Xiaozhi Liu

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Education

Beihang University **Beijing, China**
Ph.D. in Applied Mathematics, ***GPA: 91.45/100 (Rank: 4/27)*** *Sept. 2022 – Present*
- School of Mathematical Sciences & **Shen Yuan Honors College** (Top 35 students university-wide)
- Supervisor: Prof. Yong Xia

Northwestern Polytechnical University **Xi'an, China**
B.S. in Information & Computing Science, ***GPA: 88.01/100 (Rank: 4/43)*** *Sept. 2018 – Jul. 2022*
- Achieved GPA of **97.89/100** during junior year, ranking **1st in entire college (1/104)**
- Supervisor: Prof. Jianchao Bai

Université catholique de Louvain **Louvain-la-Neuve, Belgium**
Visiting Ph.D. in Applied Mathematics, ***Funded by China Scholarship Council (CSC)*** *Oct. 2025 – Oct. 2026*
- INMA/ICTEAM — Supervisor: Prof. Geovani N. Grapiglia

Research Interests

Optimization theory and algorithms, with applications in **signal processing** and **wireless communications**. Focus on developing efficient algorithms for large-scale optimization problems in 5G/6G MIMO systems and machine learning.

Publications & Preprints

A Unified Algorithmic Framework for Dynamic Compressive Sensing **2025**
- **Xiaozhi Liu**, Yong Xia. *Signal Processing: 232, 109926.* [GitHub]

Cubic NK-SVD: Parametric Dictionary Design in Frequency Estimation **2025**
- **Xiaozhi Liu**, Yong Xia. *Signal Processing: 235, 110029.* [GitHub]

Split-Merge: A Difference-based Approach for Dominant Eigenvalue Problem **2025**
- **Xiaozhi Liu**, Yong Xia. *arXiv: 2501.15131.*

Split-Merge Revisited: Scalable Generalized Eigenvalue Problems **2025**
- **Xiaozhi Liu**, Yong Xia. *arXiv: 2507.02389.*

Revisiting Atomic Norm Minimization: Sequential Atom Identification **2024**
- **Xiaozhi Liu***, Jinjiang Wei*, Yong Xia. *arXiv: 2411.08459.*

Research Experience

National Key R&D Program of China **Sept. 2022 – Present**
Core Technical Member — 5.5G Massive MIMO Parameter Estimation *Beihang University*
- Developed novel algorithms for channel state information (CSI) estimation in 5.5G Massive MIMO systems
- Optimized hybrid beamforming (HBF) algorithms, improving spectral efficiency by 30%
- Implemented super-resolution parameter estimation techniques using compressive sensing and optimization
- Published 2 papers in *Signal Processing* journal (IF: 4.4, Q1)

ASC International Student Supercomputer Challenge **Nov. 2020 – Jan. 2021**
Project Leader — BERT Model for NLP Cloze Tests ***Second Prize***
- Led team to implement and optimize BERT model under PyTorch framework from scratch
- Achieved 85%+ accuracy on CLOTH dataset through fine-tuning and hyperparameter optimization
- Leveraged GPU parallel computing on Linux HPC platform, reducing training time by 60%
- Designed efficient data pipeline for large-scale NLP dataset processing

Work Experience

Hong Kong Baptist University **Aug. 2025 – Sep. 2025**
Research Assistant — LLM Fine-tuning Optimization *Hong Kong, China*
- Improved LoRA-based parameter-efficient fine-tuning (PEFT) strategies for large language models
- Reduced fine-tuning parameters by 40% while maintaining model performance
- Collaborated with Prof. Michael K. Ng (SIAM Fellow) and Prof. Guangning Xu

Honors & Awards

National Scholarship (Ph.D., Top 0.2%) 2025
National Scholarship (B.S., Top 0.2%) 2021
Ph.D. Freshman Scholarship (Top 3/College) 2022
Outstanding Graduate 2022
1st Prize, National Math Competition 2020
1st Prize, Math Contest in Modelling 2020

Technical Skills

Programming Languages: Python, MATLAB, C, Julia, LaTeX
ML/DL Frameworks: PyTorch, TensorFlow, scikit-learn, NumPy, Pandas
Tools & Platforms: Git, Linux, Docker, Jupyter, VS Code
High Performance Computing: CUDA, GPU Programming, Parallel Computing
Languages: English (Fluent - CET-4: 593, CET-6: 523, PETS-5), Mandarin (Native)

Conference Presentations

21st Annual Meeting of CSIAM **Oct. 12-15, 2023**

- *A Unified Algorithmic Framework for Dynamic Compressive Sensing*, Kunming, Yunnan

1st ORSC Conference on Data Science and OR Intelligence **Sep. 13-15, 2024**

- *Cubic NK-SVD: An Algorithm for Designing Parametric Dictionary*, Beijing