Ziquan Wei

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Research Interests: Brain Foundation Model; Graph Representation Learning; Medical Image Analysis

Education

2023–28* **Ph.D.**, Computer Science, University of North Carolina at Chapel Hill (Advisor: Dr. Guorong Wu)

2019-22 **M.Sc.**, Biomedical Engineering, Huazhong University of Science and Technology (Advisor: Prof. Shaoqun Zeng)

2015-19 **B.Sc.**, Computer Science, Yunnan Normal University (Advisor: Prof. Yang Yang)

Research Experience

2023– Research Assistant & Linux System Admin, ACM Lab, UNC Chapel Hill

Publications

Google Scholar
† → Equal contribution

Journal

[J1] J. Ding, T. Dan, **Ziquan Wei**, P. J. Laurienti, and G. Wu, "Scanning the horizon of replicability in neuroscience: A recipe of developing replicable deep models for functional neuroimages," *IEEE transactions on bio-medical engineering*, vol. 73, no. 1, pp. 281–292, 2026,
– IF 4.5.

[J2] **Ziquan Wei** and G. Wu, "Teravoxel microscopy image analysis for neurological diseases," *Annual Review of Biomedical Engineering*, Just accepted, 2026,
– IF 9.6.

[J3] H. Cho, **Ziquan Wei**, S. Lee, T. Dan, G. Wu, and W. H. Kim, "Conditional diffusion model using ordinal regression for longitudinal neurodegenerative data generation," *Alzheimer's Dementia*, vol. 21, no. S1, e096933, Dec. 2025,
– IF 11.1.

[J4] **Ziquan Wei**, T. Dan, J. Ding, P. J. Laurienti, and G. Wu, "NeuroDetour: A neural pathway transformer for uncovering structural-functional coupling mechanisms in human connectome," *Medical Image Analysis*, Just accepted, 2025,
– IF 11.8.

*Expected.

[J5] **Ziquan Wei**, T. Dan, J. Ding, and G. Wu, "Efficient graph representation learning by non-local information exchange," *Electronics*, vol. 14, no. 5, p. 1047, 2025,
– IF 2.6.

[J6] Y. Wu, Y. Liu, Y. Li, **Ziquan Wei**, S. Xing, Y. Wang, D. Zhu, Z. Guo, A. Zhang, G. Yuan, Z. Zhang, K. Huang, Y. Wang, G. Wu, K. Cheng, and W. Bai, "Symmetry engineering in 2d bioelectronics facilitating augmented biosensing interfaces," *Proceedings of the National Academy of Sciences*, vol. 121, no. 48, e2412684121, 2024,
– IF 9.1.

[J7] S. Cheng, S. Liu, J. Yu, G. Rao, Y. Xiao, W. Han, W. Zhu, X. Lv, N. Li, J. Cai, *et al.*, "Robust whole slide image analysis for cervical cancer screening using deep learning," *Nature communications*, vol. 12, no. 1, p. 5639, 2021,
– IF 15.7.

[J8] Z. Yang, Y. Yang, K. Yang, and **Ziquan Wei**, "Non-rigid image registration with dynamic gaussian component density and space curvature preservation," *IEEE Transactions on Image Processing*, vol. 28, no. 5, pp. 2584–2598, 2018,
– IF 13.7.

[J9] S. Zhang, K. Yang, Y. Yang, Y. Luo, and **Ziquan Wei**, "Non-rigid point set registration using dual-feature finite mixture model and global-local structural preservation," *Pattern Recognition*, vol. 80, pp. 183–195, 2018,
– IF 7.6.

[J10] **Ziquan Wei**, Y. Han, M. Li, K. Yang, Y. Yang, Y. Luo, and S.-H. Ong, "A small uav based multi-temporal image registration for dynamic agricultural terrace monitoring," *Remote Sensing*, vol. 9, no. 9, p. 904, 2017,
– IF 4.1.

Conference

[C1] **Ziquan Wei**, T. Dan, and G. Wu, "Large connectome model: An fmri foundation model of brain connectomes empowered by brain-environment interaction in multitask learning landscape," in *Proceedings of the AAAI Conference on Artificial Intelligence*, AAAI, 2026.

[C2] H. Cho, **Ziquan Wei**, S. Lee, T. Dan, G. Wu, and W. H. Kim, "Conditional diffusion with ordinal regression: Longitudinal data generation for neurodegenerative disease studies," in *The Thirteenth International Conference on Learning Representations*, ICLR, 2025,
– Spotlight poster (3.26%).

[C3] **Ziquan Wei**, T. Dan, T. Chen, and G. Wu, "BrainMoE: Cognition joint embedding via mixture-of-expert towards robust brain foundation model," in *The Thirty-ninth Annual Conference on Neural Information Processing Systems*, NeurIPS, 2025.

[C4] **Ziquan Wei**, T. Dan, and G. Wu, "Brain-environment cross-attention (BECA) meta-matching: A new perspective of brain connectome zero-shot learning," in *International Conference on Medical Image Computing and Computer-Assisted Intervention*, Springer Nature Switzerland, MICCAI, 2025, pp. 140–149,
– Early accept (9%).

[C5] T. Dan, **Ziquan Wei**, W. H. Kim, and G. Wu, "Exploring the enigma of neural dynamics through a scattering-transform mixer landscape for riemannian manifold," in *Forty-first International Conference on Machine Learning*, ICML, 2024.

[C6] J. Ding, T. Dan, **Ziquan Wei**, P. Laurienti, and G. Wu, " A Wasserstein Recipe for Replicable Machine Learning on Functional Neuroimages," in *proceedings of Medical Image Computing and Computer Assisted Intervention*, Springer Nature Switzerland, MICCAI, 2024, pp. 3–13.

[C7] **Ziquan Wei**, T. Dan, J. Ding, P. Laurienti, and G. Wu, "Representing functional connectivity with structural detour: A new perspective to decipher structure-function coupling mechanism," in *proceedings of Medical Image Computing and Computer Assisted Intervention*, Springer Nature Switzerland, MICCAI, 2024, pp. 367–377.

[C8] **Ziquan Wei**, T. Dan, J. Ding, and G. Wu, "NeuroPath: A neural pathway transformer for joining the dots of human connectomes," in *The Thirty-eighth Annual Conference on Neural Information Processing Systems*, NeurIPS, 2024, pp. 67 826–67 849.

[C9] **Ziquan Wei** and G. Wu, "Non-local exchange: Introduce non-locality via graph re-wiring to graph neural networks," in *NeurIPS 2024 Workshop on Behavioral Machine Learning*, NeurIPSW, 2024.

[C10] T. Dan, J. Ding, **Ziquan Wei**, S. Kovalsky, M. Kim, W. H. Kim, and G. Wu, "Re-think and re-design graph neural networks in spaces of continuous graph diffusion functionals," in *Advances in Neural Information Processing Systems*, vol. 36, NeurIPS, 2023, pp. 59 375–59 387.

[C11] **Ziquan Wei**, T. Dan, J. Ding, M. Dere, and G. Wu, "A general stitching solution for whole-brain 3d nuclei instance segmentation from microscopy images," in *International Conference on Medical Image Computing and Computer-Assisted Intervention*, Springer Nature Switzerland Cham, MICCAI, 2023, pp. 46–55,
– Early accept (14%).

[C12] **Ziquan Wei**, T. Dan, J. Ding, C. McCormick, F. A. Kyere, M. Kim, D. Borland, J. L. Stein, and G. Wu, "High throughput deep model of 3d nucleus instance segmentation by stereo stitching contextual gaps," in *2023 IEEE 20th International Symposium on Biomedical Imaging*, IEEE, ISBI, 2023, pp. 1–5.

[C13] S. Zhang†, Y. Ding†, **Ziquan Wei**†, and C. Guan, "Continuous emotion recognition with audio-visual leader-follower attentive fusion," in *Proceedings of the IEEE/CVF International Conference on Computer Vision Workshops*, ICCVW, 2021, pp. 3567–3574.

Non-peer-reviewed

[W1] **Ziquan Wei**, S. Cheng, J. Cai, S. Zeng, X. Liu, and Z. Wang, *Cervical glandular cell detection from whole slide image with out-of-distribution data*, arXiv preprint arXiv:2205.14625, 2022.

[W2] **Ziquan Wei**, S. Cheng, J. Hu, L. Chen, S. Zeng, and X. Liu, *An efficient cervical whole slide image analysis framework based on multi-scale semantic and location deep features*, arXiv preprint arXiv:2106.15113, 2021.

Awards & Honors

2024 UNC graduate school transportation grant ($3,000)
2022 Huazhong University of Science and Technology (HUST) outstanding graduation

2019 Yunnan Normal University (YNNU) outstanding graduation

Media Coverage

2024 UNC Applied Physics Science News, New Material Could Change the Way Electronic Devices Interface with Living Tissues. [J6]

Academic Service

Editorial Board

2025 Scientific Reports

Reviewer

Journal Pattern Recognition, IEEE Transactions on Medical Imaging, NeuroImage
Conference MICCAI 2023, MICCAI 2024, NeurIPS 2024, NeurIPS 2025, AISTATS 2024, ICLR 2025, ICML 2025, AAAI 2026

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