**), pp. 3887-3895, Seul, Korea, October 27-November 2.

6. 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, Brighton, UK, May 12-17.

5. J. Liu, **Y. Sun**, and U. S. Kamilov, "Infusing Learned Priors into Model-Based Multispectral Imaging," IEEE Int. Workshop on Computational Advances in Multi-Sensor Adaptive Processing (**CAMSAP 2019**), Guadeloupe, France, December 15-18.

4. **Y. Sun**, J. Liu, and U. S. Kamilov, "Block Coordinate Regularization by Denoising," Adv. in Neural Information Processing Systems (**NeurIPS 2019**), pp. 382-392. **[Acceptance rate: 1428/6743 = 21%]**

3. **Y. Sun**, B. Wohlberg, and U. S. Kamilov, "Plug-In Stochastic Gradient Method," Proc. Int. Biomedical and Astronomical Signal Processing Frontiers Workshop (**BASP 2019**), Villars-sur-Ollon, Switzerland, February 3-8, p.75.

2. **Y. Sun**, S. Xu, Y. Li, L. Tian, B. Wohlberg, and U. S. Kamilov, "Regularized Fourier Ptychography using an Online Plug-and-Play Algorithm," Proc. IEEE Int. Conf. Acoustics, Speech and Signal Process. (**ICASSP 2019**), pp.7665-7669, Brighton, UK, May 12-17. **[Oral]**

1. **Y. Sun** and U. S. Kamilov, "Stability of Scattering Decoder For Nonlinear Diffractive Imaging," Proc. 4th Int. Traveling Workshop on Interactions between Sparse models and Technology (**iTWIST 2018**), p.31, Marseille, France, November 21-23. **[Oral]**

INVITED TALKS

JHU Intelligent Optical Imaging and Vision Laboratory | Baltimore, U.S. 9/2024
Title: 'Deep Learning for Computational Imaging'

ECE Department, Johns Hopkins University | Baltimore, U.S. 3/2024
Title: 'Turning Denoisers into Principled Imaging Solvers: Algorithm, Theory, and Application'

CSE College, Georgia Tech | Atlanta, U.S. 3/2024
Title: 'Turning Denoisers into Principled Imaging Solvers: Algorithm, Theory, and Application'

EI Computational Imaging XXII | San Francisco, U.S. 1/2024
Title: 'Provable Probabilistic Imaging using Score-based Generative Priors'

EI Implicit Neural Representations for Inverse Imaging | San Francisco, U.S. 1/2024
Title: 'Implicit Neural Representation for Tomographic Imaging'

Computational Camera and Display Workshop, CVPR | New Orleans, U.S. 7/2022
Title: '3D Tomographic Microscopy using Neural Fields'

Imaging & Vision Seminar, Rice University | Remote 7/2022
Title: 'Integrating physical and learning models for computational imaging'

Stanford Computational Imaging Lab | Remote 1/2022
Title: 'Integrating physical and learning models for computational imaging'

Boston University Computational Imaging Systems Lab | Remote 12/2021
Title: 'Integrating physical and learning models for computational imaging'

CMU Image Science Lab | Pittsburgh, PA 12/2021
Title: 'Integrating physical and learning models for computational imaging'

Caltech Computational Cameras Group | Remote 10/2021
Title: 'Integrating physical and learning models for computational imaging'

Presentations

ICCP | Madison, U.S. 7/2023
Title: 'Provable Probabilistic Imaging using Score-based Generative Priors'

ECCV | Virtual 10/2022
Title: 'Learning Cross-Video Neural Representations for High-Quality Frame Interpolation'

ICIP | Virtual 9/2021
Title: 'SIMBA: Scalable Inversion in Optical Tomography using Deep Denoising Priors'

ICLR | Spolight, Virtual 10/2021
Title: 'Async-RED: A Provably Convergent Asynchronous Block Parallel Stochastic Method using Deep Denoising Priors'

NeurIPS | Vancouver, Canada 12/2019
Title: 'Block-coordinate Regularization by Denoising'

iTWIST | Marseille, France 11/2018
Title: 'Stability of Scattering Decoder for Nonlinear Diffractive Imaging'

Working Experience

Cedars Sinai Hospital | Los Angeles, U.S. 8/2022 - 7/2023
- Clinical Data Research Specialist

Nvidia Inc. | Remote, U.S. 5/2021 - 8/2021
- Research Intern.

Capacity | St. Louis, U.S. 5/2017 - 8/2017
- Software Developer Intern

Professional Membership

Professional Society:

IEEE Signal Processing Society, *Member* 2022 - *present*

IEEE Signal Processing Society, *Student Member* 2018 - *2022*

Technical Committee:

IEEE SPS Computational Imaging Technical Committee, *Member* 2022 - *present*

Academic Services

Organizers for:

ICASSP Special Session | Hyderabad, India 2025
Theme: 'Computational Imaging in the Age of Generative AI'

Journal Editors for:

IEEE Open Journal of Signal Processing, *Consultant Associate Editor* 2022 - *present*

Journal Reviewers for:

Nature Communications (**Nat. Commun**)

OSA **Optica**

SIAM Journal on Imaging Sciences (**SIIMS**)

IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**)

IEEE Journal of Selected Topics in Signal Processing (**JSTSP**)

IEEE Transactions on Computational Imaging (**TCI**)

IEEE Transactions on Medical Imaging (**TMI**)

IEEE Transactions on Signal Processing (**TSP**)

IEEE Transactions on Image Processing (**TIP**)

IEEE Signal Processing Letters (**SPL**)

Signal Processing (**SP**)

Applied Mathematics and Computation (**AMC**)

Digital Signal Process (**DSP**)

SPIE Journal on Electronic Imaging (**JEI**)

Conference Reviewer/PCs for:

International Conference on Learning Representations (**ICLR**)

International Conference on Machine Learning (**ICML**)

Neural Information Processing Systems (**NeurIPS**)

Computer Vision and Pattern Recognition (**CVPR**)

European Conference on Computer Vision (**ECCV**)

International Joint Conference on Artificial Intelligence (**IJCAI**)

IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**)

Teaching

Washington University in St. Louis (*As Teaching Assistant*):

Sparse Model for Imaging, CSE 585T. Fall 2018.

Optimization, ESE 415. Fall 2018, Spring 2019, Spring 2020.

Cloud Computing and Big Application, CSE 427S. Fall 2016, Spring 2017, Fall 2017.

Mentorship

Johns Hopkins University

Guannan He (M.S. ECE)

Xinyao Shao (M.S. ECE)

Xinmin Shen (B.S. AMS)

Yuan Gao (M.S. HSI, 2024)

Bingyan Liang (M.S. DS, University of Wisconsin-Madison)

California Institute of Technology (*Co-advised with Prof. Bouman*):

Zihui Wu (Ph.D. CMS)

Heriniaina Rajaoberison (M.S. CMS)

Washington University in St. Louis (*Co-advised with Prof. Kamilov*):

Wentao Shangguan (M.S. CSE, 2022) — *Now Ph.D. student at Boston U.*

Renhao Liu (B.S./M.S. CSE, 2022) — *Now at Google Inc.*

Mingyang Xie (B.S. CSE, 2021) — *Now Ph.D. at U. Maryland*

Yiran Sun (M.S. CSE, 2021) — *Now Ph.D. at Rice U.*

Weijie Gan (M.S. CSE, 2020) — *Now Ph.D. at Wash U.*

Zihui Wu (B.S. CSE, 2020)	*Now Ph.D. at Caltech*
Max Torop (M.S. CSE, 2020)	*Now Ph.D. at Northeastern U.*
Shiqi Xu (M.S. ESE, 2019)	*Now Ph.D. at Duke U.*
Jiaming Liu (M.S. ESE, 2018)	*Ph.D. at Wash. U, Postdoc at Stanford U.*
Zach Pewitt (M.S. ESE, 2018)	*Now at Boeing*
Joseph Han (M.S. ESE 2018)	*Now at Deloitte*
Jialong Zhang (M.S. ESE, 2018)	*Now at Schlumberger*
Fangying Zhai (M.S. ESE, 2018)	*Now at Google Inc.*
Chunyuan Li (M.S. CSE, 2018)	