

Ziwei Xue

Ph.D student in Bioinformatics
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EDUCATION

Zhejiang University-University of Edinburgh Institute (ZJE), Haining, Zhejiang, China

- B.S. in Dual-Award Bachelor of Science (Honors) Programme Sep 2017 – Jun 2021
 - **Specialization:** Biomedical Science
 - First-Class Honours Degree
- Ph.D. candidate in Dual Award PhD Programme Sep 2021 – Present
 - **Specialization:** Bioinformatics
 - **Thesis:** Integrative Analysis of Large-scale Immunomics Data
 - **Supervisor:** Dr. Wanlu Liu

RESEARCH INTERESTS

I am interested in multi-omics data analysis, focusing on developing machine-learning and deep-learning methods to gain deeper insights into the **phenotypic diversity of immune cells in cancer and autoimmune diseases**.

My work centers on developing artificial intelligence-based approaches for integrating multi-modal next-generation sequencing datasets encompassing **genomics, transcriptomics, metabolomics, and immunomics** at **bulk, single-cell, and spatial resolutions**, with the goal of elucidating immune system dynamics under diverse disease conditions.

PUBLICATIONS

Highlight publications, *first or co-first authors \square corresponding authors

- [1] **Xue, Z.***, Wu, L.*., Tian, R., Gao, B., Zhao, Y., Bing, H., Zhao, B., Li, Y., Zhu, K., Wang, L., Yao, J. \square , Liu, W. \square & Lu, L. \square Integrative mapping of human CD8+ T cells in inflammation and cancer. *Nature Methods* **22**, 435–445. (2025)
- [2] **Xue, Z.** scAtlasVAE: A deep learning framework for generating a human CD8+ T cell atlas. *Nature Reviews Cancer* **25**, 319. (2025)
- [3] **Xue, Z.***, Wu, L.*., Gao, B.*., Tian, R., Chen, Y., Qi, Y., Dong, T., Bai, Y., Zhao, Y., He, B., Wang, L., Liu, Z., Yao, H., Lu, L., Liu, W. \square A pan-disease and population-level single-cell TCR $\alpha\beta$ repertoire reference. *Cell Discovery* **11**, 82. (2025)
- [4] Tian, R.*., **Xue, Z.***, Chen, Y., Qi, Y., Zhang, J., Yuan, J., Ruan, D., Lin, J., Liu, J., Wang, D., Ye, Y., Liu, W. \square Integrating Cross-Sample and Cross-Modal Data for Spatial Transcriptomics and Metabolomics with SpatialMETA. *Nature Communications*, **16**, 8855. (2025)
- [5] Wu, L.*., **Xue, Z.***, Jin, S., Zhang, J., Bai, Y., Jin, X., Wang, C., Wang, L., Wang, J.Q., Lu, L. & Liu, W. \square huARdb: human Antigen Receptor database for interactive clonotype-transcriptome analysis at the single-cell level. *Nucleic Acid Research* **50**, D1244-D1254. (2022)
- [6] Tian, R.*., **Xue, Z.***, Ruan, D., Chen, P., Xu, Y., Dai, C., Shen, W., Ouyang, H., Liu, W., & Lin, J. \square MSdb: An integrated expression atlas of human musculoskeletal system. *iScience*, **26**, 106933. (2023)

All Peer-reviewed publications, *first or co-first authors \square corresponding authors

- [7] Tian, R.*., Yu, Z.*., **Xue, Z.**, Wu, J., Wu, L., Cai, S., Gao, B., He, B., Zhao, Y., Yao, J., Lu, L & Liu, W. \square Evaluatuiton of T Cell Receptor Construction Methods from scRNA-Seq Data. *Genomics, Proteomics & Bioinformatics*. (2024)
- [8] Guo, Y.*., **Xue, Z.**, Gong, M., Jin, S., Wu, X. & Liu, W. \square CRISPR-TE: a web-based tool to generate single guide RNAs targeting transposable elements. *Mobile DNA* **15**, 3. (2024)
- [9] Su, Y.*., Yu, Z., Jin, S., Ai, Z., Yuan, R., Chen, X., **Xue, Z.**, Guo, Y., Chen, D., Liang, H., Liu, Z. & Liu, W. \square Comprehensive assessment of mRNA isoform detection methods for long-read sequencing data. *Nature Communications* **15**, 3972. (2024)
- [10] Li, Z.*., Xu, H.*., Li, J.*., Xu, X.*., Wang, J., Wu, D., Zhang, J., Liu, J., **Xue, Z.**, Zhan, G., Tan, B.C.P., Chen, D., Chan, Y-S., Ng, H.H., Liu, W., Hsu, C-H., Zhang, D., Shen, Y. & Liang, H. \square Selective binding of retrotransposons by ZFP352 facilitates the timely dissolution of totipotency network. *Nature Communications*. **14**, 3646. (2023)

- [11] Xiang, X.*, Tao, Y.*, DiRusso, J., Hsu, F.M., Zhang, J., **Xue, Z.**, Pontis, J., Trono, D., Liu, W.✉ & Clark, A.✉, Human reproduction is regulated by retrotransposons derived from ancient Hominidae-specific viral infections, *Nature Communications*, **13**, 463. (2022)
- [12] Jin, S.*, **Xue, Z.***, Zhang, J., Wang, Z., Zhang, J., Chen, D.*; Liu, W.✉, & Lin, J.✉ Identification of SRSF3 target mRNAs using inducible TRIBE. *Biochemical and Biophysical Research Communications* **578**, 21-27. (2021)
- [13] Guo, Y.*, **Xue, Z.**, Yuan, R., Li, J., Pastor, W. & Liu, W.✉ RAD: a web application to identify region associated differentially expressed genes. *Bioinformatics* **37**, 2741-2743. (2021)

PATENTS & COPYRIGHTS

▪ Patents

- Lu, L., Liu, W., Wu, L., **Xue, Z.** Single-cell visualization methods based on single-cell immune profiling data (ZL202111026323.4, Valid authorization)
- Liu, W., Lu, L., **Xue, Z.**, Wu, L. Data processing methods, Equipment, devices and calculations Machine readable storage media (202310802339.2, Pending)

▪ Copyrights of computer software

- Wu, L., **Xue, Z.**, Liu, W. & Lu, L. A large-scale single-cell transcriptome cross-atlas integration deep learning software based on variational neural networks (2025SR1043543)
- Lin, J., Tian, R., **Xue, Z.**, Ruan, D., Liu, W. A analysis and visualization software for muscleskeletal multi-modality data (2023SR1142549)
- **Xue, Z.**, Wu, L., Liu, W. & Lu, L. A visualization software for single-cell immune profiling data (2022SR0296997)
- Guo, Y., **Xue, Z.**, Liu, W. RAD: a web application to identify region associated differentially expressed genes (2021SR1099956)

AWARDS & SCHOLARSHIPS

- **Chu Kochen Scholarship of Zhejiang University (0.03%) (竺可桢奖学金)** 2025
- **National Scholarship of China (0.2%) (国家奖学金)** 2025
- **Qiu Shi Rising Star Ph.D. student Scholarship of Zhejiang University (求是新星计划)** 2024

CONFERENCES & PRESENTATIONS

- **14th National Conference on Bioinformatics and Systems Biology** Oct 2025
 - **Oral presentation:** AI-Driven Integration of Single-Cell Immunomics Reveals T Cell Phenotypic Plasticity and TCR Diversity
- **Annual Meeting of American Association of Immunology (AAAI)** May 2025
 - **Poster:** Unified integration of pan-cancer single-cell and spatial transcriptomics
- **Human Cell Atlas Asia Meeting** Dec 2024
 - **Poster:** Integrative Mapping of Human CD8+ T Cell in Inflammation and Cancer
 - **Poster:** A pan-disease and population-level single-cell TCR β repertoire reference atlas
- **The 1st ZiJuan Youth Scholars Forum** Dec 2023
 - **Oral presentation:** Integrative and transfer learning of large-scale immunogenomics datasets

INTERNSHIP

- **Internship, Tencent AI for Life Sciences Lab** Jun 2025 - Sep 2025
 - Technical Research - Machine Learning Direction
- **Internship, Tencent AI Lab** Aug 2022 - Sep 2022
 - Rhinobird Exchange Program

TEACHING EXPERIENCES

- **BMI3, Biomedical Informatics 3, ZJE institute, ZJU** 2021,2022,2023
 - Undergraduate course in English

PROFESSIONAL SERVICES

- **Ad hoc reviewer: Science Advances**
- **Conference committee members of Unravelling T-cell recognition, University of Oxford, UK**

LANGUAGES

- English
 - Highly proficient in academic writing and speaking
 - TOEFL iBT **111/120** (Reading 29/30, Listening 30/30, Speaking 27/30, Writing 25/30)
- Chinese and Cantonese (native language)