QIANG LI

Address: Room 511D, W.M.W. Engineering Building, CUHK, Shatin, HKSAR.
Email: qiangli@link.cuhk.edu.hk ⬦ **Personal Webpage**

EDUCATION

The Chinese University of Hong Kong   *August 2020 - August 2025 (Expected)*
Dept. System Engineering & Engineering Management, Ph.D. Candidate
Research Area: Stochastic Optimization, Multi-agent System, Machine Learning Theory.

Harbin Institute of Technology *(graduate with honors)*   *2016-2020*
Bachelor of Information and Computing Science, Dept. of Mathematics
Research Area: Stochastic Differential Equation, Fractional-order Coupled Systems.

SELECTED ACCOMPLISHMENTS

CUHK Postgraduate Student Scholarship	*2020-2024*
National Scholarship of Harbin Institute of Technology	*Fall 2019*
Second Class Innovation Scholarship from the Ministry of Industry and Information Technology of China	*Fall 2019*
Outstanding student of Harbin Institute of Technology	*Dec 2018*
First Prize in the preliminary of Chinese undergraduate mathematics contest in Heilongjiang	*Oct 2017*

RESEARCH INTRODUCTION

My research focuses on the mathematical foundations of data science, particularly on the design and analysis of algorithms that are provably effective in extracting information from data. Specifically, I work on stochastic optimization and large-scale optimization problems.

PUBLICATIONS

Conference on Machine Learning

1. Multi-agent performative prediction with greedy deployment and consensus seeking agents.
   Qiang Li, Chung-Yiu Yau, Hoi-To Wai, Advances in Neural Information Processing Systems (NeurIPS 2022) 35, 38449-38460. [Link]

2. State dependent performative prediction with stochastic approximation.
   Qiang Li, Hoi-To Wai, The 25th International Conference on Artificial Intelligence and Statistics (AiStats2022), 3164-3186. [Link]

3. On the Role of Data Homogeneity in Multi-Agent Non-convex Stochastic Optimization.
   Qiang Li, Hoi-To Wai. 2022 IEEE 61st Conference on Decision and Control (IEEE CDC 2022). IEEE, 2022. [Link]

4. Two-timescale Derivative Free Optimization for Performative Prediction with Markovian Data.
   Haitong Liu, **Qiang Li**, Hoi-To Wai, Forty-first International Conference on Machine Learning (ICML 2024). [Link]

Journal on Stochastic Differential Equation

1. Periodically intermittent discrete observation control for synchronization of fractional-order coupled systems.
   Yao Xu, **Qiang Li**, Wenxue Li, Commun. Nonlinear Science and Numerical Simulation (CNSNS) 74, 219. [Link]

2. Novel aperiodically intermittent stability criteria for Markovian switching stochastic delayed coupled systems.
   Yongbao Wu, **Qiang Li**, Wenxue Li, Chaos: Journal of Nonlinear Science (Chaos) 28. [Link]

Working Papers

1. Clipped SGD Algorithms for Privacy Preserving Performative Prediction: Bias Amplification and Remedies,
   Qiang Li, Michal Yemini, Hoi-To Wai, [Online], 2023.
2. Tighter Analysis for Decentralized stochastic Gradient Method: Impact of Data Homogeneity,
   Qiang Li, Hoi-To Wai. [Online], 2023.
3. Stochastic Optimization Schemes for Performative Prediction with Nonconvex Loss, **Qiang Li**,
   Hoi-To Wai. [Online] 2024.

PROFESSION SERVICES

Reviewer of NeurIPS	*2022, 2024*
Reviewer of ICML	*2023*
Reviewer of IEEE Transactions on Signal Processing	*2023*
Reviewer of European Signal Processing Conference (EUSIPCO)	*2022*

PROJECT

Oil and Gas Industry Chain Optimization

- **Background**: In refinery optimization, accurate modeling of production processes as a Mixed Integer Pooling Problem (a variant of NP-hard combinatorial problems like minimum cost flow) is critical due to the presence of stringent integer and non-linear constraints reflecting real-world operational complexities.
- **Techniques**: Employing Gurobi's state-of-the-art integer programming solver, we adapted a customized Branch and Bound method to tackle this challenging refinery problem. By integrating parallel computing techniques, we achieved a **remarkable 50% reduction** in computation time, significantly accelerating the resolution process and enhancing overall efficiency.

Online Resource Allocation

- **Background**: On an *e*-commerce platform, the Matthew effect can hinder high-value products from receiving adequate exposure. To counteract this, we implemented a bidding system enabling merchants to purchase exposure opportunities.
- **Techniques**: Above challenge was alleviated by formulating it as a Guaranteed Delivery Optimization problem and applying Online Primal-Dual algorithm to allocate resources. The result was maximizing returns while fulfilling contractual obligations to the greatest extent possible.

PROGRAMMING LANGUAGES

Matlab, Python, Java, SQL, Julia (Avaliable upon request).

TEACHING ASSISTANT

ENGG2004 Discrete Mathematics (Instructor: Prof. Hoi-To Wai)	*2020-2021 Fall*
ESTR2004 Discrete Math (**Elite Course**) (Instructor: Prof. Hoi-To Wai)	*2022-2023 Fall*
FTEC2101 (**Financial Technology Course**) Optimization Method (Instructor: Prof. Hoi-To Wai)	*2021-2024 Spring*