



Auctions Under Uncertainty: Strategic Distribution Reporting and Data Markets

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Turing Class
Peking University

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ABSTRACT

Classical auction theory is built around a set of assumptions: buyers have private values drawn from known distributions, and the mechanism allocates a fixed set of goods. In this talk, I will discuss two settings in which these assumptions no longer hold, and how mechanism design can be adapted accordingly. First, we study a distribution-reporting setting where the auctioneer does not know buyers' value distributions. Instead, buyers strategically report and commit to distributions before participating in the auction. Standard Bayesian incentive compatibility is no longer sufficient to guarantee truthful reporting at this ex-ante stage. We design mechanisms that restore ex-ante truthfulness while achieving strong revenue guarantees, nearly matching upper bounds. Second, we consider selling data as a digital good, where buyers' values follow scaling laws and exhibit diminishing returns with data volume. This leads to continuous allocation decisions and production costs that are absent from classical auction models. We characterize optimal mechanisms in the offline setting and give mechanisms with constant-factor approximation guarantees for online data production under demand uncertainty and for bilateral data trading with private information.

BIOGRAPHY

Miss Guan's academic excellence has been recognized with the National Scholarship, the Peking University May 4th Scholarship, the Outstanding Student Award from the Center on Frontiers of Computing Studies, and the "Academic Rising Star" title from the School of Computer Science. With a current GPA of 3.913/4.000, including full marks in 29 credits, she has established a strong publication record with two regular papers at ICML 2026, alongside work published at WINE 2025 and the ICLR 2026 Workshop on AIMS. She also serves as a reviewer for top-tier venues, including FOCS 2024 and the ICLR 2026 Workshop on AIMS. Beyond research, she is an accomplished competitive programmer, having won a Silver Medal and ranked 5th globally at the ICPC World Finals, as well as securing three regional championships and nine gold medals in ICPC/CCPC contests.

All are welcome!



In case of questions, please contact Prof. LI Minming at minming.li@cityu.edu.hk, or visit the CS Departmental Seminar Web at <https://www.cs.cityu.edu.hk/events/cs-seminars/recent-cs-colloquiums>.