

Zhangqi Zheng

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🎓 Education

Nanjing Agricultural University (Project 211, Double First-Class University) College of Science · Information and Computational Science 2023.9 – Present

- **Academic Performance:** **88.91/100** **Major Rank:** 5/60 **English:** CET-4 (600), CET-6 (535)
- **Scholarships:** Jinshanbao Education Scholarship (2025), University-level First/Second-class Scholarship (2024–2025), Excellent Subject Award, Innovation Award
- **Core Courses:** Ordinary Differential Equations (99), Operations Research (98), Mathematical Analysis (95), Probability Theory (95), Numerical Analysis (90)
- **Honors & Roles:** Excellent Student Cadre, University-level Outstanding Student **Skills:** Python · MATLAB · C · LaTeX

🔬 Research Experience

Finite-time Stability of Discrete-Time Stochastic Forced Systems · Provincial SRT Project 2024.9 – Present

- **Stability Analysis:** Constructed nonsmooth **Lyapunov functions** for nonlinear discrete systems with external disturbances
- **Stochastic Modeling:** Applied **Itô stochastic calculus** to model stochastic forcing via Brownian motion, enabling precise evaluation of state trajectories under complex random disturbances

The Artificial of Reinforcement Learning and Statistical Analysis · Research Project 2025.1 – 2025.3

- **Theoretical Guarantees:** Introduced **statistical learning theory** to enhance model stability and convergence consistency in complex environments
- **Optimization:** Balanced **CPU sampling** and **GPU gradient updates** to reduce training time by **7.9%** while maintaining convergence

📄 Publications

Sole Author *A Study of Exploration-Exploitation Strategies in Unconventional Situations* Published
AIDML 2025.

Content: Studied the exploration-exploitation problem in multi-armed bandits (MAB), analyzing limitations of ϵ -greedy, UCB, and Thompson Sampling under non-stationary and delayed reward scenarios.

Extensions: Explored extensions in contextual, multi-objective, and adversarial settings, with application-level summaries in online learning and recommendation systems.

DOI: <https://doi.org/10.62051/88exap78>

Sole Author *Differential-Agent LLM-empowered Multi-Agent for Numerical Analysis and Simulation* Published
BDCIA 2025.

Core Idea: Proposed the **Differential Agents** framework to address incomplete reasoning of LLMs in scientific computing.

Methodology: Decomposed complex tasks into **mathematical modeling** — **code generation** — **numerical solution**, enabling modular collaborative reasoning.

Results: Demonstrated significant improvements in accuracy and robustness on a custom dataset, with strong generalization ability.

DOI: <https://doi.org/10.1117/12.3103315>

Second Author *A Frequency Attribution Analysis Framework for Multi-Scale Driving Factor Decomposition in Commodity Futures* Under Review
Technological Forecasting & Social Change.

Framework: Introduced Frequency Attribution Analysis (FAA), combining **VMD decomposition** with multi-model methods (XGBoost/SVR, ELM/ElasticNet) to capture multi-scale dynamic features.

Model Enhancement: Applied a **Ridge-Stacking** ensemble strategy to improve predictive performance and model stability.

Attribution: Used **SHAP** and permutation importance for cross-frequency attribution, with the **FAR metric** quantifying driver differences; experimental results outperformed baselines including LSTM.

🏆 Competitions

iGEM (International Genetically Engineered Machine Competition) · Gold Medal 2025.11

- *Temperature-controlled One-step Synthesis of Colored Bacterial Cellulose*
- Conducted data visualization and modeling to support experimental design; participated in the on-site presentation in Paris
- **Wiki:** <https://2025.igem.wiki/nau-china/model>

MCM/ICM (Mathematical Contest in Modeling / Interdisciplinary Contest in Modeling) · Honorable Mention 2025.5, 2026.5

- *The Vibrant Spring: Multidimensional Green Agriculture*
- Responsible for core mathematical modeling, including the EEE framework, food-web differential equations, vulnerability analysis, species introduction optimization, and stochastic modeling of herbicide diffusion

Lanqiao Cup Python University Group A · Provincial Second Prize 2026.5

NAU iGEM Campus Competition · Excellence Award 2024.11

NAU Mathematical Modeling Campus Competition · Second Prize 2024.5

🛠️ Practical Experience

Artificial Intelligence Chip · Training Project 2025.8

- **Architecture Definition:** Completed mapping analysis from algorithmic requirements to chip architecture
- **Algorithm Optimization:** Proposed a lightweight fine-tuning solution based on **LoRA**, addressing high-precision recognition of complex odor features across multiple scenarios while reducing hardware resource overhead
- **Business Case:** Prepared a complete business plan covering market and competitor analysis, technical feasibility evaluation, and roadmap design; received excellent evaluation in the training program

👤 Student Activities

• **College Sports Department:** Head of the Sports Department, College of Science (Former Deputy Head) **Honor:** Second Prize for “Excellent Department” 2023.9 – Present

• **Class Leadership:** Class President of ICS232 (Former Life Committee Member) **Honor:** “Excellent Pioneer Branch”

• **Youth League Affairs:** Youth League Assistant for ICS252