

Nian Wu

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Summary

My research interests lie in **Computer Vision, Medical Image Analysis, and Generative AI**. I focus on developing time-efficient and robust machine learning algorithms for image registration, motion tracking, medical imaging synthesis, and atlas construction, with applications in cardiovascular imaging and neuroimaging. My research has been published in leading venues, including MICCAI, IPMI, ISBI, and the Machine Learning for Biomedical Imaging (MELBA) journal.

Education

Ph.D. in Computer Engineering	University of Virginia Virginia, USA	08/2023-05/2028
M.S. in Computer Technology	East China Normal University Shanghai, China	09/2020-07/2023

Publications

- [1] **Wu, N.**, Jayakumar N, Xing J., Zhang M.. *Geodesic-informed Generative Diffusion Model for Topology-preserved Image Video Generation. The Journal of Machine Learning for Biomedical Imaging, MELBA (Under Review)*.
- [2] **Wu, N.** and Zhang M.. *DeepLDDMM: Learning-Based Large Deformation Metric Mappings with Geodesic Constraint. IEEE International Symposium on Imaging, ISBI2026 (Under Review)*.
- [3] Deb, S., **Wu N.**, Epstein F.H., Zhang M.. *Unsupervised Cardiac Video Translation Via Motion Feature Guided Diffusion Model. 28th International Conference on Image Computing and Computer Assisted Intervention, MICCAI2025 (Oral)*.
- [4] **Wu, N.** and Zhang, M., *Learning Geodesics of Geometric Shape Deformations from Images. The Journal of Machine Learning for Biomedical Imaging, MELBA (Accepted, 2026)*.
- [5] **Wu, N.**, Jayakumar N, Xing J., Zhang M.. *IGG: Image Generation Informed by Geodesic Dynamics in Deformation Spaces. International Conference on Information Processing and Image Analysis, IPMI2025 (Oral)*.
- [6] **Wu, N.**, Xing J., and Zhang M.. *TLRN: Temporal Latent Residual Networks for Large Deformation Image Registration. 27th International Conference on Image Computing and Computer Assisted Intervention, MICCAI2024 (Accepted)*.
- [7] Xing J.R., Jayakumar N, **Wu N.**, Bilchickd K., Epstein F. and Zhang M. *LaMoD: Latent Motion Diffusion Model for Myocardial Strain Generation. International Workshop on Shape in Medical Imaging, ShapeMI 2024 (Accepted)*.
- [8] Xing J.R., **Wu N.**, Bilchickd K., Epstein F. and Zhang M. *Multimodal Learning to Improve Cardiac Late Mechanical Activation Detection from Cine MR Images. IEEE International Symposium on Imaging, ISBI2024 (Oral)*.
- [9] **Wu, N.** and Zhang, M.. *NeurEPDiff: Neural Networks to Predict Geodesics in Deformable Spaces. International Conference on Information Processing and Image Analysis, IPMI2023 (Oral)*.
- [10] **Wu, N.**, Wang, J., Zhang, M., Zhang, G. X., Peng, Y. X., and Shen, C. M. *Hybrid Atlas Building with Deep Registration Priors. IEEE International Symposium on Image Processing, ISBI2022 (Accepted)*.
- [11] Chinese Patent: A method of building atlases using deep learning priors. Application Number: 202310056827.3

Research Experience

Department of Computer Engineering, University of Virginia,	Charlottesville, VA, USA
Graduate Research Assistant, Advisor, Prof. Miaomiao Zhang	08/2023-present

- IGG: Image Generation Informed by Geodesic Dynamics in Deformation Spaces
- Temporal Latent Residual Networks for Large Deformation Image Registration
- *Learning Geodesics of Geometric Shape Deformations from Images*
- NeurEPDiff: Neural Networks to Predict Geodesics in Deformable Spaces

- Acceleration of MR imaging with deep learning algorithms, aims at shortening MRI scanning time by reconstructing clear MR images from undersampled k-space data.
- Navigation System for Orthopedic Surgery with machine learning algorithms, which is deployed on a surgical robot to assist the preoperative analysis and diagnosis for hip replacement surgery.
- Building atlases using deep learning priors with dramatic reduced time consumption.

Skills

Programming: Python, C/C++, JavaScript, CSS, and HTML, and have experience in MATLAB, CMake, Git, Scripting (Bash), LaTeX

Software: Pytorch, Linux, 3d Slicer

Honors

2023	Academic Services awarded by UVA	USA
2022	Scholarship of STEM Cloud Center awarded by ECNU	China
2022	Outstanding Student awarded by ECNU	China
2022	"Fen Zhong" Scholarship awarded by ECNU	China
2020	Academic Scholarship awarded by Ministry of Education	China

Other Experience

Teaching Assistant 11/2021

Prof. Miaomiao Zhang (UVA) in the seminar: VIRTUAL and FREE Winter School in "AI in Image Registration"

Invited presentation 12/2021

Youth Seminar on Mathematical Theory and Methods in Image Processing

Seminar Organizer 09/2020-07/2023

The regular seminars for research group, ECNU

Teaching Assistant Spring 2021

Mathematical Analysis, ECNU

Web Developer 07/2017-06/2019

Sinosafe General Insurance Co. Ltd, Shenzhen, China

Create web pages or applications that facilitate online insurance purchases for people.