Yinan Bu

University of Science and Technology of China | ynbu1002@gmail.com | +86 151-8999-5102

yinanbu.github.io | github.com/byn1002

EDUCATION

School of the Gifted Young, Sep.2022 – Jul.2026
University of Science and Technology of China(USTC), Hefei, China
B.Sc. in **Statistics**

- **GPA: 4.02/4.30 (92.33/100) Major GPA: 4.12/4.30 (93.63/100)**
- **Ranking: 3/116** in statistics majors(across **School of Management** and **School of the Gifted Young**);
  1st among female students(across **School of Management**, **School of the Gifted Young** and **School of Mathematical Sciences**).
  Outperformed all other statistics majors in the **School of Management**.

Research Interests: Network Analysis, Statistical Machine Learning, Biostatistics, Optimization Theory

Skills: C, Python (Pytorch), R(Rcpp), LaTeX, Mathematica, Matlab

AWARDS & HONORS

China National Scholarship (highest scholarship from Ministry of Education of China) 2025
Yang Ya Alumni Fund Scholarship (top 5 female students in School of the Gifted Young) 2024
Excellent Student Scholarship – Silver (top 10%) 2023

RESEARCH EXPERIENCES

Efficient Synthetic Network Generation via Latent Embedding Reconstruction Jul.2025-Present
Advisor:
Prof. **Ji Zhu** (Susan A. Murphy Collegiate Professor, Department of Statistics, University of Michigan, Ann Arbor);
Prof. **Gongjun Xu** (Professor, Department of Statistics, University of Michigan, Ann Arbor)

- Developed SyNGLER, a general, efficient framework for generating synthetic networks by combining latent space network models with a distribution-free generator over learned node embeddings.
- Built scalable pipelines for SyNGLER-Diff (diffusion-based latent generator) and SyNGLER-Res (bootstrap-based latent resampler), preserving key network characteristics while enabling efficient training with lower computational cost than many existing deep architectures.
- Conducted empirical studies on both simulated datasets and real-world datasets, showing that SyNGLER efficiently generates networks that more faithfully preserve key characteristics than existing approaches.

Machine Learning and Hyperdimensional Computing Apr.2024-Present
Advisor: Professor **Xueqin Wang** (Chair Professor, Department of Statistics and Finance , USTC)

- Derived asymptotic information loss in vanilla HDC operations and developed Hoeffding bounds for both hypervector similarity and predictive accuracy.
- Designed **FSHDC**, a robust and highly scalable model for fast classification and interpretation. Applied on fMRI/MRI from UK Biobank and achieved a +0.20 AUROC improvement over vanilla HDC with strong robustness under class imbalance.
- Integrated an attention mechanism into the HDC training pipeline, yielding a 30% accuracy improvement on the HAR dataset over vanilla HDC and a 15% improvement over an attention-only baseline.

Large Scale Optimization and GPU Acceleration Jan.2024-Feb.2025
Advisor: Prof. **Xueqin Wang** (Chair Professor, Department of Statistics and Finance , USTC)

- Worked on graph trend filtering (minimizing the ℓ_1 norm of discrete graph differences) to recover piecewise-smooth signals; examined the ADMM trade-off between convergence speed and subproblem solvability.
- Proposed **Doge-ADMM** (Differential Operator Grouping–based ADMM), grouping differential operators to get

closed-form subproblems and parallel updates.

- Built a parallel implementation for first- and second-order cases and achieved up to **30**× speedup over state-of-the-art methods(GitHub repository).

ACADEMIC PROJECTS

Analysis of the Government Pension Fund of Norway Jan.2024-Feb.2025

Supervisor: Prof. Canhong Wen(Department of Statistics and Finance, USTC)

- Independently designed, implemented, and deployed an RShiny website for the Norwegian Government Pension Fund Global (NBIM) with interactive Plotly charts and a Leaflet world map (live demo).
- Conducted overall analysis combining statistical summaries, maps and interpreted trends with embedded figures and map snapshots (GitHub repository).

Uncertainty-Aware Time-Series Forecasting via Conformal Prediction Dec.2024-Jan.2025

Supervisor: Prof. Yu Chen(Department of Statistics and Finance, USTC)

- Reproduced Stankeviciute et al. (2021) conformal prediction framework for probabilistic time-series forecasting (CF-RNN), implementing model-agnostic, distribution-free prediction intervals with an end-to-end calibration/evaluation pipeline.
- Conducted experiments on a range of simulated and real-world datasets (AR/ARIMA, sales, air quality, COVID-19), demonstrating robust uncertainty quantification with competitive interval widths and accuracy versus standard baselines.

CORE COURSES

Mathematics:					
Mathematical Analysis I	95	Mathematical Analysis II	92	Mathematical Analysis III	93
Linear Algebra I	93	Linear Algebra II	91	Differential Equations	93
Real Analysis	86	Complex Analysis	95	Functional Analysis	99
Probability and Statistics:					
Probability	91	Mathematical Statistics	91	Applied Stochastic Processes	94
Regression Analysis	98	Multivariate Analysis A	96	Time Series Analysis A	96
Non-parametric Statistics	95				
Learning, Optimization & Games:					
Machine Learning	92	Fundamentals of Statistical Algorithm	94	A Primer in Game Theory	93
Computer Science:					
C Programming Language	95	Applied Statistical Software	96		

ADDITIONAL INFORMATION

Teaching Experiences:

- C Programming Language, *Instructor: Prof. Lixiang Tan* Sep.2024-Feb.2025
- Linear Algebra I, *Instructor: Prof. Junchao Shentu* Mar.2025-Jun.2025

Standardized Tests:

- TOEFL:108 (R: 28, L: 30, S: 23, W: 27)

Leadership & Activities:

- Organized regional enrollment propaganda work for USTC 2024
- Flute player at the school Chinese orchestra 2022-2025
- Excellent member of the football team of School of the Gifted Young 2022-2025
- Member of the Debate team 2022-2025