Weijie Gan

Email: weijie.gan@wustl.edu
Homepage: wjgancn.github.io
Google Scholar: scholar.google.com/weijie.gan
Address: 1031 Highlands Plz. #316
Phone: (314)203-7366
St. Louis, MO, 63110

BIOGRAPHY

I am a **Ph.D. student in Computer Science** at **Washington University in St. Louis**, advised by **Dr. Ulugbek Kamilov** and **Dr. Hongyu An**. My research focuses on algorithms designs and theoretical analysis for deep learning-based computational imaging. My research topics include diffusion models, self-supervised representation learning, image reconstruction, image registration, and correction of physical model uncertainty. My work has been shown to deliver real-world impact for various imaging applications, including computational photography, MRI, PET, and ptychography.

Research Interests: Computational Imaging, Machine Learning, Computer Vision, Optimization, Medical Imaging

EDUCATION

Washington University in St. Louis, St. Louis, MO, United States — 2020 - Expected 2025
Ph.D. Candidate in Computer Science
Advisor: Prof. Ulugbek Kamilov and Prof. Hongyu An

Washington University in St. Louis, St. Louis, MO, United States — 2018 - 2020
M.Sc. in Computer Science

South China University of Technology, Guangzhou, China — 2014 - 2018
B.Eng. in Automation & B.Business in Administration (dual-degree)

WORK EXPERIENCE

Siemens Healthineers, Princeton, NJ, United States — 2024.05 - 2024.08
Research Intern in *Generative AI and Inverse Problems*
Worked with *Dr. Mariappan Nadar* and *Dr. Mahmoud Mostapha* on developing a diffusion model-based algorithm for diffusion-weighted MRI reconstruction and apparent diffusion coefficient (ADC) estimation.

Siemens Healthineers, Knoxville, TN, United States — 2023.05 - 2023.08
Research Intern in the *Physics Group of Molecular Imaging*
Worked with *Dr. Jorge Cabello* and *Dr. Maurizio Conti* on a MRI-guided PET reconstruction algorithm based on deep generative models [a1.].

Los Alamos National Laboratory (LANL), Los Alamos, NM, United States — 2022.05 - 2022.10
Research Intern in the *Applied Mathematics and Plasma Physics Group (T-5)*
Worked with Dr. *Brendt Wohlberg* on *(a)* ptychographic image reconstruction algorithm for efficient and high-quality imaging [a3.], and *(b)* contributing on the codebase of Scientific Computational Imaging Code (SCICO).

AWARDS

- First-place Young Investigator Award in 2024 SNMMI Annual Meeting
- 2022-2023 Distinguished Reviewer of IEEE Transaction on Medical Imaging
- IEEE CAMSAP Student Paper Award finalist
- AAPM Imaging Best-in-Physics Awards

- 2021 & 2023 Honor PhD (**top 15%**), Department of Computer Science, Washington University in St. Louis
- 2019 Fall & 2020 Spring **Master's Fellowship** of Washington University in St. Louis
- 2019 Fall & 2020 Spring **Engineering School Tuition Scholarship** of Washington University in St. Louis
- 2015 & 2016 **Annual Third Prize Scholarship** of South China University of Technology

PUBLICATION

('' indicates equal contribution)*

Journal:

a1. **W. Gan**, H. Xie, C. von Gall, G. Platsch, M.T. Jurkiewicz, A. Andrade, U.C. Anazodo, U.S. Kamilov, H. An, and J. Cabello, "Pseudo-MRI-Guided PET Image Reconstruction Method Based on a Diffusion Probabilistic Model", IEEE Transactions on Radiation and Plasma Medical Sciences **(TRPMS)**, 2025.

a2. **W. Gan***, Y. Hu*, 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 and Reconstruction", **Magn. Reson. Med. (MRM)**, 2024.

a3. **W. Gan**, Q. Zhai, M. T. McCann, C. G. Cardona, U. S. Kamilov, and B. Wohlberg. "PtychoDV: Vision Transformer-Based Deep Unrolling Network for Ptychographic Image Reconstruction", **IEEE Open J. Signal Process. (OJSP)**, 2024.

a4. **W. Gan**, C. Ying, P. E. Boroojeni, 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 and Applications to MRI Reconstruction", **IEEE Trans. Comput. Imag. (TCI)**, 2023.

a5. S. Chen, C. Eldeniz, T. J. Fraum, D. R. Ludwig, **W. Gan**, J. Liu, U. S. Kamilov, D. Yang, H. Michael Gach, and H. An, "Respiratory motion management using a single rapid MRI scan for a 0.35 T MRI-Linac system", **Medical physics**, 2023.

a6. S. Chen, T. J Fraum, C. Eldeniz, J. Mhlanga, **W. Gan**, T. Vahle, U. B Krishnamurthy, D. Faul, H M. Gach, M. M Binkley, U. S. Kamilov, R. Laforest, and H. An, "MR-assisted PET respiratory motion correction using deep-learning based short-scan motion fields", **Magn. Reson. Med. (MRM)**, 2022.

a7. X. Xu, S. V. V. N. Kothapalli, J. Liu, S. Kahali, **W. Gan**, D. Yablonskiy, and U. S. Kamilov, "Learning-based Motion Artifact Removal Networks for Quantitative R2* Mapping", **Magn. Reson. Med. (MRM)**, 2022.

a8. **W. Gan**, Y. Sun, C. Eldeniz, J. Liu, H. An and U. S. Kamilov, "Deformation-compensated learning for image reconstruction without ground truth", **IEEE Transactions on Medical Imaging (TMI)**, 2022. **[impact factor=10.60]**

a9. 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. (TCI)**, 2021.

a10. **W. Gan***, C. Eldeniz*, S. Chen, T. J. Fraum, D. R. Ludwig, Y. Yan, J. Liu, T. Vahle, U. B. Krishnamurthy, U. S. Kamilov, and H. An, "Phase2Phase: Respiratory Motion-Resolved Reconstruction of Free-Breathing MRI Using Deep Learning Without a Ground Truth for Improved Liver Imaging", **Investig. Radiol.**, 2021. **[impact factor=10.06]**

a11. 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. Top. Signal Process. (JSTSP)**, 2020.

Conference:

b1. **W. Gan***, H. Gao*, Y. Hu, H. An, and U. S. Kamilov, "A Self-supervised Diffusion Bridge for MRI Reconstruction", Proc. Int. Symp. Biomedical Imaging (**ISBI**), 2025.

b2. Z. Zou, J. Liu, S. Shoushtari, Y. Wang, **W. Gan**, and U. S. Kamilov, "FLAIR: A Conditional Diffusion Framework with Applications to Face Video Restoration", Proc. IEEE Winter Conf. Appl. Comput. Vis. **(WACV)**, 2025.

b3. **W. Gan***, J. Hu*, Z. Sun, H. An, and U. S. Kamilov. "A Plug-and-Play Image Registration Network", Proc. Int. Conf. Learn. Represent. (**ICLR**), 2024. **[acceptance rate: 2250/7304=30.8%]**

b4. Y. Hu, S. V. V. N. Kothapalli, **W. Gan**, A. L. Sukstanskii, G. F. Wu, M. Goyal, D. A. Yablonskiy, and U. S. Kamilov, "DiffGEPCI: 3D MRI Synthesis from mGRE Signals using 2.5D Diffusion Model", Proc. Int. Symp. Biomedical Imaging **(ISBI)**, 2024.

b5. **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. Adv. Neural Inf. Process. Syst. **(NeurIPS)**, 2023. **[acceptance rate: 3222/12343=26.1%]**

b6. **W. Gan***, H. Gao*, Z. Sun, and U. S. Kamilov, "SINCO: A Novel structural regularizer for image compression using implicit neural representations", Proc. IEEE Int. Conf. Acoustics, Speech and Signal Process (**ICASSP**), 2023.

b7. C. Park, S. Shoustari, **W. Gan**, and U. S. Kamilov, "Convergence of Nonconvex PnP-ADMM With MMSE Denoisers", Proc. Int. Workshop on Computational Advances in Multi-Sensor Adaptive Process. (**CAMSAP**) 2023.

b8. J. Liu, X. Xu, **W. Gan**, S. Shoushtari, and U. S. Kamilov, "Online Deep Equilibrium Learning for Regularization by Denoising", Proc. Adv. Neural Inf. Process. Syst. **(NeurIPS)**, 2022.

b9. 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**), 2022.

b10. **W. Gan***, Y. Hu*, 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.

b11. **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 (**ISBI**), 2021.

b12. M. Xie, J. Liu, Y. Sun, **W. Gan**, B. Wohlberg, and U. S. Kamilov, "Joint Reconstruction and Calibration using Regularization by Denoising", Proc. IEEE Int. Conf. Comp. Vis. Workshops (**ICCVW**), 2021.

b13. 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.

b14. **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 (**Asilomar**), 2020.

Workshop and Abstract:

c1. X. Guo, V. Shah, D. Pigg, G. Platsch, X. Chen, H. Xie, **W. Gan**, C. Liu, L. Partin, and B. Spottiswoode, "Generative uptake time correction for SUV harmonization in whole-body PET", Proceeding of Annual Meeting of the **SNMMI**, 2024.

c2. H. Xie, **W. Gan**, B. Zhou, M.K. Chen, M. Kulon, A. Boustani, X. Chen, Q. Liu, X. Guo, M. Xia, Y. Zhou, H. Liu, L. Guo, H. An, U. S. Kamilov, H. Wang, B. Li, A. Rominger, K. Shi, G. Wang, R. D Badawi, and C. Liu. "Dose-aware diffusion model for 3D low-dose PET denoising: A multi-institutional validation with reader study and real low-dose data", Proceeding of Annual Meeting of the **SNMMI**, 2024.

c3. H. Xie, **W. Gan**, X. Chen, B. Zhou, Q. Liu, M. Xia, X. Guo, Y.H. Liu, H. An, U. S Kamilov, G. Wang, A. J Sinusas, and C. Liu. "Dose-aware Diffusion Model for 3D Low-count Cardiac SPECT Image Denoising with Projection-domain Consistency", IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD), 2024.

c4. C. Guo, S. Chen, W. Gan, Y. Hu, J. Liu, C. Eldeniz, Y. Chen, U. S. Kamilov, T. J Fraum, and H. An, "MOTIF-CORD: Motion Integrated Forward Model with Co-Estimated Coil Sensitivity and Regularization by Denoiser for Free Breathing Liver DCE-MRI", Proceedings of the 28th Annual Meeting of the **ISMRM**, 2024.

c5. X. Guo, V. Shah, D. Pigg, G. Platsch, X. Chen, H. Xie, W. Gan, N. C. Dvornek, C. Liu, G. Hermosillo, L. Partin, and B. Spottiswoode, "Time-Aware GAN for Uptake Time Correction and Standard Uptake Value Harmonization in Dynamic PET Imaging", GenAI for Health: Potential, Trust and Policy Compliance, 2024.

c6. M. David, Y. Yuan, A. Bacon, A. Movva, S. Shah, B. Lang, **W. Gan**, I. Berke, U. S. Kamilov, and S. Lake, "Machine Learning Approaches To Segment And Cluster Cells Of The Cartilage And Capsule In Rat Elbow Histology Sections." Osteoarthritis and Cartilage 31 (2023): S55-S56.

c7. S. Chen, C. Eldeniz, T. J. Fraum, D. Ludwig, **W. Gan**, U. S. Kamilov, D. Yang, and H. An, "Respiratory Motion Detection and Reconstruction Using CAPTURE and Deep Learning Phase2Phase Network for a 0.35 T MRI-LINAC System", Ann. Meeting American Association of Physicists in Medicine **(AAPM)**, 2022. **[Best-in-Physics Award in Imaging]**

c8. S. Chen, **W. Gan**, C. Eldeniz, U. S. Kamilov, T. J Fraum, and H. An, "DL-MOTIF: Deep Learning Based Motion Transformation Integrated Forward-Fourier Reconstruction for Free-Breathing Liver DCE-MRI", Proceedings of the 30th Annual Meeting of the **ISMRM**, 2022.

c9. P. E. Boroojeni, P. Commean, C. Eldeniz, **W. Gan**, G. Skolnick, K. Patel, U. S. Kamilov, and H. An, "Rapid high-resolution cranial bone MRI using deep-learning prior image reconstruction", Proceedings of the 30th Annual Meeting of the **ISMRM**, 2022.

c10. S. Chen, C. Eldeniz, **W. Gan**, U. S. Kamilov, T. Fraum, and H. An, "Forward-Fourier Motion-Corrected Reconstruction for Free-Breathing Liver DCE-MRI", Proceedings of the 29th Annual Meeting of the **ISMRM**, 2021.

c11. S. Chen, C. Eldeniz, **W. Gan**, U. S. Kamilov, D. Yang, M. Gach, and H. An, "Respiratory Motion Detection and Reconstruction Using CAPTURE and Deep Learning for a 0.35 T MRI-LINAC System: An Initial Study", Proceedings of the 29th Annual Meeting of the **ISMRM**, 2021.

c12. 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", Proceedings of the 28th Annual Meeting of the **ISMRM**, 2020.

c13. C. Eldeniz, **W. Gan**, S. Chen, J. Liu, U. S. Kamilov, and H. An, "Phase2Phase: Reconstruction of free-breathing MRI into multiple respiratory phases using deep learning without a ground truth", Proceedings of the 28th Annual Meeting of the **ISMRM**, 2020.

Patent:

d1. H. An, U. S. Kamilov, C. Sihao, C. Eldeniz, W. Gan, J. Liu, and T. Fraum. "Free breathing dynamic contrast enhanced (DCE) liver MR imaging". US Patent App. 18/176,876, 2024.

d2. H. An, U. S. Kamilov, **W. Gan**, C. Eldeniz, and J. Liu. "Systems and Methods of Reconstructing Magnetic Resonance Images using Deep Learning," US Patent 12,000,918, 2024.

d3. U. S. Kamilov, H. An, Y. Hu, J. Liu, C. Eldeniz, **W. Gan**, and Y. Chen. "Self-supervised joint image reconstruction and coil sensitivity calibration in parallel mri without ground truth." US. Patent App. 17/968,541, 2023

d4. H. An, U. S. Kamilov, P. E. Boroojeni, **W. Gan**, J. Liu, and Y. Hu. "Self-supervised deep learning reconstruction with weighted training loss." US Patent App. 18/483,258, 2024.

Preprinted:

e1. H. Xie, **W. Gan**, B. Zhou, M.-K. Chen, M. Kulon, A. Boustani, B. A. Spencer, R. Bayerlein, W. Ji, X. Chen, Q. Liu, X. Guo, M. Xia, Y. Zhou, H. Liu, L. Guo, H. An, U. S. Kamilov, H. Wang, B. Li, A. Rominger, K. Shi, G. Wang, R. D Badawi, and C. Liu. "Dose-aware Diffusion Model for 3D Low-dose PET: Multi-institutional Validation with Reader Study and Real Low-dose Data", [arXiv:2405.12996].

e2. H. Xie, **W. Gan**, W. Ji, X. Chen, A. Alashi, S. L Thorn, B. Zhou, Q. Liu, M. Xia, X. Guo, Y.H. Liu, H. An, U. S Kamilov, G. Wang, A. J Sinusas, and C. Liu, "A Generalizable 3D Diffusion Framework for Low-Dose and Few-View Cardiac SPECT", [arXiv:2412.16573].

e3. 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].

e4. 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].

e5. **W. Gan***, H. Xie*, B. Zhou, X. Chen, Q. Liu, X. Guo, L. Guo, H. An, U. S. Kamilov, G. Wang, and C. Liu. "Dose-aware Diffusion Model for 3D Ultra Low-dose PET Imaging", [arXiv:2311.04248].

e6. **W. Gan***, C. Park*, Z. Zou, Y. Hu, Z. Sun, and U. S. Kamilov, "A Structured Pruning Algorithm for Model-based Deep Learning", [arXiv:2311.02003].

e7. X. Xu, **W. Gan**, S. V.V.N. Kothapalli, D. A. Yablonskiy, and U. S. Kamilov, "CoRRECT: A Deep Unfolding Framework for Motion-Corrected Quantitative R2* Mapping", [arXiv: 2210.06330].

PRESENTATION & TALK

p1. "Learning under Inexact Data and Model for Computational Imaging", Grundfest Memorial Lecture Series in Graphics and Imaging, May 2024, Online.

p2. "SINCO: A Novel structural regularizer for image compression using implicit neural representations", Asilomar 2023, Pacific Grove, CA, USA.

p3. "Deep Learning Method for Accelerated Magnetic Resonance Imaging (MRI) without Groundtruth", WashU Imaging Sciences Pathway (ISP) Retreats 2021, Virtual.

p4. "Deep Image Reconstruction using Unregistered Measurements without Groundtruth", Proc. Int. Symp. Biomedical Imaging (ISBI), 2021, Virtual.

p5. "Image reconstruction for MRI using deep CNN priors trained without ground truth", Proc. 54th Asilomar Conf. Signals, Systems, & Computers (Asilomar), 2020, Virtual.

PROFESSIONAL SERVICES

Professional societies:

- IEEE Student Member and IEEE Signal Processing Society Student Member (2020 - present).
- The International Society for Magnetic Resonance in Medicine (ISMRM), Graduate Trainee (2020 - present).

Journal Reviewer:

- IEEE Transaction on Medical Imaging (**TMI**)
- IEEE Transaction on Computational Imaging (**TCI**)
- IEEE Transaction on Image Processing (**TIP**)
- IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**)
- IEEE Transactions on Radiation and Plasma Medical Sciences (**TRPMS**)
- BMC Medical Imaging
- Scientific Report
- Visual Computer
- Journal of Mathematical Imaging and Vision

Conference Reviewer/PC:

- International Conference on Learning Representations (**ICLR**) 2024/2025
- Conference on Neural Information Processing Systems **(NeurIPS)**) 2023
- IEEE CVF Computer Vision and Pattern Recognition Conference (**CVPR**) 2023/2024/2025
- European Conference on Computer Vision (**ECCV**) 2024
- Asian Conference on Computer Vision (**ACCV**) 2024
- IEEE CVF International Conference on Computer Vision (**ICCV**) 2023
- IEEE CVF International Conference on Computer Vision Workshop (**ICCVW**) 2021

- IEEE International Symposium on Biomedical Imaging (**ISBI**) 2021/2022/2023/2024/2025
- IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**) 2022/2023/2024/2025
- International Conference on Machine Learning (**ICML**) 2022
- IEEE International Conference on Image Processing (**ICIP**) 2022/2023/2024
- International Symposium on Computational Sensing (**ISCS**) 2023

TEACHING SERVICE

As Course Teaching Assistant:

- ESE 415 Optimization, WashU. 2021 Spring & 2022 Spring & 2023 Spring
- ESE 513/CSE 534A Large-Scale Optimization for Data Science, WashU. 2021 Fall & 2022 Fall & 2023 Fall

STUDENT SUPERVISION

Co-advised with Prof. Ulugbek Kamilov:

- Yuan, Yangpeng (B.S. student, now at Duke), achievement: [c6.].
- Hu, Yuyang (M.S. student, now Ph.D. at WashU), achievement: [a2., b10., d3.].
- Ian, Hudson (M.S. student, now at Microsoft)
- James, H. Tillman (B.S. student)
- Huang, Nan (M.S. student)
- Jing, Dian (M.S. student)
- Siu, Vincent (B.S. student, now Ph.D. at WashU)
- Harry, Gao (B.S. student), achievement: [b6., b1.].
- Park, Chicago (B.S. student), achievement: [e6.].
- Hu, Junhao (M.S. student, now Ph.D. at WashU), achievement: [b3.].
- Wang, David (B.S. student)
- Li, Anqi (M.S. student)
- Tan, Yusheng (M.S. student)
- Zhang, Haoyu (M.S. student)