



informatics Junior Faculty Interest Group

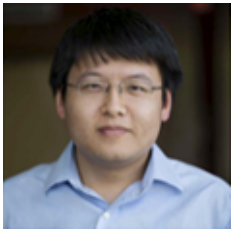
Please send your comments and feedback to the JFIG Media Coordinator:

Stanley Lim
 Eli Broad College of Business
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President's Column



by RUIWEI JIANG
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Industrial and
Operations Engineering Department,
University of Michigan, Ann Arbor

The JFIG was founded in 2001 with the mission “to create a forum to increase junior faculty interaction with each other, with senior faculty, and with industry, and to provide opportunities for networking and collaborative research.” It is my great honor to serve as the President of JFIG over the past year (21st year of JFIG). Even though the world has been recovering from the COVID pandemic, it is still quite challenging for junior faculty to maintain work-life balance, especially with young (unvaccinated) kids at home. Because of these reasons, we (JFIG team) transitioned some of our traditional JFIG events to the virtual format and I was delighted to see significant increase in the participation of the JFIG members in these events. In addition, JFIG continued to grow in terms of membership and remained strong financially.

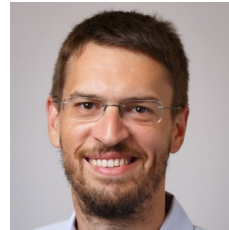
The JFIG paper competition is one of the most prestigious and long-standing competitions in the INFORMS community and highlights some of the best research carried out by the junior faculty. The 2022 JFIG paper competition had 42 eligible high-quality papers. I am thankful to Frank E. Curtis and Daniel Kuhn, who volunteered to co-chair the review committee of the paper competition. I also would like to thank all faculty members from various fields who served as the judges for Round 1 and Round 2 of the competition. Despite their busy schedules, our senior colleagues worked hard and dedicated their valuable time to maintain the high-standards and timeliness throughout the paper competition. The six finalists selected by the review committee presented their papers in two technical hybrid-sessions organized by JFIG at the INFORMS Annual Meeting.

We also successfully organized four virtual panel discussions on wide range of topics that are of interest to JFIG members including finding funding opportunities to CAREER awards and the newly launched early-career researchers webinar. Also, I would like to thank the schools and departments who sponsored the JFIG events in 2022.

I am highly grateful to JFIG officers, Albert Berahas, Stanley Lim, Serasu Duran, and Emily Tucker, for their significant support, dedication, and hard work in raising funds, organizing events, and ensuring smooth functioning of JFIG. This year, there will be two vacancies on the JFIG board as Stanley and I are approaching the end of our terms. We are seeking nominees for the open officer positions (President-Elect and Media Coordinator). Please consider running for one of these positions to help shape the future of JFIG.

Lastly, I would like to congratulate Albert on his appointment as the incoming JFIG president. I sincerely wish him and the JFIG board the very best for with their planned endeavors for the coming year.

President-Elect's Column



by ALBERT S. BERAHAS
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Industrial and
Operations Engineering Department,
University of Michigan, Ann Arbor

First and foremost, I would like to express my gratitude for your trust in me as the President-Elect of the INFORMS Junior Faculty Interest Group (JFIG) 2022-24. It is an incredible honor and privilege to serve our great community.

Despite the challenges brought by the pandemic, JFIG has grown in terms of membership, participation, and activities. In 2022, we were able to resume pre-pandemic activities at the INFORMS Annual Meeting, such as the JFIG Luncheon and technical sessions, which were a great success. JFIG's membership continues increasing each year, and we received 42 papers for the JFIG Paper Competition (11 more than the previous year). Moreover, we launched the Early-Career Researchers Webinar series.

I am particularly grateful for Ruiwei's excellent leadership, the amazing support of the JFIG officers, the faculty (junior and senior) who participated in JFIG events, and the dedicated INFORMS staff. Moving forward, I look forward to working with Emily and Serasu, the new JFIG officers, and the JFIG community to build upon these successes and add new and exciting components to our offerings.

Thank you for your continued support. See you in Phoenix!

2022 JFIG Paper Competition Results

by JFIG LEADERSHIP TEAM

The JFIG paper competition has been organized by JFIG since 2001 with the goal of promoting and encouraging research among junior faculty. The competition serves to increase the visibility of research conducted by junior faculty and the graduate students working with them within the fields of operations research and management science.

This year, we received 42 eligible papers. Each paper was written by junior faculty, sometimes with help from their students or industry partners. The papers were evaluated based on the importance and timeliness of the topic, appropriateness of the research approach, and the significance of research contribution. This year, the submitted papers spanned a wide range of research areas including Optimization, Stochastics/Applied Probability, Game Theory/Mechanism Design, Empirical, Machine Learning/Data Analytics, Inventory Theory, Statistics, Sustainability, Retail Operations, Supply Chain, and Simulation.

The review process was overseen by two invited co-chairs:

- Frank E. Curtis (Department of Industrial and Systems Engineering, Lehigh University)
- Daniel Kuhn (College of Management of Technology, EPFL)



JFIG Paper Competition Co-chairs: Frank E. Curtis (left) and Daniel Kuhn (right)

We are thankful to them for their service and help. This competition would be impossible were it not for their efforts. We would also like to thank the following reviewers from a wide variety of areas who volunteered their time and expertise to evaluate the submissions.

Round 1: each paper was reviewed by 2 judges, and six papers went to Round 2. Round 1 judges were:

Andrea Lodi	Karthik Natarajan	Velibor Misis
Andreas Waechter	Negar Kiyavash	Vineet Goyal
Andrew Schaefer	Nikos Trichakis	Vishal Gupta
Andy Sun	Omar Besbes	Henry Lam
Chung Piaw Teo	Paat Rusmevichientong	Sven Leyffer
Cole Smith	Phebe Vayanos	
Dan Iancu	Uday Shanbhag	
Juan Pablo Vielma	Varun Gupta	

Round 2: each paper was reviewed by one committee (Department Editor at a top journal) and co-chairs. Round 2 committee were:

- Andreas Waechter, Northwestern University
- Chung Piaw Teo, National University of Singapore

- Omar Besbes, Columbia University
- Varun Gupta, University of Chicago
- Velibor Misis, UCLA

Final round: all reviews were shared and voted by the 5 committee members (not including co-chairs). Six finalists were selected by the review committee and invited to present at the JFIG sponsored sessions at the 2022 INFORMS Annual Meeting in Indianapolis and the winners were announced at the JFIG Business Meeting.

Below are the paper summaries from the finalists. Congratulations to them!

First place: *Adjustability in Linear Robust Optimization*

by NINGJI WEI (TEXAS TECH UNIVERSITY) AND PETER ZHANG (CARNEGIE MELLON UNIVERSITY)

Abstract: We investigate the concept of adjustability – the difference in objective values between two types of dynamic robust optimization formulations: one where (static) decisions are made before uncertainty realization, and one where uncertainty is resolved before (adjustable) decisions. This difference reflects the value of information and decision timing in optimization under uncertainty, and is related to several other concepts such as interchangeability in games and optimality of decision rules in robust optimization. We develop a theoretical framework to quantify adjustability based on the input data of a robust optimization problem with linear objective, linear constraints, and fixed recourse. We make very few additional assumptions. In particular, we do not assume constraint-wise separability or parameter nonnegativity that are commonly imposed in the literature for the study of adjustability. This allows us to study important but previously under-investigated problems, such as formulations with equality constraints and problems with both upper and lower bound constraints. Based on the discovery of an interesting connection between the reformulations of the static and fully adjustable problems, our analysis gives a necessary and sufficient condition – in the form of a theorem-of-the-alternatives – for adjustability to be zero when the uncertainty set is polyhedral. Based on this sharp characterization, we provide a mixed-integer optimization formulation as a certificate of zero adjustability. Then, we develop a constructive approach to quantify adjustability when the uncertainty set is general, which results in an efficient and tight algorithm to bound adjustability. We demonstrate the efficiency and tightness via both theoretical and numerical analyses.

Second place: Representing Random Utility Choice Models with Neural Networks

by ALI AOUAD (LONDON BUSINESS SCHOOL) AND ANTOINE DÉSIR (INSEAD)

Abstract: Motivated by the successes of deep learning, we propose a class of neural network-based discrete choice models, called RUMnets, which is inspired by the random utility maximization (RUM) framework. This model formulates the agents' random utility function using the sample average approximation (SAA) method. We show that RUMnets sharply approximate the class of RUM discrete choice models: any model derived from random utility maximization has choice probabilities that can be approximated arbitrarily closely by a RUMnet. Reciprocally, any RUMnet is consistent with the RUM principle. We derive an upper bound on the generalization error of RUMnets fitted on choice data, and gain theoretical insights on their ability to predict choices on new, unseen data depending on critical parameters of the dataset and architecture. By leveraging open-source libraries for neural networks, we find that RUMnets outperform other state-of-the-art choice modeling and machine learning methods by a significant margin on two real-world datasets.

Third place: A Decomposition Algorithm for Two-Stage Stochastic Programs with Nonconvex Recourse

by HANYANG LI (PHD STUDENT) AND YING CUI (UNIVERSITY OF MINNESOTA TWIN CITIES)

Abstract: In this paper, we have studied a decomposition method for solving a class of nonconvex two-stage stochastic programs, where both the objective and constraints of the second-stage problem are nonlinearly parameterized by the first-stage variable. Due to the failure of the Clarke regularity of the resulting nonconvex recourse function, classical decomposition approaches such as Benders decomposition and (augmented) Lagrangian-based algorithms cannot be directly generalized to solve such models. By exploring an implicitly convex-concave structure of the recourse function, we introduce a novel decomposition framework based on the so-called partial Moreau envelope. The algorithm successively generates strongly convex quadratic approximations of the recourse function based on the solutions of the second-stage convex subproblems and adds them to the first-stage master problem. Convergence under both fixed scenarios and interior samplings is established. Numerical experiments are conducted to demonstrate the effectiveness of the proposed algorithm.

Honorable mention: Conditional Uniformity and Hawkes Processes

by ANDREW DAW (UNIVERSITY OF SOUTHERN CALIFORNIA)

Abstract: Classic results show that the Hawkes self-exciting point process can be viewed as a collection of temporal clusters, in which exogenously generated initial events give rise to endogenously driven descendant events. This perspective provides the distribution of a cluster's size through a natural connection to branching processes, but this is irrespective of time. Insight into the chronology of a Hawkes process cluster has been much more elusive. Here, we employ this cluster perspective and a novel adaptation of the random time change theorem to establish an analog of the conditional uniformity property enjoyed by Poisson processes. Conditional on the number of epochs in a cluster, we show that the transformed times are jointly uniform within a particular convex polytope. Furthermore, we find that this polytope leads to a surprising connection between these continuous state clusters and parking functions, discrete objects central in enumerative combinatorics and closely related to Dyck paths on the lattice. In particular, we show that uniformly random parking functions constitute hidden spines within Hawkes process clusters. This yields a decomposition that is valuable both methodologically and practically, which we demonstrate through application to the popular Markovian Hawkes model and proposal of a flexible and efficient simulation algorithm.

Honorable mention: Online Capacity Scaling Augmented With Untrusted Machine Learning Predictions

by DAAN RUTTEN (PHD STUDENT) AND DEBANKUR MUKHERJEE (GEORGIA INSTITUTE OF TECHNOLOGY)

Abstract: Modern data centers suffer from immense power consumption. As a result, data center operators have heavily invested in capacity scaling solutions, which dynamically deactivate servers if the demand is low and activate them again when the workload increases. We analyze a continuous-time model for capacity scaling, where the goal is to minimize the weighted sum of flow-time, switching cost, and power consumption in an online fashion. We propose a novel algorithm, called Adaptive Balanced Capacity Scaling (ABCS), that has access to black-box machine learning predictions. ABCS aims to adapt to the predictions and is also robust against unpredictable surges in the workload. In particular, we prove that ABCS is $(1 + \epsilon)$ -competitive if the predictions are accurate, and yet, it has a uniformly bounded competitive ratio even if the predictions are completely inaccurate. Finally, we investigate the performance of this algorithm on a real-world dataset and carry out extensive numerical experiments, which positively support the theoretical results.

Honorable mention: *Convex Fairness Measures: Theory and Optimization*

by MAN YIU TSANG (PHD STUDENT) AND KARMEL S. SHEHADEH (LEHIGH UNIVERSITY))

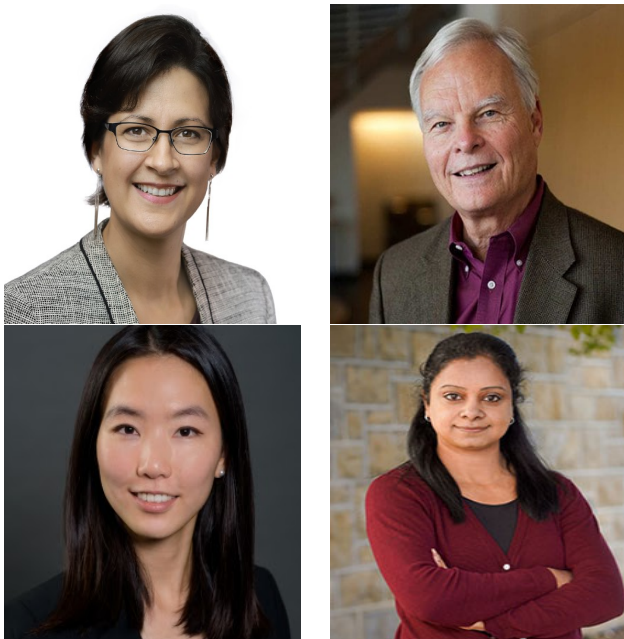
Abstract: We propose a new parameterized class of fairness measures, convex fairness measures, suitable for optimization contexts. This class includes our new proposed order-based fairness measure and several popular measures (e.g., deviation-based measures, Gini deviation). We provide theoretical analyses and derive a dual representation of these measures. Importantly, this dual representation renders a unified mathematical expression and a geometric characterization for convex fairness measures through their dual sets. Moreover, we propose a generic framework for optimization problems with a convex fairness measure objective, including reformulations and solution methods. Finally, we provide a stability analysis on the choice of convex fairness measures in the objective of optimization models.

JFIG Sponsored Virtual Panel Discussions

In 2022, JFIG organized one virtual panel discussion session and three research seminars as part of the newly launched early-career researchers webinar program throughout the year.

Tuesday, March 1, 2022

From Finding Funding Opportunities to CAREER Awards: A Guide for Junior Faculty



Speakers: Irina Dolinskaya (top left), Lawrence Seiford (top right), Eunhye Song (bottom left), and Divya Srinivasan (bottom right)

Panelists:

- Irina Dolinskaya (National Science Foundation)
- Lawrence Seiford (University of Michigan)
- Eunhye Song (The Pennsylvania State University)
- Divya Srinivasan (Clemson University)

Link to Recording:

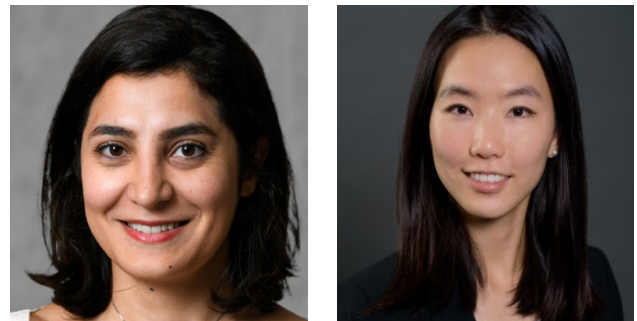
<https://www.youtube.com/watch?v=p11BvLDV0Hc>

Early-Career Researchers Webinar

We introduced the early-career researchers webinar as a new initiative for junior faculty and senior Ph.D. students in Operations Research/Management Sciences to present their recent research. More information about the webinar is available via this link: <https://sites.google.com/view/ecr-webinar/home>.

Friday, September 16, 2022

Early-Career Researchers Webinar Series I



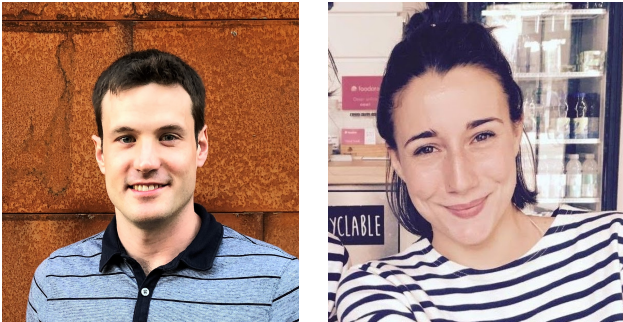
Speakers: Sara Shashaani (left) and Eunhye Song (right)

Speakers:

- Sara Shashaani (North Carolina State University)
- Eunhye Song (Georgia Institute of Technology)

Friday, November 11, 2022

Early-Career Researchers Webinar Series II



Speakers: Jacob Mays (left) and Lesia Mitridati(right)

Speakers:

- Jacob Mays (Cornell University)
- Lesia Mitridati (Technical University of Denmark (DTU))

Friday, December 9, 2022

Early-Career Researchers Webinar Series III



Speakers: Lauren Steimle (left) and Emily Tucker (right)

Speakers:

- Lauren Steimle (Georgia Institute of Technology)
- Emily Tucker (Clemson University)

JFIG Sponsored Events at 2022 Annual Meeting in Indianapolis



In 2022, JFIG organized two paper competition sessions during the INFORMS Annual Meeting. These sessions include talks by the six finalists of the 2022 JFIG paper competition. We also organized the JFIG Luncheon and conducted our business meeting on October 17. The session was extremely well received.



JFIG Luncheon at INFORMS Annual Meeting

Sunday, October 16, 2022

SE85. JFIG Paper Competition Session I Session Co-chairs: Frank E. Curtis, Kuhn Daniel, and Ruiwei Jiang

Presenters:

- Ali Aouad (London Business School) and Antoine Désir (INSEAD)
- Hanyang Li and Ying Cui (University of Minnesota Twin Cities)
- Ningji Wei (Texas Tech University) and Peter Zhang (Carnegie Mellon University)

Monday, October 17, 2022

MA85. JFIG Paper Competition Session II Session Co-chairs: Frank E. Curtis, Kuhn Daniel, and Ruiwei Jiang

Presenters:

- Andrew Daw (University of Southern California)
- Daan Rutten and Debankur Mukherjee (Georgia Institute of Technology)
- Man Yiu Tsang and Karmel S. Shehadeh (Lehigh University)

Financial and Membership Status Update



by SERASU DURAN
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Haskayne School of Business,
University of Calgary

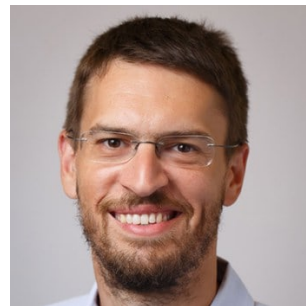
JFIG received a total sponsorship of \$1,500 in 2022. The total revenue in 2022 is \$6,667, and the total expense is \$1,621. The fund balance is \$14,526 as of November, 2022.

JFIG Leadership Team

INFORMS has been supporting junior faculty through JFIG since 2001. Our mission is to create a forum to increase junior faculty interaction with each other, with senior faculty, and with industry, and to provide opportunities for networking and collaborative research. Currently, our leadership team is as follows:



President: Ruiwei Jiang,
✉ ruiwei@umich.edu



President-Elect: Albert S. Berahas,
✉ aberahas@umich.edu



Treasurer: Serasu Duran,
✉ serasu.duran@haskayne.ucalgary.ca



Secretary: Emily Tucker,
✉ etucke3@clermson.edu



Media Coordinator: Stanley Lim,
✉ slim@msu.edu

We have seen a healthy growth of JFIG membership over the past few years. The number of JFIG members has increased to 197 as of August, 2022 and 202 as of March, 2023.

Social Media Platforms

JFIG provides an email listserv where announcements regarding job postings, workshops and conferences are disseminated. For timely updates, follow us on Twitter (@informsjfig) and join our LinkedIn Group.

- LinkedIn: <https://www.linkedin.com/groups/13968217>
- Twitter: <https://twitter.com/informsjfig>
- INFORMS JFIG: <https://connect.informs.org/jfig/about-us/aboutjfig>

Open Officer Positions - Call for Nominations

JFIG wants you! This is a call for officer nominations for two open positions on the JFIG Board, including:

- Vice-president/President-elect (two-year term, transition to President after one year)
- Media Coordinator (two-year term)

If you know of a JFIG member who is interested in any of the above positions, please email us at jfig.informs@gmail.com with their name, email address, and a short biographical note. If you are interested in a position, you can self-nominate and send us the same information. More information about the nomination deadline will be announced shortly. After the nomination deadline, JFIG will reach out to all candidates in order to arrange for the voting process.

Sponsors

We would like to thank our sponsors for their generous support and help. The activities of this group could never take place without your sponsorship.



Sponsorship from the Industrial and Operations Engineering, University of Michigan



Northwestern
University

Sponsorship from the Industrial Engineering and Management Sciences, Northwestern University



LEHIGH
UNIVERSITY

Sponsorship from the Industrial and Systems Engineering, Lehigh University

Thank you!

Would your department/school like to sponsor us and help JFIG with our activities? If so, please contact our treasurer, Serasu Duran at serasu.duran@haskayne.ucalgary.ca.