Omid Rafieian

Cornell Tech and SC Johnson College of Business
Cornell University

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Research Interests

Substantive areas: digital marketing, mobile advertising, targeting, personalization, privacy, polarization, online auctions.

Methods: policy evaluation, structural models, machine learning, reinforcement learning, mechanism design, causal inference.

Employment

Cornell Tech and SC Johnson College of Business, Cornell University
Demir Sabanci Faculty Fellow of Marketing and Management, February 2021 to present
Assistant Professor of Marketing, July 2020 to present

Education

University of Washington, Seattle, WA
Ph.D., Marketing, 2015 to 2020

Sharif University of Technology, Tehran, Iran
B.S., Applied Mathematics, 2010 to 2015

Dissertation

Title: Essays on Personalization and Market Design in Mobile Advertising
Chair: Hema Yoganarasimhan

Winner, 2019 MSI Alden G. Clayton Doctoral Dissertation Proposal Competition

Winner, 2019 Vithala R. and Saroj V. Rao ISMS Doctoral Dissertation Award

Winner, 2020 American Statistical Association Doctoral Research Award (Statistics in Marketing Section)

Publications

1. Rafieian, O., Kapoor, A., and Sharma, A., "Multi-Objective Personalization of Marketing Interventions," Forthcoming at *Marketing Science*

2. Rafieian, O., (2023) "Optimizing User Engagement through Adaptive Ad Sequencing," *Marketing Science*, Vol 42(5), pp 910-933.

3. Rafieian, O., and Yoganarasimhan, H., (2022) "Variety Effects in Mobile Advertising," *Journal of Marketing Research*, Volume 59, Issue 4, pp 718-738.

   Finalist, AMA-MRSIG Don Lehmann Award, 2023

4. Rafieian, O., and Yoganarasimhan, H., (2021) "Targeting and Privacy in Mobile Advertising," *Marketing Science*, Vol 40(2), pp 193-218. (*Lead article*)

   Winner, Frank M. Bass Dissertation Paper Award,2021

   Finalist, John D.C. Little Best Paper Award, 2021

Chapters and Survey Papers

5. Rafieian, O., and Yoganarasimhan, H., "AI and Personalization," Artificial Intelligence in Marketing (*Review of Marketing Research*, Vol. 20), pp. 77-102.

Working Papers

6. Rafieian, O., "A Matrix Completion Solution to the Problem of Ignoring the Ignorability Assumption." (Major Revision at *Marketing Science*)

7. Bondi, T., Rafieian, O., Yao, Y., "Privacy and Polarization: An Inference-Based Framework." (Major Revision at *Management Science*, Extended Abstract at *EC'24*)

8. Rafieian, O., "Revenue-Optimal Dynamic Auctions for Adaptive Ad Sequencing."

9. Rafieian, O., Zuo, S., "Personalized Algorithms and the Virtue of Learning Things the Hard Way."

Work in Progress

10. Ghili, S., Rafieian, O., and Rashid, M., "Auctions Meet Bandits: The Role of Exploration in Advertising Auctions."

11. Mosaffa, M., Rafieian, O., and Yoganarasimhan, H., "Media Bias in Visual Content: A Deep Learning Approach."

12. Khadem, S., Rafieian, O., "Value of Perfect User Tracking in Ad Personalization."

13. Rafieian, O., "Geographical and Behavioral Information: Complements or Substitutes in Personalized Policies?"

14. Bondi, T., Liaukonyte, J., and Rafieian, O., "Reducing Choice Frictions through Quality Grade Personalization: Evidence from a Large-Scale Experiment."

15. Bondi, T., Khadem, S., and Rafieian, O., "Repaired Incentives? Evidence from Right to Repair Legislation in Five U.S. States."

Research Awards and Honors

Finalist, AMA-MRSIG Don Lehmann Award, 2023

Winner, Frank M. Bass Dissertation Paper Award,2021

Finalist, John D.C. Little Best Paper Award, 2021

Winner, American Statistical Association Doctoral Research Award (Statistics in Marketing Section), 2020

Winner, MSI Alden G. Clayton Doctoral Dissertation Proposal Competition, 2019

Winner, Vithala R. and Saroj V. Rao ISMS Doctoral Dissertation Award, 2019

Fellow, AMA-Sheth Doctoral Consortium, New York, New York, 2019.

2016-2018 Ph.D. Program Dean's Achievement Award

James B. Wiley Endowed Ph.D. Fellowship in Marketing, 2018-2020

F. Kemper Freeman, Jr. 2014 Distinguished Leader Fellowship, University of Washington, 2017-2019.

Foster School of Business Fellowship, University of Washington, 2015-2017

Teaching and Service Awards

Marketing Science Service Awards, 2022

Management Science Service Awards, 2020, 2021, 2022

Teaching

Data Analytics and Modeling (NCC 5010, JCT-MBA, AMBA, Cornell University)

Managerial Statistics (NCCE 5010, EMBA, Cornell University)

Doctoral Seminar in Quantitative Models (NRE 5020, Ph.D., Cornell University)

Service

Editorial Review Board member at *Marketing Science* (2021 - present)

Ad-hoc reviewer for *Management Science*, *Journal of Marketing Research*, *Journal of Marketing*, *Quantitative Marketing and Economics*, *Economic Journal*, *International Journal of Industrial Organization*

Program Committee at *Economics and Computation (EC)* 2024, *Workshop on Platform Analytics (WoPA)* 2023, 2024, 2025

Student Supervision

Si Zuo (Committee Member, Graduation Year: 2025)

Yanqing Gui (Committee Member, Graduation Year: 2026)

Mohammad Mosaffa (Chair, Graduation Year: 2028)

Sepehr Khadem (Chair, Graduation Year: 2028)

Meng Yang (Committee Member, Graduation Year: 2028)

Invited Talks

Multi-Objective Personalization of Marketing Interventions
- University of Pennsylvania, 2024
- Duke University, 2024
- Washington University in St. Louis, 2023

A Matrix Completion Solution to the Problem of Ignoring the Ignorability Assumption
- TikTok Marketing Science, 2023
- Temple University, 2023

Adaptive Ad Sequencing (based on "Optimizing User Engagement through Adaptive Ad Sequencing" and "Revenue-Optimal Dynamic Auctions for Adaptive Ad Sequencing")
- University of Wisconsin Madison, 2019
- University of Colorado Boulder, 2019
- University of Southern California, 2019
- University of Texas Dallas at Dallas, 2019
- Texas A&M University, 2019
- Harvard Business School, 2019
- Stanford University, 2019
- Yale University, 2019
- University of Toronto, 2019
- Penn State University, 2019

University of Rochester, 2019
Johns Hopkins University, 2019
Rutgers University, 2019
Carnegie Mellon University, 2019
Cornell Tech, 2019
Cornell University, 2019
University of California San Diego, 2019
Dartmouth College, 2021
Temple University, 2023

Conference Talks

Privacy and Polarization: An Inference-Based Framework.
ESIF Economics and AI+ML Meeting, 2024

Personalized Algorithms and the Virtue of Learning Things the Hard Way.
UTD Bass FORMS, 2025 (scheduled)
Marketing Science Conference, 2024
Theory + Practice in Marketing, 2024

A Matrix Completion Solution to the Problem of Ignoring the Ignorability Assumption.
UTD Bass FORMS, 2023

Revenue-Optimal Dynamic Auctions for Adaptive Ad Sequencing.
Marketing Science Conference, 2020
QME Conference, 2020

Optimizing User Engagement through Adaptive Ad Sequencing.
Marketing Science Conference, 2020
Informs Annual Meeting, 2020

How Does Variety of Previous Ads Influence Consumer's Ad Response?
Marketing Science Conference, 2018
UW-UBC Conference, 2018
CMU-Temple Conference on Digital Marketing and Machine Learning, 2018

Targeting and Privacy in Mobile Advertising.
Marketing Science Conference, 2017
UTD Bass FORMS Conference, 2019

Abstracts for Work In Progress

10. Ghili, S., Rafieian, O., and Rashid, M., "Auctions Meet Bandits: The Role of Exploration in Advertising Auctions."

Sponsored search positions are typically allocated through real-time auctions, where the outcomes depend on advertisers' quality-adjusted bidsthe product of their bids and quality scores. Although quality scoring helps promote ads with higher conversion outcomes, setting these scores for new advertisers in any given market is challenging, leading to the cold-start problem. To address this, platforms incorporate multi-armed bandit algorithms in auctions to balance exploration and exploitation. However, little is known about the optimal exploration strategies in such auction environments. We utilize data from a leading Asian mobile app store that places sponsored ads for keywords. The platform employs a Thompson Sampling algorithm within a second-price auction to learn quality scores and allocate a single sponsored position for each keyword. We empirically demonstrate two key ways in which exploration increases platform revenues. First, we quantify how exploration enhances efficiency by discovering high-quality new advertisers, a mechanism well-established in standard bandit problems. Second, unlike standard non-strategic bandit problems, we find that exploration can serve as a tool to increase market thickness, thereby boosting platform revenues. Based on these insights, we propose a customized exploration strategy in which the platform adjusts the level of exploration for each keyword according to specific keyword-level characteristics. We derive the Pareto frontier for revenue and efficiency and offer actionable policies that highlight substantial gains for the platform on both fronts when using a customized exploration strategy.

11. Mosaffa, M., Rafieian, O., and Yoganarasimhan, H., "Measuring Polarization in Visual Content Using Counterfactual Image Generation."

Political polarization is an increasingly significant issue in American politics, influencing public discourse, policy, and consumer behavior. While studies on polarization in news media have extensively focused on verbal content, non-verbal elements, particularly visual content, have received less attention due to the complexity and high dimensionality of image data. Traditional descriptive approaches often rely on feature extraction from images, leading to biased polarization estimates due to information loss. In this paper, we introduce the Polarization Measurement Using Counterfactual Image Generation (PMCIG) method, which combines economic theory with generative models and multi-modal deep learning to fully utilize the richness of image data and provide a theoretically grounded measure of polarization in visual content. Applying this framework to a decade-long dataset featuring 26 prominent politicians across 20 major news outlets, we identify significant polarization in visual content, with notable variations across outlets and politicians. At the news outlet level, we observe that Republican-leaning outlets are more likely to use positive images of Republican politicians while Democratic-leaning outlets tend to favor the opposite. At the politician level, our results reveal considerable differences in the degree of polarization, with certain politicians consistently portrayed in a more ideologically slanted manner than others. Furthermore, our model uncovers temporal trends and highlights distinct patterns in the evolution of media polarization between Democratic-leaning and Republican-leaning outlets

over the past decade.

12. Khadem, S., Rafieian, O., "Value of Perfect User Tracking in Ad Personalization."

In this paper, we examine the impact of imperfect information at the user tracking level on advertising performance. We introduce two types of identifiers, perfect and imperfect, and discuss how imperfections can manifest in two forms: *fragmented* and *aggregated*. We propose a framework to compare the effectiveness of each identifier in personalized targeting models and assess the loss associated with each type of imperfection. Our framework consists of two main components: a machine learning model for personalized targeting and a counterfactual policy evaluation procedure. We applied this framework to a dataset using both a perfect identifier and an imperfect identifier. Our results indicate that the model using the imperfect identifier experiences a 9.1% performance loss compared to the model with the perfect identifier. Interestingly, while both types of imperfect information contribute to this loss, aggregated imperfections have a more significant impact, as fragmented information retains some level of user's information.

13. Rafieian, O., "Geographical and Behavioral Information: Complements or Substitutes in Personalized Policies?"

In this paper, we seek to quantify the extent to which geographical information improves targeting over and above behavioral information, and vice versa. This question is particularly important from a privacy policy perspective. We combine a predictive machine learning framework with well-known measures of spatial correlation, such as Moran's I and Geary's c tests, and show that geographical information complements behavioral information. We then examine whether the source of this complementarity is spatial influence. We develop a shuffle test that allows us to identify spatial influence. Interestingly, we find that spatial influence does not explain why geographical information complements behavioral information. Instead, geographical information is most useful when behavioral information is sparse, such as when the user is new to the platform.

14. Bondi, T., Liaukonyte, J., and Rafieian, O., "Reducing Choice Frictions through Quality Grade Personalization: Evidence from a Large-Scale Experiment."

Quality grading is widely used in markets for used products to help buyers reduce uncertainty about the products condition. However, providing detailed quality grades can shift consumers reference points and cannibalize demand for non-premium products. In this paper, we examine this trade-off and offer a strategy based on the personalization of the choice set. Using a theoretical framework, we demonstrate how reference-dependent behavioral biases introduce friction in the market. In particular, we show that offering granular choice sets can lower both consumer welfare and seller revenues in equilibrium. We then propose a personalized approach in which the consumer reveals their preferences in an interactive environment, and the algorithm offers a personalized product based on those preferences. Our theoretical analysis illustrates the conditions under which this method improves outcomes. By analyzing previous experiments conducted by a large-scale marketplace for refurbished products, we find empirical evidence of demand cannibalization due to granular quality grading. We subsequently design an experiment that uses a

modified choice architecture, offering a personalized quality option to each consumer. Our results show that this approach significantly reduces market friction, helping consumers find the right match more effectively.

15. Bondi, T., Khadem, S., and Rafieian, O., "Repaired Incentives? Evidence from Right to Repair Legislation in Five U.S. States."

Right to Repair regulations, which require manufacturers to make spare parts and repair tools accessible to consumers, have gained traction in the U.S., with laws already passed in New York, California, Colorado, Minnesota, and Oregon. These regulations aim to boost consumer confidence in refurbished goods by lowering repair costs and promoting product longevity. However, their impact on consumer behavior and manufacturer strategies remains largely unknown. This paper examines the equilibrium effects of Right to Repair laws on the refurbished tech market. We first develop a simple theoretical model of consumer demand and manufacturer design and pricing. Using a proprietary dataset from a leading marketplace for refurbished electronics, we empirically assess whether Right to Repair legislation has increased demand for refurbished tech. Lastly, we conduct an informational field experiment on the platform to test whether raising consumer awareness of these regulations influences purchasing decisions. Our findings offer important insights into how these regulations shape market dynamics and consumer behavior in the refurbished tech industry.