

# Yiquan Wang

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## Education

<b>National Base for Mathematical Research and Teaching Talents, Xinjiang University</b> <i>B.S. in Mathematics and Applied Mathematics</i>	Urumqi, Xinjiang 2023.09 – 2027.06
<b>Tsien Excellence in Engineering Program, Tsinghua University &amp; X-Institute</b> <i>Joint Program, X Scholar</i>	Shenzhen, Guangdong 2024.06 – 2027.06
<b>Institute of Neurological and Psychiatric Disorders, Shenzhen Bay Laboratory</b> <i>Visiting Student, Wen Yuan's Research Group</i>	Shenzhen, Guangdong 2025.07 – 2025.09

## Research Projects

<b>National Undergraduate Innovation Training Program</b>	2025.04 – 2026.04
<ul style="list-style-type: none"><li>• <b>Project:</b> Copy Number Variation Conditional Diffusion Model: For Alzheimer's Disease Risk Assessment.</li><li>• This project aims to integrate copy number variation (CNV) features from whole-genome sequencing data with multi-dimensional clinical data such as metabolic indicators. Leveraging the success of diffusion models in processing high-dimensional simulation data and protein phenotype prediction, we will construct a comprehensive framework consisting of CNV feature encoding, genomic region attention, and conditional U-Net diffusion modules. This will simulate CNV distribution changes and evolutionary processes in the genome, analyze the specific role of CNV in regulating Alzheimer's disease pathways, and ultimately improve disease risk assessment and early intervention accuracy. Supervised by Prof. Kai Wei.</li></ul>	
<b>Chinese Academy of Sciences (CAS) Innovation Practice Training Program</b>	2024.11 – 2025.09
<ul style="list-style-type: none"><li>• <b>Project:</b> A Knowledge Graph-based Q&amp;A System for Heatwave Disaster Adaptation.</li><li>• To address the urgent global challenge of increasingly severe heatwaves, this project details an automated pipeline for constructing a domain-specific knowledge graph from academic literature. The system leverages a Large Language Model to extract relational triples from unstructured text. A novel workflow then standardizes entities by using SentenceTransformer embeddings and a FAISS index for semantic clustering, followed by LLM-based canonical name generation. The resulting knowledge graph powers a hybrid KG-RAG query engine that retrieves factual subgraphs to provide context for an LLM, enabling the generation of precise, source-grounded answers for complex queries on heatwave adaptation. Supervised by Researcher Yong Ge.</li></ul>	
<b>Tsinghua University Tsien Excellence in Engineering Program ESRT</b>	2024.08-2025.10
<ul style="list-style-type: none"><li>• <b>Project:</b> From Signal to Symphony: Predicting Protein Function with a Deep Learning Fusion Model on Sonified Sequences.</li><li>• This research introduces a novel computational framework that translates protein sequence and structural information into musical encodings to predict function and guide protein design. The study systematically demonstrates the value of co-evolving both data representation and model complexity through a three-stage comparative analysis, achieving 90.44% accuracy. The framework was also integrated into a conditional diffusion model to guide the generative design of novel, structurally viable Green Fluorescent Protein (GFP) variants. Supervised by Prof. Kai Wei.</li></ul>	
<b>Provincial Undergraduate Innovation Training Program</b>	2024.03 – 2025.06
<ul style="list-style-type: none"><li>• <b>Project:</b> Research on the Generation Cyclability of Cartesian Product Graphs and Related Problems.</li><li>• This project mainly focuses on studying the generation cyclability of the <math>n</math>-th Cartesian product graphs of complete graphs. Currently, there are research results on the generation cyclability of <math>n</math>-th Cartesian product graphs of complete graphs with two vertices and three vertices. I mainly study the generation cyclability of <math>n</math>-th Cartesian product graphs of complete graphs with at least 4 vertices. Supervised by Prof. Eminjan Sabir.</li></ul>	

## Professional Experience

### Beijing Frontier Research Center for Biological Structure, Tsinghua University

Intern Beijing, China

2025.07 – Present

- Developed the [Polypeptide Structure Database](#) and engaged in protein and polypeptide design research.

### Institute of Software, CAS & Huawei Mindspore Community

Intern Remote

2024.09 – 2025.03

- Implemented a VGG19-based model for Pollock-style art generation, focusing on fractal and turbulent feature extraction and the creation of NFT-based digital labels. Featured on [Huawei's official Wechat](#).

## Selected Publications

- [1] **Wang, Y.**, Cai, M., Dong, Y., et al. (2025). From Signal to Symphony: Predicting Protein Function with a Deep Learning Fusion Model on Sonified Sequences. *Journal of Chemical Information and Modeling* (Accepted, JCR Q1, CAS Q2 Top).
- [2] **Wang, Y.\***, Cai, M., & Huang, T. Y. (2025). AI for disease prediction: Performance insights and key limitations. *Journal of Clinical Neuroscience*, 138, 111360.
- [3] Wang, X., **Wang, Y.**, & Huang, T. Y. (2025). Crypto-ncRNA: Non-coding RNA (ncRNA) Based Encryption Algorithm. *ICLR 2025 Workshop*. (Co-first author).
- [4] Wang, X., **Wang, Y.\***, & Pan, J. (2025). Digital Art Creation and Copyright Protection in Pollock Style Using GANs, Fractal Analysis, and NFT Generation. *ICLR 2025 Workshop*. (Co-first author).
- [5] Wang, X., **Wang, Y.\***, Xu, L., et al. (2024). Octopus Inspired Optimization Algorithm: Multi-Level Structures and Parallel Computing Strategies. *arXiv preprint arXiv:2410.07968*. (Co-first author).
- [6] Zhao. H., Shi. W., Liu Chang., **Wang, Y.**. (2025). Boundary Box-Guided Targeted Adversarial Attacks with Semantic Perturbation. In *2025 IEEE international conference on systems, man, and cybernetics*. IEEE. (Accepted, CCF-C).
- [7] **Wang, Y.\***, Zhang, J., & Chang, Y. (2024, November). A probability prediction model for flood disasters based on Multi-layer Perceptron. In *Journal of Physics: Conference Series* (Vol. 2905, No. 1, p. 012003). IOP Publishing.
- [8] Wang, J., & **Wang, Y.\*** (2024, September). Multi-stage Crop Planting Strategy optimization Model Based on PSO Algorithm. In *2024 3rd International Conference on Electronics and Information Technology (EIT)* (pp. 915-919). IEEE.
- [9] **Wang, Y.**, Zai, J., Liu, Z., et al. (2025). Hamiltonian Connectivity in  $k$ -Ary  $n$ -Cubes under a Region-Based Fault Model. (under review).
- [10] **Wang, Y.**, Zhang, J., Chang, Y., et al. (2025). Boosting MOOCs Engagement through Graph Neural Network-Driven Social-Academic Recommendations. (under review).

## Awards & Honors

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| • <b>SynBio Challenges:</b> Silver Award   | 2025 |
| • <b>2025 X-Fusion "Global Innovator Fusion Conference":</b> Best Poster Award                     | 2025 |
| • <b>The Mathematical Contest in Modeling (MCM):</b> Honorable Mention                             | 2025 |
| • <b>Alibaba Cloud Tianchi University Student Competition:</b> National Finals, 17th Place         | 2024 |
| • <b>APMCM Asia-Pacific Mathematical Modeling Competition:</b> National Third Prize                | 2024 |
| • <b>"Alpha Egg Cup" National Go Championship:</b> 15th Place                                      | 2024 |
| • <b>Xinjiang Youth Amateur Go Competition:</b> 53rd Place   | 2024 |
| • <b>Hunan Province Spring Cup Go Competition:</b> 7th Place                                       | 2024 |
| • <b>National Youth Intellectual Sports Meeting Go Competition:</b> 9th Place                      | 2024 |
| • <b>Xinjiang University Vulnerability Reporting Honor</b>   | 2023 |
| • <b>"Tianshan Fixed Network Cup" Cybersecurity Skills Competition:</b> 7th Place, Xinjiang Region | 2023 |

## Academic Activities

### Peer Reviewer:

- NeurIPS 2025 AI for Science Workshop
- NeurIPS 2025 MATH-AI Workshop
- ICLR 2025 Workshop on AI for Nucleic Acids
- ICLR 2025 Workshop on GenAI Watermarking
- ICML 2025 Workshop on AI for Math
- Mini-Reviews in Medicinal Chemistry
- Current Science
- F1000 Research

### Academic Engagement:

- Tsinghua University-Peking University Center for Life Sciences Summer Camp 2025.07
- Shenzhen Bay Laboratory / Shenzhen Medical Academy of Research and Translation Summer Research 2025.07 – 2025.09
- Tsinghua University Tsien Excellence in Engineering Program – Zero One Scholar 2024.06 – 2027.06
- AI Winter School, Brown University Department of Physics 2025.01
- CAAI Artificial Intelligence and Technology Ethics Training Course 2024.09 – 2024.12
- Fudan University Summer School of Mathematical Logic 2024.08
- Jinan University Guangdong Thousand Villages Survey Project 2024.08
- Wuhan University National Tianyuan Mathematics Center Discussion Class 2024.03 – 2024.06

## Website Development

- **Polypeptide Structure Database:** <https://www.frcbs.tsinghua.edu.cn/cpdb/>
- **Tong Wang Research Group:** <https://tongwang.vercel.app/>
- **Shenzhen X-Institute Course Website:** <https://lingyi.wyqmath.cn/>

## Skills & Interests

**Technical Skills:** Python, C/C++, MATLAB, LaTeX, Linux, HTML/CSS/JavaScript

**Research Interests:** Artificial Intelligence, Deep Learning, AI for Science, Bioinformatics, Computational Biology, Mathematical Modeling, Neuroscience

**Languages:** Chinese (Native), English (Professional Working Proficiency)