

Xiaozhi Liu

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Education

Beihang University

Ph.D. in Applied Mathematics

Beijing, China

Sept. 2022 – Present

- School of Mathematical Sciences & **Shen Yuan Honors College** (selected among only **35 students university-wide**)
- Supervisor: Prof. Yong Xia
- GPA: **91.45/100** (Rank: **4/27**)

Northwestern Polytechnical University

B.S. in Information and Computing Science

Xi'an, China

Sept. 2018 – Jul. 2022

- School of Mathematics and Statistics
- Supervisor: Prof. Jianchao Bai
- GPA: **88.01/100** (Rank: **4/43**)
- During my junior year, I achieved a GPA of **97.89/100**, ranking **first in the entire college (1/104)**

Université catholique de Louvain

Visiting Ph.D. in Applied Mathematics

Louvain-la-Neuve, Belgium

Oct. 2025 – Oct. 2026

- Institute of Information and Communication Technologies, Electronics and Applied Mathematics (INMA/ICTEAM)
- Supervisor: Prof. Geovani N. Grapiglia
- Funding: Supported by the **China Scholarship Council (CSC)**

Research Interests

My research interests lie in **optimization theory and algorithms**, with a focus on their applications in **signal processing** and **wireless communications**.

Publications & Preprints

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

2025: Xiaozhi Liu, Yong Xia. *Cubic NK-SVD: An Algorithm for Designing Parametric Dictionary in Frequency Estimation*. Signal Processing: 235, 110029. [github]

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

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

2024: Xiaozhi Liu*, Jinjiang Wei*, Yong Xia. *Revisiting Atomic Norm Minimization: A Sequential Approach for Atom Identification and Refinement*. arXiv: 2411.08459.

Research Experience

Super-Resolution Parameter Estimation in 5.5G Massive MIMO National Key R&D Program of China
Core Technical Member Sep. 2022 – Present

- Addressed issues related to the estimation of wireless channel state information (CSI) and the optimization of hybrid beamforming (HBF) algorithms in 5.5G Massive MIMO systems
- Developed novel algorithms for parameter estimation and signal completion

Application of BERT Model in Cloze Tests for NLP PASC International Student Supercomputer Challenge
Project Leader, Second Prize Nov. 2020 – Jan. 2021

- Independently studied the BERT model under the PyTorch framework from scratch
- Implemented training and testing of the CLOTH dataset using Python programming
- Leveraged high-performance computing platform (Linux) for GPU parallel computing to enhance computational efficiency

Work Experience

Hong Kong Baptist University

Research Assistant

Hong Kong, China

Aug. 2025 – Sep. 2025

- Supervisors: Prof. Michael K. Ng (SIAM Fellow) and Prof. Guangning Xu
- Research Focus: Improvement of LoRA-based parameter-efficient fine-tuning (PEFT) strategies for large language models (LLMs)

Presentations

Oct. 12-15, 2023: *A Unified Algorithmic Framework for Dynamic Compressive Sensing*. 21st Annual Meeting of CSIAM, Kunming, Yunnan.

Sep. 13-15, 2024: *Cubic NK-SVD: An Algorithm for Designing Parametric Dictionary in Frequency Estimation*. 1st ORSC Conference on Data Science and Operations Research Intelligence, Beijing.

Honors & Awards

2025: National Scholarship for Doctoral Students (Top 0.2% nationwide)

2021: National Scholarship for Undergraduate Students (Top 0.2% nationwide)

2022: Ph.D. Freshman Scholarship (awarded to only 3 students in the college)

2022: Outstanding Graduate

2020: First Prize, National Undergraduate Mathematics Competition, Shaanxi Province

2020: First Prize, China Undergraduate Mathematical Contest in Modelling (CUMCM), Shaanxi Province

Technical Skills

Programming: Python, Matlab, C, Julia, \LaTeX

Machine Learning: PyTorch, TensorFlow

HPC: Linux, GPU Parallel Computing

Languages: **English:** Fluent (CET-4: 593, CET-6: 523, PETS Level 5)

Mandarin: Native Speaker