

# Xu Hu

Senior Undergraduate @ [AHU](#) / Visiting Student @ [NCSU](#)

 [xhu25@ncsu.edu](mailto:xhu25@ncsu.edu) / [huxu896@gmail.com](mailto:huxu896@gmail.com)

 [Research Gate](#)



## Research Interest

- Data Augmentation & Generation
- Time Series Forecasting & Implementation
- Diffusion Model & Multi-Modal
- Brain Imaging/MRI & Mental Illness

## Reference

- Prof. Xiaolei Fang (North Carolina State University)- Advisor of Research Intern [xfang8@ncsu.edu](mailto:xfang8@ncsu.edu)
- Prof. Shu-Cherng Fang (North Carolina State University)- Advisor of Research Intern [fang@ncsu.edu](mailto:fang@ncsu.edu)
- Prof. Vince D. Calhoun (TReNDS;GSU&GAtech&Emory)- Collaborator [vcalhoun@gatech.edu](mailto:vcalhoun@gatech.edu)
- Prof. Zhengyang Zhou (USTC)- Advisor of the Summer Research [zzy0929@ustc.edu.cn](mailto:zzy0929@ustc.edu.cn)
- Prof. Zhifu Tao (Anhui University)- Undergraduate Tutor [jeff.tao@ahu.edu.cn](mailto:jeff.tao@ahu.edu.cn)

## Education Background

Anhui University (Project “211”), Hefei, China

2021-2025

- B.E.c Economic Statistics, Department of Big Data and Statistics
- GPA: 4.27/5.00 WES: TBD Major Rank: Top 0.95%
- **Main Courses:** Mathematics Analysis 1&2 (90&94), Advanced Algebra(87), Probability&Mathematical Statistics(89), Operation Research(97), Statistics(94), Bayesian Statistics(100), R Programming(95), Python Programming(95), Data Mining(93), Applied Statistical Analysis(95), Statistical Forecasting&Decision(96), Econometrics(Intermediate) (96), Time Series(91)

## Publications

- [1] **Hu Xu**, Yu Jianwen, Xu Qin, Tao Zhifu, "Volatility information in high-frequency financial interval-valued time series: A direct modeling pattern". the Fluctuation and Noise Letters 2024, SCI: Q4.
- [2] TBD (2024)
- [3] TBD (2024)

## Research Experience

**ISE, Edward P. FITTS Department, North Carolina State University**

Raleigh, USA

*Student Intern, under the supervision of Prof. Shu-Cherng Fang and Prof. Xiaolei Fang* 08/2024–12/2024

### Adaptive Diffusion Models for Industrial Irregular Time Series Analysis

- Applied conditional diffusion models to sparse/irregular/missing time series data in industrial settings.
- Implemented domain adaptation, replacing Gaussian noise with Brownian motion-based noise to match real-world sensor data characteristics.

**TReNDS lab, ECE, GSU&Georgia Tech&Emory**

Atlanta, USA

*Research Intern, under the supervision of Prof. Vince D. Calhoun*

05/2024–07/2024

### Multi-model Latent Diffusion Based on the FNC to Generate GM for Early Diagnosis of Schizophrenia Using the Brain Image/MRI

- Utilizing an improved Diffusion Transformer (DiT) to achieve reverse generation from Functional Network Connectivity (FNC) to Gray Matter (GM).

- Introducing FNC matrix as a condition in the DiT model to guide the GM generation process.
- Be applied to diagnose the probability of schizophrenia by scanning the brain, instead of relying on the function of brains.

**Data Science and Analytic Thrust, HK University of Science and Technology** Guangzhou, China  
*Research Intern, under the supervision of Prof. Yuxuan Liang and Prof. Zhenyang Zhou* 07/2024–08/2024

### **Spatial-Temporal Selective State Space(ST-Mamba) Model for Traffic Flow Prediction**

- Be the first model without using graph modeling in the space-temporal model.
- Effectively capture the long-range dependency for traffic flow data.
- Employ the Mamba block to improve computational efficiency and accuracy.
- By ablation experiments, find some new conclusions of the SSM.

**Department of Big Data and Statistics, Anhui University** Hefei, China

*Undergraduate's Research Project, under the supervision of Prof. Zhifu Tao*

### **Volatility Information in High-Frequency Financial Interval-Valued Time Series: A Direct Modeling Pattern**

- Developed a novel VAR-NN forecasting model combining Vector Autoregressive process, volatility information, and neural networks.
- Introduced four types of interval-valued data volatility information for more accurate predictions.
- Outperformed traditional methods in forecasting high-frequency financial data.

## **Competition Awards**

**2023 ICM - American Undergraduate Mathematical Modeling Competition - Finalist** 02/2023

*Propose a solution about the network science and operation research*

### **Award Global Grand Prize Nomination (top 0.15%)**

- Applied Canonical Correlation Analysis to the United Nations' 17 Sustainable Development Goals.
- Use some advanced econometrics methods to analyse the factors influencing the progress.
- Utilized an LSTM to predict achievable goals over the next decade.
- Concluded with a sensitivity analysis, affirming the robustness of the model.

## **Honorary & Service & Leadership**

- **The Student Assistant of the President in Anhui University**

*The first junior undergraduate selected*

06/2022-06/2023

- **“Award Excellence Project & Excellence Leadership” from Nanyang Technological University**

*The leader of the classroom & the best project*

07/2023-08/2023

- **The Member of a Startup Company “Empower Planet”**

*Presentation for investment & Field visit to agricultural aid bases*

04/2023-08/2023

## **Skills**

### **Professional Qualification:**

ACCA (2022): Pass the exam of BA, MA, FA; BEC Medium pass

**Computer Skills:** Python, MATLAB, R, PyTorch

**Language:** IELTS 7(6.5) ; GRE: TBD