

# ***Research Statement***

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## **Economic theory and Market design**

My primary research interest lies in the domain of economic theory. In particular, I am interested in market design, the field of microeconomics where theory is able to give practical advice on the design and implementation of actual markets.

## **Signaling in matching markets**

My graduate work largely focuses on the analysis of a signaling mechanism in decentralized two-sided markets. This endeavor shows that the introduction of signals facilitates match formation as well as increases the welfare of agents of one side of the market for a wide range of environments. However, there are instances when signaling precludes match formation. This project also examines the impact of a signaling mechanism for different environments that vary in market size, the number of signals, positions, and periods of interaction.

## **Current research**

I am also currently involved in a fascinating project (written jointly with Utku Unver) that analyzes the problem of optimal object allocation in a one-sided matching market without transfers. We examine a model having many agents and many objects with interdependent values. Each agent receives noisy signals about object values. These signals would, if known to other agents, affect the values those other agents assign to the objects. This environment requires optimal mechanisms to aggregate information and to induce truthful revelation of preferences. We show the general impossibility of an incentive-compatible and Pareto-optimal mechanism in this environment. Moreover, we propose a mechanism that is undominated among all incentive-compatible mechanisms.

## **Auctions and contests**

My research interests are also linked to auction theory. Being involved in the preparation of the second edition of Vijay Krishna's book "Auction Theory", I acquired invaluable knowledge of foundations and modern issues of auction theory. Currently, I am engaged in a project (written jointly with Lev Lokutsievskiy) that is closely related to the theory of auctions. This endeavor considers an object allocation problem via contests in the environment of private values. Several buyers, whose valuations are independently identically distributed, compete for one object. All buyers bid simultaneously. Each buyer can get the object with some probability. This probability equals the ratio of that buyer's bid to the sum of all buyers' bids. We consider two settings: one in which buyers always pay their bid and the other in which buyers pay only upon receiving the object. We establish the existence and characterize the properties of symmetric equilibria in both environments. We also derive an explicit solution for a certain class of agent value distributions.

## **Summary**

Solving economic theory problems motivated by practical needs is an excellent way to develop new theory and design better markets. Auctions and matching are two branches of market design that have proven to have many real-world applications. Other branches include the design of carbon, prediction, and electronic markets as well as e-commerce. Though my future research will surely encompass other areas of economics, I would be particularly interested to pursue modeling questions of market design.