

## Call for Papers on Special Issue: Applications of Data-Driven Optimization in Management Science

Journal: *Journal of Management Science and Engineering*

Special Issue Title: Applications of Data-Driven Optimization in Management Science

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Submission Deadline: 31 May 2020

*Guest Editor*

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Research Interests: Risk-aware decision-making, dynamic programming, large-scale implementation

### **Summary**

Dear Colleagues,

Data-driven optimization has fundamentally changed the landscape of management science and operations research. Historically, data has sometimes been a secondary consideration used to calibrate optimization models or implement numerical case studies. Now, data is the prime mover. In recognition of this transformation, we are inviting submissions of new research papers in the area of data-driven management science and operations research, broadly defined.

We highlight three respects/challenges in which data-driven optimization has revolutionized the field of management science. First, we now have access to prodigious data sets to aid in decision-making. The size of these modern data sets often pushes the boundaries of available computing power and memory. Second, modern data sets often fail to meet classical statistical assumptions. In fact, some may even be adversarially generated. We must be able to provide performance guarantees even in

such cases. Finally, in many cases, we \*only\* have access to data. Idealized assumptions about access to the generating/simulation model are typically not met.

We welcome submissions that advance application or methodology. For full consideration, submissions must make a substantial contribution in recognition of some or all of the key challenges just mentioned.

In application, we are particularly interested in (but certainly not limited to) current topics such as:

1. Financial optimization and high frequency trading. Finance is one of the flagship applications of data-driven optimization. Here, investors may have access to huge amounts of data and sometimes must make rapid decisions.
2. Revenue management and dynamic pricing. Airlines/agents often have to learn about consumer demand response by adjusting their pricing decisions. This situation introduces the exploration vs. exploitation tradeoff.
3. Real time and same day logistical systems. There is now significant interest in same day delivery services in a variety of sectors. This demand requires the ability to do efficient, real-time optimization and routing.

In methodology, we are interested in a variety of topics including (but again not limited to):

1. Data-driven risk assessment and mitigation. Decision models that respect the risk preferences of the decision maker are gaining increasing interest. There is significant potential for data-driven methods here, for instance, using data to elicit the risk preferences of the stakeholders.
2. Dynamic programming and the curse of dimensionality. Dynamic programming is already well known to be a challenging problem, even in the perfect information case. The data-driven setting is natural in many problems (such as the three applications just mentioned), yet this setting poses additional theoretical challenges.
3. Multi-armed bandit (MAB). The MAB is perhaps the most classic example of the exploration vs. exploitation tradeoff. It is also a fundamentally data-driven problem. Advances in the study of MAB and its variants (such as risk-aware and robust MAB) often have broader impact to other areas of optimization and dynamic programming.

We thank you in advance for considering the Journal of Management Science and Engineering as a venue for your work. Respectfully,

Dr. William Benjamin Haskell

*Guest Editor*

**Keywords**

- Data-driven optimization
- risk-aware decision-making
- robust optimization
- time series and forecasting
- statistical model estimation
- large-scale implementation

**How to make a submission**

Please submit your paper via the following website:

<https://mc03.manuscriptcentral.com/jmse>

In the process of submission, please select type “Special Issue” and special issue “Applications of Data-Driven Optimization in Management Science”.