Ziquan Wei

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Objective

Seeking a position in fundamental AI and cognition modeling to leverage my expertise in building large-scale models, brain modeling, efficient microscopy image analysis, and multi-modal AI.

Experience

- **University of North Carolina at Chapel Hill [🌐]** *Sept 2022 - Current*
  Research Assistant & System Admin Chapel Hill, USA
  - (NeurIPS '25, MICCAI '25, AAAI '26) Brain Foundation Models: Architected **BrainMoE**, proposing **cognition joint embedding**. Developed **Large Connectome Model 1.2B**, proposing a multitask supervised pretraining landscape to interpret **brain-environment interactions**.
  - (NeurIPS '24, MICCAI '24, MedIA '26) Detour Pathway Transformers: Discovered **detour structure** in brain network, leading to a novel **Graph Transformer** to uncover structural-functional coupling in human connectomes.
  - (MICCAI '23, ARBME '26) 3D Medical Vision: Engineered a high-throughput deep learning pipeline for 3D neulcei **instance segmentation in teravoxel microscopy images**.
  - HPC Administration: Administrator for a **10-node** computing cluster. Manage **16 GPUs** and over **2PB** of storage.
- **Nanyang Technological University [🌐]** *Jun 2021 – Sep 2021*
  Intern Remote
  - (ICCVW '21) Multimodal AI: Successfully **integrated audio, visual and EEG** streams to improve recognition accuracy of **human driver's emotion** in dynamic environments.
- **Huazhong University of Science and Technology [🌐]** *Sept 2019 – June 2021*
  Research Assistant Wuhan China
  - (arXiv) Cell Detect: Increased the efficiency of **YOLOv3** for **abnormal cell detection in gigapixel microscopy**.
- **Yunnan Normal University [🌐]** *Sep 2016 – Jun 2019*
  Research Assistant Kunming, China
  - (RS '17, IEEE TIP '18) Image Registration: Conducted research on **multi-view** image registration for remote sensing applications using a new **EM algorithm** based on **spatial curvature** measurements.

Education

- **University of North Carolina at Chapel Hill, USA** — ***PhD in Computer Science***, *Aug 2023 - May 2028*
- **Huazhong University of Science and Technology, China** — ***Master in Biomedical Engineering***, *Sept 2019 - June 2022*
- **Yunnan Normal University, China** — ***Bachelor in Computer Science***, *Sept 2015 - June 2019*

Projects

- **CyberNeuro: Auto Statistics for Tabular Data + Auto QC for brain MRI Pre-processing** *Jan 2026 - Current*
  Tools: [Ollama, FastMCP, TypeScript, Vite, Agent-to-agent, Agent tool calling] [, Kaggle Writeup]
  - **Lead** the project. Creat tasks for the team and review the project development.
  - Created backend infrastructure of **MCP, Agent-to-Agent, tool visualization**, and robust agent **tool calling** for an interactive workflow.
- **CellPheno: Segmenting and Classifying Cellular Resolution Teravoxel Microscopy Images** *Feb 2023 - Feb 2026*
  Tools: [C++, Python, Nifti, Unet, GNN] [, *Science* Submission]
  - Study design to have **error resistance** and **teravoxel whole-brain visualization** in analysis of a large cohort (n=118).
  - Handled computations, e.g., **segmentation, cell classification, visualization**, for cellular LSFM analysis.

Selected Publications

Full list see [Scholar]. C=Conference J=Journal *=In Submission †=Co-first author

C1. **[ICML '26]*** ZW, et al. **Marrying Generative Model of Healthcare Events with Digital Twin of Human-Environment Interaction for Disease Reasoning**.

J1. **[Science '26]*** FAK†, IC†, ZW†, et al. **Chd8 haploinsufficiency leads to molecular layer heterotopias and agedependent cortical...** (IF=45.8)

J2. **[MedIA '26]** ZW, et al. **NeuroDetour: A Neural Pathway Transformer for Uncovering Structural-Functional Coupling...** (IF=11.8).

J3. **[ARBME '26]** ZW, et al. **Teravoxel Microscopy Image Analysis for Neurological Diseases**. (IF=9.6).

C2. **[AAAI '26]** ZW, et al. **Large Connectome Model: An fMRI Foundation Model of Brain Connectomes Empowered by Brain-Environment...**

C3. **[NeurIPS '25]** ZW, et al. **BrainMoE: Cognition Joint Embedding via Mixture-of-Expert Towards Robust Brain Foundation Model**.

C4. **[NeurIPS '24]** ZW, et al. **NeuroPath: A Neural Pathway Transformer for Joining the Dots of Human Connectomes**.

C5. **[MICCAI '23]** ZW, et al. **A General Stitching Solution for Whole-Brain 3D Nuclei Instance Segmentation from Microscopy....** (EA, 14%)

C6. **[ICCVW '21]** SZ†, YD†, ZW†, et al. **Continuous emotion recognition with audio-visual leader-follower attentive fusion**.

J4. **[TIP '18]** YZ, et al., ZW. **Non-rigid image registration with dynamic Gaussian component density and space curvature...** (IF=13.7)

J5. **[RS '17]** ZW, et al. **A small UAV based multi-temporal image registration for dynamic agricultural terrace monitoring**. (IF=4.1)