Tianhong Xie

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Education

Tongji University **Expected Jun 2028**
Bachelor of Information Security *Shanghai, China*

- **GPA**: 4.24/5.0 (Score: 87.4/100) | **Core Coursework GPA**: 5.0/5.0
- **Core Coursework**: High-Level Language Programming, Digital Logic, Data Structures, Object-Oriented Programming.

Research Experience

Predicting Macromolecular Precursors via Machine Learning and Chemical Rules **Sep 2025 – Present**
Undergraduate Researcher | Advisors: Assoc. Prof. Lei Ma, Assoc. Prof. Shaotang Song *Tongji University*

- Developed a macromolecular cleavage and retrieval engine by integrating Python programming with chemical retrosynthetic analysis.
- Implemented automated molecular deconstruction and feature-based searching for target macromolecules to efficiently match and output optimal monomer precursor schemes.

High-Resolution Prediction Modeling for Local Sea State Elements at Ro-Ro Terminals **Dec 2025 – Present**
Undergraduate Researcher | Advisor: Assoc. Prof. Wengen Li (Advanced Data and Machine Intelligence Systems Lab) *Tongji University*

- Constructed and optimized a high-resolution machine learning inference model tailored for local microclimates, utilizing empirical sea state and meteorological datasets from domestic terminals.
- Aimed at enhancing the accuracy and robustness of localized sea state predictions under complex maritime and climatic conditions.

Project Experience

Machine Learning-Assisted Early Warning and Prevention Mechanisms for Team Collaboration Risks **Dec 2024 – Present**
Project Lead | Advisor: Assoc. Prof. Youling Yu *Tongji University*

- Led the development of a collaboration risk assessment system utilizing machine learning and multi-dimensional scoring mechanisms.
- Designed a dynamic point-based algorithm to quantitatively evaluate member contributions, enabling intelligent early warnings for potential teamwork risks and significantly improving collaborative efficiency.

Low-Level Implementation of BiLSTM-CRF for Chinese Word Segmentation **Mar 2026 – Apr 2026**
Independent Developer | Tech Stack: PyTorch, Python *Personal Project*

- Developed a BiLSTM-CRF model from scratch for Chinese Word Segmentation (CWS), bypassing high-level APIs to implement the core logic through low-level tensor operations.
- Optimized the CRF Forward Algorithm and Viterbi Decoding using 3D tensor broadcasting and dimension alignment, achieving a significant increase in inference speed on GPU.

- Refined model performance through Dropout, L2 regularization, and dynamic learning rate scheduling, achieving a 91.0% F1 Score on the SIGHAN PKU benchmark.

Competitions & Awards

Tongji University Outstanding Undergraduate Scholarship **Dec 2025**
Academic and Comprehensive Excellence *University Level*

- Awarded in recognition of exceptional academic performance, research potential, and overall comprehensive excellence.