

Dong Liu 刘董

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EDUCATION

University of Science and Technology of China (USTC)

Hefei, China

- **School of the Gifted Young**
- Bachelor of Science Degree Expected 09/2021-07/2025
- Major: Mathematics and Applied Mathematics, Track: Probability and Statistics
- Current Overall GPA: 4.13 / 4.30; Grade Ranking: 1 / 161
- Language Proficiency:
 - TOEFL 101: R30 / L28 / S21 / W22
 - GRE 331: 162V + 169Q + 4W
- Scholarships:
 - National Scholarship (Top 2% at School of the Gifted Young) 10/2024
 - National Scholarship (Top 2% at School of the Gifted Young) 09/2023
 - National Scholarship (Top 2% at School of the Gifted Young) 09/2022
 - 2021 Freshman Entrance Scholarship, Gold Award 09/2021
- Honors:
 - S.T Yau College Student Mathematical Contest, Winners' Prize (Ranked 10th Overall) 06/2024
 - National College Student Mathematics Competition Mathematics, First Prize 12/2023
 - China Undergraduate Mathematical Contest in Modeling, Second Prize 11/2022
 - National College Student Mathematics Competition Mathematics, Second Prize 12/2021
- TA Experience: Assisted Prof. Caifeng Tu in Mathematical Analysis(B2) 03-07/2024

RESEARCH INTERESTS

Deep Learning, Convex Optimization, ADMM, Federated Learning, Reinforcement Learning, Machine Learning, Clinical diagnosis

PROGRAMMING SKILLS

10 years' experience with C/C++. Skilled in Python, R and MatLab. Familiar with Linux and Bash.

PUBLICATION

- *Distributed Learning via Inexact Dual Generalized ADMM*. **Will be Submitted to ICML 2025.**
- *FedIDA: A Federated Framework for non-smooth Composite Optimization*. **Will be Submitted to ICML 2025.**
- [*Optimizing the Cost-Benefit of Diagnostic Tests in Clinical Decision-Making*](#). **Submitted to JMLR in December 2024.**
- **Dong Liu.** (2023). *Analysis of Maximum Interval of Existence for an Initial Value Problem of an Ordinary Differential Equation*. Warming Volume 66. [I solved a previously unsolved problem given by the teacher in the Differential Equations class, and published the related findings in *Warming*, the journal of School of Mathematical Sciences USTC.]

RESEARCH EXPERIENCE

Sequential Lab Test (at Harvard University)

Cambridge, MA

Under the supervision of Prof. [Tianxi Cai](#), collaborating with a Postdoc

03/2024-Present

- Proposed a novel framework to optimize the sequential design of laboratory tests on real data. (Reinforcement learning)
- Independently completed the code writing and testing; Independently completed the proof
- A paper titled *Optimizing the Cost-Benefit of Diagnostic Tests in Clinical Decision-Making* is submitted to JMLR.

Federated Learning: A Class of Symmetric ADMM-like Algorithms
(Note: received funding from the first NNSFC Youth Student Program)

Hefei, China

Under the supervision of Prof. [Xueqin Wang](#), serving as the program lead

09/2023-Present

- Proposed a class of symmetric ADMM-like algorithms for federated learning
- Transformed a class of primal-dual algorithm into distributed algorithms
- Proved the convergence of our algorithm, both distributed version and federated version
- Wrote a lot of codes for the project, including our method and various benchmarks
- A paper titled *Distributed Learning via Inexact Dual Generalized ADMM* is to be submitted to ICML 2025.
- A paper titled *FedIDA: A Federated Framework for non-smooth Composite Optimization* is to be submitted to ICML 2025.

Establishing a Multimodel Biomedical LLM Based on UK Biobank Data

Hefei, China

Under the supervision of Prof. [Xueqin Wang](#), serving as a team member

10/2023-Present

- Practical experience with fine-tuning Llama-3
- Studied the up-to-date framework of Multimodel LLM, such as BLIP-2

PROJECTS EXPERIENCE

Kinetics Analysis and Maximum Power Output Design for Wave Energy Converters

China Undergraduate Mathematical Contest in Modeling (CUMCM)

09/2022

- Established two kinetic models targeting specific simplified wave energy converters and optimized the damping coefficient for the maximum average output power
- Improved the hill climbing algorithm and obtained a maximum output power of 323.489 W

Electromagnetism A Course Project

2022 Spring

Improving the Helmholtz Coils Magnetic Field Uniformity

Under the supervision of Prof. [Haijun Pan](#) and Prof. [Qing Lin](#)

- Introduced new coils (number= n , initial value=2) to the Helmholtz coils to generate absolutely uniform magnetic fields
- Utilized the Comsol software to simulate the increasing uniformity in the axisymmetric areas between coil pairs when assuming n approaches the infinity

Freshman Seminar Course Project

2022 Spring

Research on Freely Falling Jet Fluids Breaking Points Positions

Under the supervision of Prof. [Zhenyu Li](#)

- Investigated even “jet flows” from fixed openings based on Bernoulli differential equation and Young-Laplace equation

STUDENT ACTIVITIES

Student Union of School of the Gifted Young, USTC

03/2022-07/2023

Member of the Academic Department

- Organized two note-taking contests and hosted a lecture on mathematical analysis