

Zhenbang Zhang

Mohamed bin Zayed University of Artificial Intelligence (MBZUAI)

Abu Dhabi, UAE

zhangzhenbang2021@gmail.com | Zhenbang.Zhang@mbzuai.ac.ae

+971 558899361 | +86 15753409021 | [Google Scholar](#) | [Personal Website](#)

Education

Mohamed bin Zayed University of Artificial Intelligence (MBZUAI)

Sept. 2025 – Present

M.Sc. in Machine Learning, GPA: 3.73/4.00

Abu Dhabi, UAE

Shandong University

Sept. 2021 – June 2025

B.S. in Computer Science, GPA: 3.52/4.00

Qingdao, China

Research Interests

My current research interest is to transform 2D vision foundation models into language-controllable spatial intelligence systems grounded in 3D/4D worlds. My previous work has focused on reconstructing coherent 3D structures from noisy or degraded observations and generating temporally consistent visual content. I hope to extend these experiences toward **language-grounded 3D/4D world representations**, especially the next step from **semantic querying** to **action-aware world modeling**.

In particular, I am interested in studying whether 3D/4D Gaussian language fields can encode not only objects, parts, and states, but also **affordances**, **contact regions**, **action preconditions**, and **action-conditioned state transitions**. My long-term goal is to build representation layers that can support future vision-language-action systems by improving their 3D spatial grounding, interaction reasoning, and physical world understanding.

Selected Publications

- **Zhang, Z.[†]**, Cui, Z.[†], El-Messiry, H., Han, R., & Xu, Z. (2026). Motion-Residual Conflict-Aware Time Reversal for Generative Inbetweening. In *Proceedings of the Forty-Third International Conference on Machine Learning* (accepted).
- **Zhang, Z.[†]**, Li, H.[†], Yang, Z., Xu, Z., Sun, D., Gao, X., Zhang, F., & Han, R. (2026). vEMRec: High-resolution volume electron microscopy reconstruction based on structure-preserving and high-fidelity 3D alignment. *Advanced Science*.
- **Zhang, Z.[†]**, Feng, J.[†], Li, H., El-Messiry, H., Xu, Z., & Han, R. (2026). 3D Registration-Guided Deformable Residual Inpainting for ssEM Restoration. *Bioinformatics* (accepted).
- **Zhang, Z.[†]**, Feng, J.[†], Li, H., El-Messiry, H., Xu, Z., & Han, R. (2025). Unsupervised trajectory optimization for 3D registration in serial section electron microscopy using Neural ODEs. In *The Thirty-Ninth Annual Conference on Neural Information Processing Systems*.
- **Zhang, Z.[†]**, Li, H.[†], Xu, Z., Meng, W., & Han, R. (2025). A Gaussian filter-based 3D registration method for serial section electron microscopy. In *Proceedings of the AAAI Conference on Artificial Intelligence* (Vol. 39, No. 1, pp. 1156–1164).
- He, B.[†], Zhang, Y.[†], **Zhang, Z.[†]**, Cheng, Y., Zhang, F., Sun, F., & Han, R. (2024). vEMstitch: An algorithm for fully automatic image stitching of volume electron microscopy. *GigaScience*, 13, giae076.

[†] Equal contribution.

Research Experience

Research Assistant

MBZUAI, Advisor: Prof. Zhiqiang Xu

Oct. 2025 – Present

Abu Dhabi, UAE

- Conduct research on **diffusion-based generative modeling** for temporally consistent video inbetweening, focusing on motion-residual conflicts, temporal coherence, and structure-preserving generation; resulting in a **first-author paper accepted to ICML 2026**.
- Lead research on **3D reconstruction and restoration** for volume electron microscopy, recovering coherent volumetric structures from noisy, anisotropic, and degraded observations; resulting in a **first-author paper accepted to Bioinformatics (CCF-A)**.

Research Intern

Mathematics and Interdisciplinary Science Center, Shandong University, Advisor:
Prof. Renmin Han

Jul. 2023 – Oct. 2025

Qingdao, China

- Developed a Gaussian filter-based **3D registration** method for serial-section EM alignment, reformulating alignment beyond conventional pairwise registration and achieving **about 30% improvement in accuracy**; resulting in a **first-author paper at AAAI 2025**.
- Proposed an unsupervised trajectory-optimization framework based on **Neural ODEs**, modeling serial-section EM alignment as continuous trajectory optimization to improve cross-section structural consistency; resulting in a **first-author paper at NeurIPS 2025**.
- Developed ***vEMRec***, an end-to-end high-fidelity 3D alignment pipeline for volume electron microscopy, and validated it on six real-world datasets exceeding **1 TB**; improving 3D structural recovery, volumetric consistency, and processing efficiency for connectome-scale reconstruction; resulting in a **first-author paper in Advanced Science**.

Teaching Experience

Teaching Assistant, Course: Linear Algebra

Shandong University

2023 – 2024

Qingdao, China

- Supported undergraduate instruction in linear algebra through problem-solving sessions, office hours, and assignment grading.
- Strengthened scientific communication and mentoring skills through one-on-one support.

Skills

Programming: Python, C++, C, MATLAB, LaTeX

Research Tools: PyTorch, diffusion models, 3D image reconstruction, image registration, large-scale volumetric data processing

Languages: Chinese (Native), English (IELTS: 6.5)