

Differential Privacy as a Tool for Mechanism Design in Large Systems

[Invited Talk]

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ABSTRACT

In this talk we overview how *differential privacy* gives a collection of tools that can be easily applied to design algorithms which enjoy remarkable incentive properties in large systems and markets – settings in which the number of interacting agents is large, and each of the individual players are “small”. We illustrate this power with two vignettes – designing mediators to coordinate equilibrium behavior in games of incomplete information (due to Kearns, Pai, Roth, and Ullman, and Rogers and Roth, 2014), and designing ascending price auctions such that *sincere bidding* is an asymptotic dominant strategy (due to Huang, Hsu, Roth, Roughgarden, and Wu, 2014).

In both of these settings, we get good incentive properties under the assumption that the market is “large” in some sense. However, we discuss how our methodology (via differential privacy) allows us to make substantially milder “large market” assumptions than those commonly appearing in the literature.