Zhiwen Yang

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Reseaerch Interests

Mathematical Modeling, Machine Learning, Deep Learning, Computational Biology, Dynamic System

Work Experience

Research Student, Hong Kong University of Science and Technology Sep 2025 – Present
Guangzhou, China (Remote) Supervisor: Prof. Jun Xia

Developed a Benchmark Framework that eliminates data leakage via strict splitting strategies and evaluates model robustness on diverse.

Research Intern, Guomics, School of Medicine, Westlake University Guomics.com
Hangzhou, China *Apr 2025 – Jul 2025*

PI: Prof. Tiannan Guo

Contributed to a research project on GNN-based protein protein interactions prediction by assessing model performance and conducting biological validation via GO analysis.

Remote Research Intern, Laboratory for Proteome Complexity Science *Apr 2025 – Jul 2025*

PRISM: Deep learning framework for proteomics data imputation, achieving state-of-the-art performance. Our manuscript is currently under review at *Nature Communications*.

Education

Bachelor of Mathematics and Applied Mathematics *Sep. 2022 – Jun. 2026*
YangZhou University, School of Mathematical Sciences, Tianyuan Class

Data Visualization, SDG Global Summer School *(Non-degree)* *Jun. 2025 – Aug. 2025*
Zhejiang University, College of Computer Science and Technology, China Full Scholarship Recipient

Patent and Publications

1. Z. Li, **Z. Yang**, Y. Chen, T. Guo, "PRISM: A Proteomics Robust Imputation framework for Structure-aware Modeling of missingness", ***Nature Communications***, Under Review (Preprint). (JCR Q1, IF: 16.6)
2. **Z. Yang**, L. Zhang, Y. Chen, "Microplastic Transport and Ecological Impacts in the Yangtze River Estuary: A Coupled Modeling Approach", In Preparation.
3. **Z. Yang**, X. Guo, and J. Huang, "Modeling the relationship between maternal health and infant behavioral characteristics based on machine learning", *PLOS ONE*, vol.19, no.8, e0307332, 2024. (JCR Q1, IF: 3.7)
4. Z. Fang, **Z. Yang**, X. Zhang, and Q. Han, "MedSegKAN: A superior medical image segmentation method based on the improved KAN structure", in *Proceedings of the 16th International Conference on Graphics and Image Processing (ICGIP 2024)*. (EI & Scopus Indexed)
5. **Z. Yang** and L. Zhang, "A coupling algorithm based on unstructured grids to study the impact of microplastics on fish", *Chinese* ***Patent*** *CN119558222A*, **Granted Dec. 5, 2025**.

Honors and Awards

Red Bird Challenge Camp, The Hong Kong University of Science and Technology (Guangzhou) *Jul 2025*

Excellent Project in **National** Undergraduate Training Program for Innovation *May 2024 – May 2025*
(First author, Project Lead)

Science Pioneer (<0.01%, Outstanding Research Contributions), Yangzhou University *Nov 2024*

First Prize, 10th National College Students Statistical Modeling Competition *Jul 2024*

Honorable Mention, 2024 COMAP's Mathematical Contest in Modeling (MCM) *May 2024*

***National** Second Prize* (Top 1.5%), Contemporary Undergraduate Mathematical Contest in Modeling *Sep 2023*

Third Prize, 36th Shanghai Adolescents Science and Technology Innovation Contest *Apr 2021*

Outstanding Student (Top 1%), Department of Mathematics, Shanghai University *Dec 2020*

Teaching

High School Math Teacher (Internship), Taicang Senior High School *Sep 2025 – Nov 2025*

Responsible for teaching mathematics, developing lesson plans, and evaluating student progress.

Academic Activities

President, Mathematical Modeling Association, Yangzhou University (Led workshops and competitions to promote mathematical modeling skills among **100+ students**) *Sep 2024 – Sep 2025*

Attendee, *ICGIP 2024* (Presented MedSegKAN) *Nov 2024*

Selected Projects

PRISM: A Proteomics Robust Imputation framework for Structure-aware Modeling of missingness *May 2025 - Present*
PI: Prof. Tiannan Guo

- PRISM, a novel imputation framework for proteomics data, integrating a Denoising Convolutional Autoencoder (DCAE) and Deep Matrix Factorization (DMF) using **PyTorch**, achieving superior RMSE and preserving biological structure (publication under review in *Nature Communications*).

Advection-diffusion coupling algorithm for studying the impact of microplastics on fish based on unstructured grids *Jan 2023 - Present*
Supervisor: Prof. Lai Zhang

- Developed an advection-diffusion coupling algorithm to simulate **PDE** equations in unstructured grids, demonstrating the dynamic migration patterns of microplastics in the marine environment.
- Improved the Logistic model and the **Lotka-Volterra** model, accurately depicting the dynamic changes in the population sizes of predator and prey fish schools.

Machine learning methods and applications on biostatistics data *Jul 2023 - Aug 2024*
Supervisor: Jianfei Huang

- Designed a hybrid model combining Random Forest and MLP to predict infant behavior using maternal psychological data, achieving an AUC value of **0.97** and improving the validation set performance by over **15%**.
- Applied the **Fuzzy C Means clustering** algorithm to grade the infant sleep quality and developed a regression model to deeply explore the relationship between maternal anxiety and infants' contradictory behaviors.

Skills

Technical Skills: Python (PyTorch, TensorFlow, scikit-learn), Matlab, Linux, R, LaTeX, Git/GitHub

Language Skills: English (IELTS: 6.5; Overall), Chinese (Native)