

Introduction. The advent of online platforms led to large quantities of detailed user data, such as those at the disposal of online retailers, ride-sharing platforms, recommendation systems, and online advertising markets. These platforms also enabled (i) abundant collection of data detailing the interaction structure among different market participants, and (ii) algorithms that automate various tasks ranging from matching participants in these platforms to pricing goods and services that are offered through them. Consequently, they have evolved into an interconnected network of economic and computational systems. This opened up exciting research opportunities that focus on the design and optimization of such platforms, and that are at the interface of operations, economics, and computation. The goal of the proposed postdoctoral program is to support candidates to conduct interdisciplinary research in these areas with the Operations Management group at Chicago Booth. The focus of our search is on top candidates who have a doctoral degree (or are last year doctoral students) in operations research, operations management, computer science, economics, or any other related fields.

Research Topics. The postdocs will contribute to research projects led by the Booth Operations Management faculty. The projects have a broad scope and will mainly focus on the following topics and their intersections:

1. *Revenue Management and Market Design:* Modern online marketplaces provide an immense opportunity for data-driven theoretical research due to unique challenges they face. These challenges include (i) incentive issues, (ii) real-time nature of applications, and (iii) uncertainties about the environment and behavior of the users. Our aim in this research line is to use techniques based on algorithms, stochastic optimization, and game theory to tackle such challenges. With the help of a data-driven approach, we aim to propose solutions to improve economically-relevant objectives of these platforms (such as revenue, social welfare, or user engagement).

Topics of interests include, but are not limited to: (i) data-driven mechanism design for various emerging online platforms (e.g., food delivery systems such as DoorDash, shared micromobility platforms such as Bird, and non-traditional online advertising platforms such as Amazon product ads), (ii) new paradigms in assortment planning and auction design for modern online retail (e.g., online intermediary platforms such as eBay, online hospitality brokerage services such as Airbnb, and cloud computing markets such as AWS), and (iii) dynamic pricing, matching and auctions in (shared) online economies (e.g., ride-sharing platforms such as Uber and Lyft, crowd-sourced freelancing marketplaces such as Upwork, and sponsored search platforms such as Google Ads).

2. *Social and Economic Networks:* Today there is abundant data available on the interactions between individuals, between individuals and firms, and between firms. Networks provide convenient representations of such interactions. Our goal in this line of research is to study the impact of social and economic networks on various operational setting, and to shed light on how firms can leverage the available data on networks to improve their decision.

A broad set of questions related to networks is of interest. Among these we mention the following: (i) network models of platforms with applications to sharing-economy, (ii) using information as a lever to influence outcomes in networked systems, (iii) learning and opinion formation in social networks, platforms' role in spreading misinformation, and methods for tackling the misinformation problem.

3. *Economics, Operations, and Learning:* With the prosperity of machine learning techniques in the

last couple of years, there has been a huge interest in studying operational and economical problems through this lens. We aim to study various classic and modern problems at the intersection of operations research and market design using learning theory. The goal of this research line is to propose new solutions for these problems by using techniques based on online learning, reinforcement learning, and algorithmic machine learning.

Topics of interests include, but are not limited to: (i) structural online learning and its applications in dynamic pricing and online auctions, (ii) incentivizing exploration and its applications in designing recommendation systems, and (iii) connections between online learning and stochastic online optimization, and their applications in problems such as assortment optimization, online allocations, and ride-sharing matching/pricing.

Contributions and Impact. Postdoctoral scholars are expected to contribute to the research atmosphere and the intellectual life of Chicago Booth and the Operations Management group. This contribution can happen in different ways, ranging from collaborating on impactful theoretical and practical projects and publishing papers in top outlets, to mentoring PhD students and supervising their research projects. Especially the candidates whose long term objective is to pursue an academic career in a related field are encouraged to apply to our program. Our hope is to help them succeed through research collaborations, training, and other resources that can be provided by the Booth Operations Management faculty.

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