Liang Shan

twistshan1218@gmail.com
(+86)13661199541
http://github.com/Twist-Shan

Research Interest

- **Statistical Learning, Machine Learning, Optimization Theory, Operations Research, Financial Engineering**

Education

Peking University — **Beijing, China**
- *B.A. in Mathematics, School of Mathematical Sciences* — *Jun. 2024–Jul. 2028 (Expected)*
  Second Major B.A. in Economics, National School of Development — *Sep. 2025–Jul. 2028 (Expected)*
  - **Mathematics Courses**: Mathematical Analysis, Advanced Algebra, Geometry, Mathematical Statistics, Statistical Thinking, Stochastic Analysis and Applications.
  - **Mathematics Courses (Current Semester)**: Probability Theory, Complex Analysis, Ordinary Differential Equations, Applied Stochastic Processes.
  - **Computer Science Courses**: Machine Learning and Artificial Intelligence, Fundamentals of Artificial Intelligence
  - **Finance and Economics Courses**: Principles of Economics, Intermediate Microeconomics, Introduction to Finance, Security Investment, Mathematical Methods in Finance, Modern Quantitative Trading Systems, Topics in Quantitative Finance

University of Copenhagen — **Copenhagen, Denmark**
- *International Exchange Student, Department of SCIENCE* — *Sep. 2025–Jan. 2026*
  - **Mathematics Courses**: Topics in Statistics (MCMC), Advanced Operation Research: Stochastic Programming.
  - **Computer Science Courses**: Probability Machine Learning

Peking University — **Beijing, China**
- *B.A. in Physics, School of Earth and Space Sciences* — *Sep. 2023–Jun. 2024*

Research Experience on Statistical Learning and Machine Learning

Optimization on Tensor Regression Model — **HKUST**
- *Advisor: Prof. Yi Chen, HKUST & Prof. Biao Cai, CityU* — *May. 2025 – Present*
  - **Algorithm Implementation for Partially Observed Dynamic Tensor Regression**
    Ongoing Research Project
    - Investigated and implemented the POSTER framework for ultra-high-dimensional dynamic tensor regression tasks, specifically handling complex random and block missing data patterns.
    - Initiated theoretical convergence analysis of the non-convex alternating minimization framework, utilizing tools from High-Dimensional Probability to try to establish statistical guarantees and error bounds under sparsity and structural constraints.
    - Designed robust simulation pipelines to evaluate tensor structure recovery.

Applications of LLM Agent — **Peking University**
- *Advisor: Prof. Shanghang Zhang, Peking University* — *Apr. 2025 – Jun. 2025*
  - **Wechat Agent** — GitHub
    Course Project
    - Developed an LLM-driven typesetting plugin on the Dify platform, automating the end-to-end content generation and draft publishing pipeline via Python and WeChat APIs.
    - Engineered structural prompts using DeepSeek-VL v3 to enforce strict HTML and CSS constraints, ensuring the zero-shot generation of platform-compliant, mobile-responsive layouts.
    - Integrated a RAG-based writing assistant using embedding models and orchestrated external APIs (e.g., Firecrawl, Bing Search) for dynamic web scraping, data retrieval, and content compliance.
    - Evaluated the impact of generation parameters on layout stability and authored comprehensive technical documentation detailing the system architecture and experimental results.

Research Experience on Finance

- **Modern Quantitative Trading Systems** **Peking University**
  Advisor: Prof. Changhao Jiang, Peking University *Sep. 2024 – Jan. 2025*
  - **Quantitative Trading Backtesting Framework** GitHub
    Course Project
    * Engineered a modular, object-oriented quantitative backtesting framework in Python, decoupling signal generation from order execution to support highly customizable trading algorithms.
    * Designed and implemented diverse quantitative strategies, including Momentum, Mean Reversion (Bollinger Bands), Cross-Sectional, and Time-Series, utilizing pandas and NumPy for vectorized data processing.
    * Developed an analytics module to compute key performance indicators (e.g., Sharpe Ratio, Annualized Returns) and automated the generation of visual performance reports for systematic strategy evaluation.

- **Security Investment** **Peking University**
  Advisor: Prof. Hai Huang, Peking University *Mar. 2025 – Jun. 2025*
  - **Empirical Asset Pricing and Portfolio Management** GitHub
    Course Project
    * Conducted empirical research on the Chinese A-share market, analyzing risk-return profiles, market volatility drivers, and sector-specific performance across historical market cycles.
    * Constructed optimal investment portfolios utilizing the Markowitz Mean-Variance framework, integrating fundamental quantitative stock selection and backtesting strategies across dynamic rebalancing frequencies.
    * Evaluated mutual fund performance by implementing Treynor-Mazuy (TM) and Henriksson-Merton (HM) models to quantitatively assess fund managers' market-timing and stock-picking capabilities.

Skills & Others

- **Computer Skills**: Python (&PyTorch), R, C++ (Elementary), LaTeX
- **Language**: Mandarin Chinese (Native), English (Fluent)
- **The Graduate Record Examinations (GRE)**: Total 325 with 155 (Verbal) + 170 (Quant)