

Tian, Zhiwen

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Education

Beijing Normal University-Hong Kong Baptist University united international college (UIC)

Sept 2022 – June 2026

• Major BSc in Applied Mathematics GPA: 3.79/4.0 (Rank 2)

Relevant Courses: Mathematical Modeling, Bayesian Network, Real Analysis, Complex Analysis, Mathematical Analysis, Optimization, Numerical Analysis, Ordinary Differential Equations, Partial Differential Equation, Applied Statistics, Probability Theory, Applied Stochastic Process, Time Series for Finance and Macroeconomics, Linear Algebra II, Calculus II

• Minor in Computer Science and Technology

Relevant Courses: Machine Learning, Data Mining, Compiler Construction, Database Management Systems, Data Structure and Algorithm, Design Analysis and Algorithm, Discrete Structure, Python, C Programming

Research Experience

A Fluid Mechanical Study of Rotation-induced Traumatic Brain Injury Research Assistant

Nov 2024 - Present

- Read papers on rotation - induced traumatic brain injury to understand cerebrospinal fluid's role
- Analyzed different density ratios and created scatter plots to explore their impact on related factors
- Using Gauss's theorem and other methods to integrate the momentum equation over a region

Olympic Preparation Technology Research Project: Development of the Third Generation Intelligent Selection Arrow Equipment and System Research Assistant

June 2024 – Oct 2024

- Test archery experiments, and collect datasets (8 parameters) about the arrow's ejection motion
- Use Python for statistical processing of data and Matlab numerical integration for error estimation
- Built regression models to observe their stability
- Created visualizations, analysis how to optimize the selected arrow's machine

Project Experience

2020 U.S. Election Sentiment Analysis, Core Member

Nov 2024

- Analyzed 1.7M+ tweets using XLNet and TextBlob, achieving 99.2% data integrity
- Developed a hybrid sentiment model, revealing Biden's balanced vs. Trump's polarized sentiment trends
- Visualized sentiment trends and regional insights, aligning with election outcomes
- Tools: Python, Pandas, Transformer-XLNet, TextBlob

Spam Classification Analysis & Optimization, Sole Author

Oct 2024

- Developed and optimized 7 ML models (Gradient Boosting, SVM, Random Forest) for spam detection, achieving 94% accuracy and 0.978 AUC via grid search and 5-fold cross-validation.
- Engineered data preprocessing pipeline including Z-score standardization, outlier removal ($Z > 3$ threshold), and index alignment, improving model robustness.
- Conducted error analysis using PCA visualization, identifying perceptron boundary limitations and decision tree underfitting, proposing feature engineering enhancements.
- Visualized results through ROC curves, confusion matrices, and accuracy trends to quantify model performance differences.
- Tools: Python, Scikit-learn, GridSearchCV, Matplotlib, UCI Spambase Dataset.

Analysis of Regional Medical Resource Allocation in China, Core Member

Aug 2024

- Analyzed 1990–2023 medical institution data across 31 provinces using ARIMA and LSTM, achieving MSE of 235.69 (LSTM) vs. 403.28 (ARIMA) on test sets
- Identified regional disparities via PCA and Moran's I spatial analysis, revealing economic level (GDP) as the dominant factor in resource allocation
- Forecasted 2024–2034 trends showing stable growth in developed regions and persistent gaps in underdeveloped areas, informing national healthcare policy optimization
- Tools: Python, ARIMA, LSTM, PCA, Spatial Lag Model (SLM), KNN-based Moran's I

Sex Ratio Effects on Lamprey Ecosystem Dynamics, Core Member

Feb 2024

- Developed four models (Logistic, Lotka-Volterra, TOPSIS, Parasitic Ecosystem) to analyze gender ratio impacts on population

stability.

- Integrated Least Squares with Great Lakes data (2012-2017), achieving 89% growth rate accuracy.
- Conducted phase trajectory analysis, identifying critical sex ratio thresholds for ecosystem equilibrium.
- Tools: MATLAB, Python, AHP, Lotka-Volterra Simulator.

Extracurricular Experience

ITSC department of UIC , Student Assistant	Sept 2024 – Present
• Assisted in daily work, provided auxiliary technical support, engaged in project management	
UIC , Peer Mentor	Aud 2023 - June 2024
• Provided academic and life guidance for freshmen to help them adapt to university life	
• Established a good teacher-student relationship through regular meetings and activities, which has improved the satisfaction and sense of belonging of new students	
UIC W-beE Outdoor Club , Finance Department Officer	Sept 2023 - Aug 2024
• Responsible for the financial management of the club, including budget preparation, sponsorship, fund allocation, and financial reporting	
• Successfully organized multiple outdoor activities, ensured the reasonable use of activity funds, and improved the financial transparency of the club	
UIC Table Tennis Association , Working Staff	Sept 2022 - June 2023
• Assisted in organizing table tennis competitions and training activities, including venue arrangements and equipment management, and served as a match referee, ensuring the smooth progress of the event	

Scholarship and Awards

• 2022-2024 First Class Award & Second Class Award	Dec 2023 & Dec 2024
• 2024 The Third National Data Analysis Competition for College Students, Second Prize	Sept 2024
• 2024 Mathematical Contest in Modeling (MCM), Meritorious Winner (Top 8%)	May 2024
• 2023-2024 Outstanding Peer Mentor Award , UIC	May 2024
• 2024 Bronze Award of Servant Leadership, UIC	May 2024
• 2023 National Undergraduate Mathematical Contest in Modeling, Third Prize	Jan 2024
• 2023 GUANGDONG-HONG KONG-MACAO GREATER BAY AREA MATHEMATICS EDUCATION FORUM volunteer	Jan 2024
• 2022-2023 Guangdong Medical Valley Scholarship	Dec 2023
• 2023 Shenzhen Cup Mathematical Modeling Challenge, Second Prize	Oct 2023
• 2023 Best Chinese Writing Award, UIC	May 2023

Skills and Hobbies

Technology Skills: python, Matlab, R , Latex, SPSS, Microsoft Office

Language: English (Medium of Instruction, CET-6), Chinese (Mother Tongue)

Hobbies: Writing, Swimming, Frisbee, Basketball