



School of Data Science

香港城市大學  
City University of Hong Kong

# SDSC SEMINAR

## Sample-Efficient Decision-Making Algorithms in Complex Environments

Date: 26 April 2024 (Friday)

Time: 8:50am - 9:50am

Venue: Rm 7-207, Lau Ming Wai Academic Building,  
City University of Hong Kong

### ABSTRACT

Data-driven decision-making has gained significant attention in recent years due to its impressive performance in various fields like intelligent control, human-machine games, operations research, large language models, etc. Within the decision-making framework, an agent interacts with the environment to collect data following a certain policy and then aims to improve the policy to achieve a specific goal by leveraging the gathered data. However, the real-world environment is highly uncertain and complex, which poses several challenging issues, including unknown environments, large state spaces, risk concerns, and the presence of adversaries. It thus necessitates developing sample-efficient algorithms to learn target policies in such complex environments. In this talk, I will share a series of my works on developing efficient decision-making methods that take these practical factors into consideration, with provable sample-efficiency guarantees. In addition, I would also like to discuss some potential directions in decision-making for future research.



### Dr Shuang QIU

#### GUEST SPEAKER'S PROFILE

Dr Shuang QIU is currently a Research Assistant Professor at the Department of Mathematics at the Hong Kong University of Science and Technology. He earned his Ph.D. in Computer Science and Engineering from the University of Michigan in 2021. He subsequently worked as a postdoctoral researcher in the Booth School of Business at the University of Chicago and in the Department of Mathematics at the Hong Kong University of Science and Technology from 2021 to 2023. His research primarily focuses on developing sequential decision-making methods for complex environments, which lies at the intersection of reinforcement learning, game theory, stochastic optimization, and statistical learning. His research interests also extend to the practical applications of decision-making methods across various research fields.

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All are welcome