Qingyu Song

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WORK EXPERIENCE

Sep. 2025 - Assistant Professor, Xiamen University.

EDUCATION

The Chinese University of Hong Kong, Hong Kong, China 2021-2025
Ph.D., Computer Science and Engineering
Advisor: Prof. Hong Xu
Thesis: Exploring the Foundation of Learning to Optimize: From Practice to Theory.

Tsinghua University, Beijing, China 2018-2021
M.S., Control Engineering
Advisor: Prof. Jianming Hu
Thesis: Traffic Time Series Data Prediction with Graph Neural Networks.

Harbin Institute of Technology, Weihai, China 2014-2018
B.S., Software Engineering
Advisor: Dr. Xuefeng Piao
Thesis: Vehicle Trajectory Cleaning and Traffic Flow Prediction with Deep Learning Methods.

RESEARCH INTEREST

I am broadly interested in (theoretical) foundations and applications of deep learning on the following topics:

- Optimization in Deep Learning. [A3, C8]
- Learning to Optimize. [A1, C8, C7, C6, C5, W2, W1]
- AI for Networking. [C7, C5, W2, W1]
- Inference Acceleration for LLM. [A3]
- Communication Efficient Federated Learning. [C4]
- Graph Neural Networks. [C5, W2, W1, C3, C1]
- Time Series Prediction. [C3, C1]

PUBLICATIONS

In submission

A3. Wei Lin, **Qingyu Song**, and Hong Xu. The Multi-Query Paradox in Zeroth-Order Optimization. arXiv preprint arXiv:2509.15552 (2025).

A2. **Qingyu Song**, Peiyu Liao, Wenqian Zhao, Yiwen Wang, Shoubo Hu, Hui-Ling Zhen, Ning Jiang, and Mingxuan Yuan. Harnessing On-Device Large Language Model: Empirical Results and Implications for AI PC. arXiv preprint arXiv:2505.15030 (2025).

A1. Wei Lin, **Qingyu Song**, and Hong Xu. Adaptive Coordinate-Wise Step Sizes for Quasi-Newton Methods: A Learning-to-Optimize Approach. arXiv preprint arXiv:2412.00059 (2024).

Conference Proceedings

C8. **Qingyu Song**, Wei Lin, and Hong Xu. Learning Provably Improves the Convergence of Gradient Descent. In NeurIPS 2025.

C7. Siyong Huang, **Qingyu Song**, Kexin Yu, Zhaoning Wang, Zhizhen Zhong, Qiao Xiang, and Jiwu Shu. Toward Scalable Learning-Based Optical Restoration. In ACM APNet, 2025.

C6. **Qingyu Song**, Wei Lin, Juncheng Wang, Hong Xu. Towards Robust Learning to Optimize with Theoretical Guarantees. In IEEE/CVF CVPR, 2024.

C5. **Qingyu Song**, Juncheng Wang, Jingzong Li, Guocheng Liu, Hong Xu. A Learning-only Method for Multi-Cell Multi-User MIMO Sum Rate Maximization. In IEEE INFOCOM, 2024.

C4. Yu Zhang, Wei Lin, Sisi Chen, **Qingyu Song**, Jiaxun Lu, Yunfeng Shao, Bei Yu, Hong Xu. Fed2Com: Towards Efficient Compression in Federated Learning. In IEEE ICNC, 2024.

C3. **Qingyu Song**, RuiBo Ming, Jianming Hu, Haoyi Niu, Mingyang Gao. Graph Attention Convolutional Network: Spatiotemporal Modeling for Urban Traffic Prediction. In IEEE ITSC, 2020.

C2. Jinhua Chen, **Qingyu Song**, Can Zhao, Zhiheng Li. Graph Database and Relational Database Performance Comparison on a Transportation Network. In ICACDS, 2020.

C1. **Qingyu Song**, Jianming Hu, Ruobing Zhang, Zuo Zhang. An Urban Topological Map Generation Method for Traffic Flow Prediction Based on Road Segment Clustering with Floating Vehicle Trajectory Dataset. In COTA CICTP, 2019.

Workshops

W2. **Qingyu Song**, Guocheng Liu, Hong Xu. Learning to Optimize Non-Convex Sum-Rate Maximization Problems. In ICML 2023, 1st Workshop on Synergy of Scientific and Machine Learning Modeling.

W1. **Qingyu Song**, Guocheng Liu, Hong Xu. Towards a Learning-Only Approach for Non-Convex Sum Rate Maximization. In ACM SigMetrics 2023, 1st Workshop on Learning-augmented Algorithms: Theory and Applications.

RESEARCH EXPERIENCE

Jan. 2025 - Apr. 2025 Intern, Huawei Noah's Ark Lab. Mentor: Dr. Hui-Ling Zhen, Dr. Shoubo Hu
Project: LLM Quantization.

Mar. 2024 - Jan. 2025 CUHK Advisor: Prof. Hong Xu
Project: Learning Provably Improves the Convergence of Gradient Descent.

Sep. 2023 - Dec. 2023 CUHK Advisor: Prof. Hong Xu, Prof. Juncheng Wang (HKBU)
Project: Convergence Analysis of Learning to Optimize (L2O) in Out-of-Distribution (OOD) Scenarios

Nov. 2022 - May. 2023 Visiting Researcher, Huawei Noah's Ark Lab Mentor: Dr. Guochen Liu
Project: Learning-Based Precoding for Multi-Cell, Multi-User MIMO Interference Reduction.

Nov. 2020 - May. 2021 Research Assistant, Tsinghua University Advisor: Prof. Jianming Hu
Project: National Key R&D Program, 5.1 Efficient and Intelligent Vehicle-to-Vehicle Networking Technology for

Tokyo Olympics, Topic 2 - Research on Traffic State Perception System.

Jan. 2020 - May. 2020 Research Assistant, Tsinghua University Advisor: Prof. Jianming Hu
Project: Graph Neural Network-based Traffic Flow Prediction.

Mar. 2018 - May. 2018 UG Research Assistant, Tsinghua University Advisor: Prof. Jianming Hu
Project: Vehicle Traffic Trajectory Data Cleaning and Augmentation.

Oct. 2017 - Jan. 2018 R&D Intern, NEBULA-LINK Internet Technology Co., Ltd. Mentor: Dr. Yizhi Wang
Project: Android App Development and Data Analysis for Advanced Driver Assistance Systems.

May. 2016 - May. 2017 Part-time R&D Intern, HITWH Mentor: Dr. Xuefeng Piao
Project: Android App Development for Inspection System with Client/Server Architecture.

TEACHING

Fall 2025	XMU CSCI, Introduction to Computational Thinking
Spring 2022	CUHK CSCI 4430 / ESTR 4120, Data Communication and Computer Networks
Spring 2021	CUHK CSCI 4430, Data Communication and Computer Networks
Fall 2021	CUHK ENGG 2760A / ESTR 2018: Probability for Engineers

AWARDS

Sep. 2025 2025 ACM SIGCSE China Doctoral Dissertation Award!

Jun. 2025 Travel Grant, ACM APNet 2025.

Mar. 2024 Student Travel Grant, IEEE INFOCOM 2024.

Jul. 2023 Financial Support, ICML 2023.

2021 - 2025 Full Postgraduate Studentship, CUHK.

2019 - 2020 First Honor and Second Honor Scholarships, Tsinghua University.

Jun. 2018 Outstanding Graduate Award at Provincial Level, People's Government of Shandong Province.

2015 - 2017 First Honor and Second Honor Scholarships, Harbin Institute of Technology, Weihai.

SERVICES

Conference Reviewer: ICLR 2026, NeurIPS 2025, ICML 2025, ICLR 2025.

PC Member: AAAI 2026, EuroSys 2026 (Shadow), IJCAI 2025, ECAI 2025, ICA3PP 2025, ICPADS 2025.

Journal Reviewer: TNSE.

Updated September 2025