

Data-Driven Decision Making with Safety Guarantee

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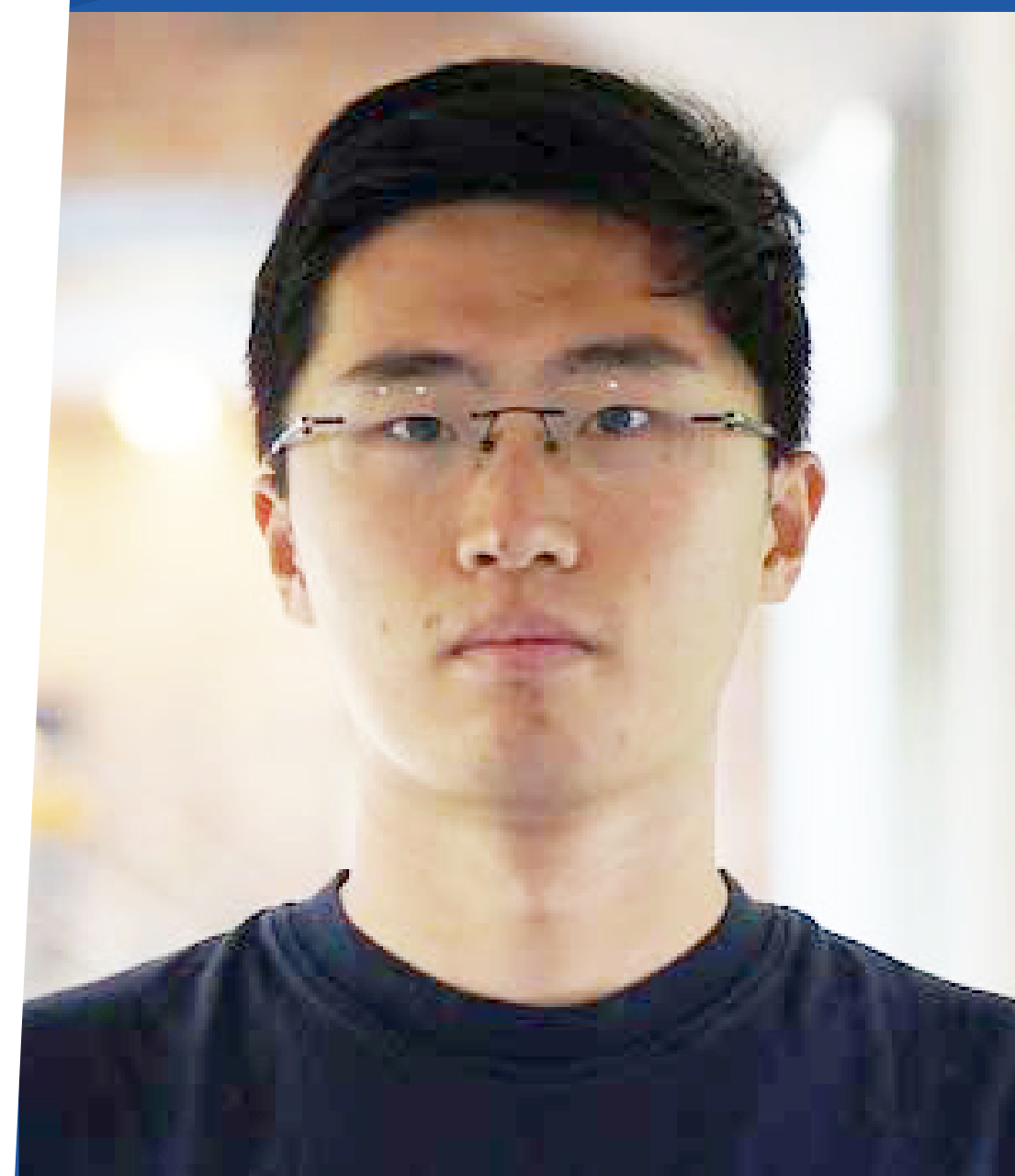
Time: 9:30am - 10:30am

Seminar link: <https://cityu.zoom.us/j/96599804944>



ABSTRACT

In many real-world applications, decision makers usually need to make better decisions without the precise knowledge of the uncertainty. With limited amount of data, distributionally robust chance-constrained optimization (DRC) becomes a powerful tool for decision making because it alleviates the ambiguity in distribution by protecting the optimal solution against a family of candidate distributions, and thus generalizes better when previously unseen samples arise. However, DRC models are usually very hard to solve in general. Therefore, in this talk, I will seek to answer the following two questions: (1) how can we solve DRCs more efficiently, and (2) when are DRCs convex and/or tractable? For DRCs with a covering structure, which arise frequently in facility location, scheduling, production planning, and vehicle routing, we establish their NP-hardness, propose a two-stage reformulation and derive families of strong valid inequalities. For general DRCs, we uncover a set of sufficient conditions under which DRCs produce a convex feasible region and design efficient algorithms for solving such convex DRCs. We will demonstrate the effectiveness of our proposed solution approaches in multiple real-world applications including emergency medical facility location problem, optimal power flow problem, and the planning of charging stations for battery electric buses.



Mr Haoming SHEN

GUEST SPEAKER'S PROFILE

Mr Haoming Shen is a Ph.D. Candidate in the Department of Industrial and Operations Engineering at the University of Michigan, where he is advised by Professor Ruiwei Jiang.

His research focuses on data-driven optimization under uncertainty with applications to robotics, power grids, and transportation systems. He has received the honorable mention award in 2022 INFORMS Optimization Society Best Student Paper Competition.