

# 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
  - **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 research centers on integrating the growing volume and diversity of next generation sequencing data across multiple modalities, including **genomics, transcriptomics, proteomics, and immunomics**, at bulk, single cell, and spatial resolutions, to provide a comprehensive view of immune system dynamics in disease contexts.

## PUBLICATIONS

### Highlight publications, †first or co-first authors ☐ 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.✉, Liu, W.✉ & Lu, L.✉ 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.✉ 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.✉ 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.✉ 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.✉ MSdb: An integrated expression atlas of human musculoskeletal system. *iScience*, **26**, 106933. (2023)

### All Peer-reviewed publications, †first or co-first authors ☐ 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.✉ 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.✉ 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.✉ 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.✉ 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-modaility 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 (竺可桢奖学金)** 2025
- **National Scholarship of China (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

- **National Conference on Bioinformatics and Systems Biology 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) 2025**
  - **Poster:** Unified integration of pan-cancer single-cell and spatial transcriptomics
- **Human Cell Atlas Asia Meeting 2024**
  - **Poster:** Integrative Mapping of Human CD8+ T Cell in Inflammation and Cancer
  - **Poster:** A pan-disease and population-level single-cell TCR $\alpha\beta$  repertoire reference atlas
- **The First ZiJuan Youth Scholars Forum 2023**
  - **Oral presenter:** Integrative and transfer learning of large-scale immunogenomics datasets

## INTERNSHIP

- **Internship, Tencent AI for Life Sciences Lab** Jun 2025 - Present
  - 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)