CHENGRUI QU

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5 Yiheyuan Rd, Haidian District, Beijing, China, 100871

Research Interests

- Theoretical Foundations of Decision-Making
- Reinforcement Learning for Reasoning
- Data-Driven Optimization for Real-World Systems

Education

- **California Institute of Technology** *Jun. 2024 - Sep. 2024*
  Summer Undergraduate Research Fellowships (SURF) Pasadena, CA, USA
  - Advisor: Adam Wierman
- **Peking University** *Sep. 2021 - Jun. 2025 (expected)*
  Major: Theoretical and Applied Mechanics (Applied Mathematics) Beijing, China
  - GPA: 3.894/4.0, Average Score: 92.5/100, **Rank: 1/39**

Publications & Preprints

- **C. Qu**, L. Shi, K. Panaganti, P. You, and A. Wierman. Hybrid Transfer Reinforcement Learning: Provable Sample Efficiency from Shifted-Dynamics Data, AISTATS 2025 (**Oral, top 2%**)
- K. Mukhi, **C. Qu**, P. You, and A. Abate. Robust Aggregation of Electric Vehicle Flexibility, ACM HSCC 2025 (**Best Poster Award** in DTU PES Summer School 2024)
- **C. Qu**, H. Jia and P. You. Decision-Dependent Distributionally Robust Optimization with Application to Dynamic Pricing. In Submission to IEEE CDC 2025
- Y. As*, **C. Qu***, B. Unger, D. Kang, M. Hart, L. Shi, S. Coros, A. Wierman and A. Krause. SPiDR: A Simple Approach for Zero-Shot Safety in Sim-to-Real Transfer. In Submission to NeurIPS 2025

Research Experiences

- **Hybrid Transfer Reinforcement Learning: Provable Sample Efficiency From Shifted-Dynamics Data** *2024*
  ***Instructors**: Dr. Laixi Shi, Dr. Kishan Panaganti; **Advisor**: Prof. Adam Wierman, Caltech*
  - Formulated a novel RL framework for finite-sample analysis in practical hybrid transfer scenarios
  - Established a minimax lower bound on sample complexity within this framework
  - Developed an algorithm that provably outperforms state-of-the-art pure online RL in terms of sample efficiency
- **Data-driven Distributionally Robust Pricing with Price-Aware Demand** *2024*
  ***Advisor**: Prof. Pengcheng You, Peking University*
  - Developed a pricing strategy framework that accounts for price-sensitive, time-coupled stochastic demand
  - Constructed a decision-dependent ambiguity set with asymptotic convergence guarantees
  - Developed tractable distributionally robust optimization methods with finite-sample guarantees
- **Distributionally Robust Aggregation of Electric Vehicle Flexibility** *2024*
  ***Collaborator**: Karan Mukhi, Oxford, **Advisor**: Prof. Pengcheng You*
  - Proposed a systematic way of characterizing feasibility under high-dimensional stochastic energy demand
  - Designed distributionally robust methods to delineate the aggregate feasible set for downstream applications
  - Formulated a tractable optimization reformulation incorporating probabilistic guarantees

Teaching Experiences

- **Principle of Economics (English taught)** *Spring 2024*
  TA, National School of Development, Peking University
- **International Trade (English taught)** *Spring 2024*
  TA, National School of Development, Peking University
- **Reinforcement Learning Reading Group** *Fall 2023-Spring 2024*
  Co-organizer, Peking University
- **Power System Reading Group** *Fall 2023-Spring 2024*
  Co-organizer, Peking University
- **Financial Economics Reading Group** *Summer 2022*
  Co-organizer, Peking University

Honors and Awards

- **Li Yanhong Scholarship (Top undergraduate student award)** *2024*
- **NSFC 1st Youth Student Basic Research Grant** *2023*
- **National Scholarship (Top undergraduate student award)** *2023*
- **Pacemaker to Merit Student, Peking University** *2023*
- **The First Prize in 14th National Zhou Peiyuan Mechanics Competition (Top 0.3%)** *2023*
- **Merit Student, Peking University** *2022*
- **The First Prize in 37th Chinese Physics Olympiad (Jiangsu Province)** *2020*
- **The First Prize in 34th Chinese Chemistry Olympiad (Jiangsu Province)** *2020*
- **The First Prize in 36th Chinese Maths Olympiad (Jiangsu Province)** *2020*

Invited Talks

- **Hybrid Transfer Reinforcement Learning: Provable Sample Efficiency From Shifted-Dynamics Data** *Sep. 2024*
  ORSC Data Science 2024, Beijing
- **Distributionally Robust Aggregation of Electric Vehicle Flexibility** *Mar. 2024*
  School of Data Science, The Chinese University of Hong Kong, Shenzhen

Professional Skills

Programming Skills: C++, Python, MATLAB, CUDA, Shell
Leadership: President of the Jiangsu Cultural Association, Peking University

References

1. **Adam Wierman**
   Carl F Braun Professor, Department of Computing and Mathematical Sciences
   California Institute of Technology
   Email: adamw@caltech.edu

2. **Pengcheng You**
   Assistant Professor, Department of Industrial Engineering and Management
   Peking University
   Email: pcyou@pku.edu.cn

3. **Yujie Tang**
   Assistant Professor, Department of Industrial Engineering and Management
   Peking University
   Email: yujietang@pku.edu.cn