

# QIANG LI

**Address:** Room 511D, W.M.W. Engineering Building, CUHK, Shatin, HKSAR.

**Email:** qiangli@link.cuhk.edu.hk [◇ Personal Webpage](#)

## EDUCATION

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### **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.

**Advisor:** [Prof. Hoi-To Wai](#).

### **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.

**Advisor:** [Prof. Wenxue Li](#)

## SELECTED ACCOMPLISHMENTS

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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

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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

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### **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) 35, 38449-38460.

2. State dependent performative prediction with stochastic approximation.

**Qiang Li**, Hoi-To Wai, International Conference on Artificial Intelligence and Statistics (AISTATS), 3164-3186.

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.

4. Time-timescale Derivative Free Optimization for Performative Prediction with Markovian Data.

Haitong Liu, **Qiang Li**, Hoi-To Wai, International Conference on Machine Learning (ICML) 2024.

### **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 74, 219.

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

## Working Papers

1. Clipped SGD Algorithms for Privacy Preserving Performative Prediction: Bias Amplification and Remedies,  
**Qiang Li**, Michal Yemini, Hoi-To Wai, [Online], arXiv preprint arxiv: 5532733.
2. Tighter Analysis for Decentralized stochastic Gradient Method: Impact of Data Homogeneity,  
**Qiang Li**, Hoi-To Wai. (**Invited Paper**) Submitted to **IEEE Automatic Control**.

## PROFESSION SERVICES

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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

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### Oil and Gas Industry Chian 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

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

## TEACHING ASSISTANT

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