Xujiang Tang

Curriculum Vitae

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Education

Yangtze University College of Arts and Sciences Jingzhou, Hubei, China
B.Sc. in Mathematics and Applied Mathematics *Sep. 2023 – Jun. 2027 (Expected)*
GPA: 3.5 / 4.0

Key High-Achievement Courses:

- Optimization Theory — **97/100** (Ranked 1st in the Major)
- Numerical Computation Methods — **96/100**
- Mathematical Modeling, Data Structures, Ordinary Differential Equations, Probability & Mathematical Statistics

Submitted / Under-Review Papers & Manuscripts

Focus: Learning Theory, Optimization Algorithms, Stochastic Processes and Causal Inference

1. **X. Tang** and C. Fan (Corresponding Author). *Out-of-Distribution Generalization Error Bounds for Successful Prediction of Deep Autoregressive Algorithms.*
   Submitted to **ICML 2026** | Under Review

2. **X. Tang**, et al. *Geometric Disentanglement of Causal Cycles and Latent Confounders via Non-Gaussian Heterogeneity.*
   Submitted to **UAI 2026** (Causal Inference & Statistical Learning) | Under Review

3. **X. Tang**. *Quartic Difficulty: Assessing the Learnability of Unsupervised Learning Algorithms.*
   Submitted to **COLT** (Generalization Bounds and Theoretical Guarantees)

4. **X. Tang**. *Robust Optimal Reinsurance and Investment with Inflation Risk: A Game-Theoretic Approach and Explicit Solutions.*
   Submitted to **AIMS Mathematics**

5. **X. Tang** and D. Hu. *Geometric Manifold Rectification: Inducing Neural Collapse for Robust Representation Alignment.*
   Submitted to **ICLR 2026 Workshop**

6. **X. Tang**, et al. *Theoretical Analysis of Transformer Architecture.*
   Submitted to an **EI-indexed International Conference** (MIT Remote Research Group)

Research Experience

Independent Research on Dynamical Systems and Machine Learning Remote / On-Campus
Project Lead *Mar. 2024 – Present*

- **Koopman Operator Theory:** Collaborated with the research group of Prof. Yanbing Jia (Henan University of Science and Technology) to solve long-sequence modeling problems.
- Proposed a Koopman Operator Linearization Skeleton system for nonlinear dynamical modeling.
- Validated the system on multiple chaotic datasets, outperforming baseline deep learning models.

Stochastic Modeling and Quantitative Finance Independent Team Project
Team Lead *Oct. 2023 – Apr. 2024*

- **Rough Volatility & MCMC:** Led a team to investigate the rough volatility characteristics of financial markets.
- Overcame computational bottlenecks of MCMC methods in stochastic process generation.
- Designed a novel algorithm to resolve inductive bias in matrix representation; optimized parameter estimation strategies.
- Open-sourced the model framework on GitHub; manuscript in preparation for a top-tier journal.

Biomedical Data Science (Spatial Transcriptomics) Northeastern University
Research Assistant | Advisor: Dr. Dayu Hu *Sep. 2024 – Jan. 2025*

- Assisted in designing single-cell data clustering algorithms, integrating a geometric perspective into computational pipelines.
- Optimized computation and processing workflows for high-dimensional biological data.

Internship & Professional Experience

Peking University Open-Source Large Model Group Remote
Research Engineering Intern *Jun. 2024 – Aug. 2024*

- Participated in engineering deployment of Large Language Models (LLMs) and Retrieval-Augmented Generation (RAG) tasks, improving the model's external knowledge retrieval performance.

Deloitte & Guolian Securities China
Data Analysis Intern *Jul. 2024 – Sep. 2024*

- Applied statistical methods to securities research and developed quantitative workflows for financial reporting.
- Led team projects to solve business problems via data-driven approaches.

Honors & Awards

- **Silver Medal**, Kaggle Jigsaw Toxic Comment Classification Challenge
- **Regional Gold Medal**, WorldQuant International Quant Championship
- **Third Prize**, Graduate AI Forum, University of Chinese Academy of Sciences (UCAS) — *Only undergraduate recipient*
- **Multiple National Second Prizes** in mathematical modeling competitions (Future Cup, Central China Cup, Higher Education Press Cup); Led university mathematical modeling team formation and training
- **Reviewer**, ICLR 2026 Workshop (GRAm)
- **Participation Award**, NeurIPS 2025 Open Problems in WiML & OPP Competitions

Skills

- **Mathematics:** Convex Optimization, Numerical Analysis, Stochastic Processes, Differential Equations, Causal Inference
- **Programming:** Python (PyTorch, NumPy, Pandas), MATLAB, R, C++
- **Tools:** LaTeX, Git/GitHub, Linux
- **Languages:** English (Professional Fluency), Mandarin (Native)

Last updated: February 2026