Michael Huang

https://mh3166.github.io/

Contact Information

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Academic Positions

Zicklin School of Business, CUNY Baruch College, New York, NY
Assistant Professor of Operations and Decision Analytics **2024-Present**

Education

University of Southern California, Los Angeles, CA **2017-2023**
Doctoral Candidate in Data Sciences and Operations
Thesis: Decision-Aware Learning in the Small-Data, Large-Scale Regime
Advisors: Vishal Gupta, Paat Rusmevichientong

Columbia University, New York, NY **2011-2016**
M.S. in Operations Research 2016
B.S. in Operations Research, Minor in Computer Science 2015

Research Interests

Large-scale, data-driven optimization with scarce data and algorithm design. Applications in transportation, healthcare, and recommender systems.

Working Papers

6. "Decision-Focused Learning with Directional Gradients" with V. Gupta.
Under Review

5. "Decision-Aware Denoising" with V. Gupta and P. Rusmevichientong.
Major Revision.

Publications

4. "Debiasing In-Sample Policy Performance for Small-Data, Large-Scale Optimization." with V. Gupta, and P. Rusmevichientong.
Operations Research, 2022.

3. "Dynamic server assignment in multiclass queues with shifts, with application to nurse staffing in emergency departments." with C. W. Chan and V. Sarhangian.
Operations Research, 2021.
   - Implemented data-driven web application to schedule nurses for a trial at Weill Cornell Medicine which reduced length of stay by an average of 1.7 hours

2. "Extending Search Phases in the Micali-Vazirani Algorithm." with C. Stein.
16th International Symposium on Experimental Algorithms, 2017. (44% acceptance rate)

Technical Notes

1. "Simplifying the Analysis of the Stein Correction in the Small Data-Large Scale Optimization Regime, " with V. Gupta and P. Rusmevichientong,

Professional Experience

Boston Consulting Group, Los Angeles, CA **Spring 2022**
Senior Data Scientist
- Collaborated with the data science team of a luxury department store chain to design and deploy a markdown strategy optimizer
- Adopted across all retail departments for the US market as part of a strategy projecting a 7% profit uplift

IBM, Yorktown Heights, NY **Summer 2020**
Research Intern, Industry and Solutions Group
- Developed a decision-tree-based learning method for regression/classification settings that combines dimension reduction and model fitting in an end-to-end framework

Mora, Boston, MA **2019**
Co-Founder and Chief Data Scientist

- Accepted into Harvard Business School Rock Incubator Venture Program
- Partnered with Harvard University Health Services to automate and improve recommendations generated from existing referral database

Aquant Capital Management, LLC, New York, NY **Summer 2016**
Consultant

- Replicated a private equity fund strategy through a risk-adjusted portfolio of small, value stocks
- Built a tool based on game theory model to optimize bidding strategy for auctions

Haidar Capital, New York, NY **2014-2015**
Intern

- Authored software to automate profit and loss reconciliations
- Researched competitor funds focusing on macro strategy to identify potential and unexplored ideas

Commodity Futures Trading Commission, New York, NY **2014**
Surveillance Analyst Intern

- Developed tools and quantitative models to detect disruptive trading practices

Honors and Awards

Marshall PhD Teaching Award **2022**

- Awarded to a student instructor (including PhD students and post-doctoral researchers) each year by USC Marshall School of Business for outstanding teaching practice

Marshall PhD Fellowship **2021**

- One of three fellowship awards of $10,000 given to PhD students on the quality of their dissertation proposal and research achievements

Marshall Outstanding Researcher Award **2021**

- Awarded to two PhD candidates each year for exemplifying excellence in research

2nd Place ($2,500) in Correlation One Datathon, West Coast Regional 2020

- Data science competition requiring teams to pose and and answer their own problems in urban transportation based upon real datasets
- Team awarded 2nd place among 1,000 total applicants
- Submission measured causal effects of introducing a bike share system to identify which neighborhoods of New York would benefit most from additional Citibike stations
- Leveraged weather as an instrumental variable to identify proportion of Citibike users who originally used taxis as their primary mode of transportation

1st Place ($20,000) in Correlation One Datathon, Southern California 2017

- Data science competition requiring teams to pose and and answer their own problems in urban transportation based upon real datasets
- Team awarded 1st place among 1,000 total applicants
- Submission identified neighborhoods in NYC that needed more access to public transportation
- Quantified benefits of investing in more transportation using the excess demand growth in transportation usage after the introduction of Uber to the city

Marshall/Graduate School Fellowship **2017-2022**

- Merit-based fellowship for graduate students to support their doctoral work, covering their tuition and stipend

The Robert Gartland Fellowship **2016**

- Fellowship of $5,000 to support MS students in the Columbia IEOR department, who have demonstrated academic excellence and professional promise in engineering and its business applications

Teaching Experience

Zicklin School of Business, Baruch College
QNT 2020 Foundations of Predictive Analytics and Decision Modeling
Undergraduate Core
Instructor **Fall 2024**

- Core undergraduate class for all business school majors

ODA 74100 Fundamentals of Deterministic Optimization
PhD Core
Instructor **Spring 2024**

- Graduate level class corresponding to the first doctoral course in the field of optimization that serves as the foundation for all subsequent courses in the area

USC Marshall School of Business
BUAD 311 Operations Management
Undergraduate Core
Instructor **Fall 2020**

- Independently lead lectures, held office hours, and graded exams for a core class with 28 students
- Coordinated with a larger course teaching team to create exams
- Awarded Marshall PhD Teaching Award, Instructor Rating: 4.63/5.00

Teaching Assistant **Spring 2020**

- Supported 500+ students over all sessions including office hours three times a week
- Coordinated with teaching team to create exams and quizzes

Columbia University
CSOR 4231 Analysis of Algorithms I
Undergraduate and Graduate Core
Teaching Assistant **Fall 2016**

- Supported 100+ students with office hours and graded homeworks and exams
- Coordinated with instructor to create homework and exam questions

IEOR 4405 Production Scheduling
Undergraduate Core
Course Assistant **Spring 2016**

- Graded homeworks and exams for 45 students

Projects

Impact of Improved Logistics on Customer Satisfaction **2020**

- Citadel Correlation One National Championship Datathon submission that studied how improving logistics in for the Brazilian e-commerce company Olist can improve customer satisfaction
- Leveraged instrumental variables, matching for causal inference, and natural language processing, to identify two important operations levers that improve customer satisfaction: earlier package arrival and reducing the number of shipments
- Used insights to prescribe potential regions in Brazil where Olist should expand their existing supply chain to improve customer satisfaction while optimizing their growth in the Brazilian market

Invited Talks

6. "Decision-Focused Learning with Directional Gradients"
   INFORMS Annual Meeting, Seattle, WA **Oct. 2024**
   25th ISMP Conference, Montreal, Canada **Jul. 2024**

5. "Decision-Aware Denoising"
   INFORMS Annual Meeting, Phoenix, AZ **Oct. 2023**

4. "Debiasing In-Sample Performance for Small-Data, Weakly-Coupled Settings"
   Rotman Young Scholar Seminar Series **Mar. 2023**
   INFORMS Annual Meeting, Indianapolis, IN **Oct. 2022**
   Cornell Young Researchers Workshop 2022 **Oct. 2022**
   International Conference on Continuous Optimization **Jul. 2022**

3. "Learning Policy Performance for Weakly-Coupled Linear Optimization in the Small-Data, Large-Scale Regime"
   INFORMS Annual Meeting, Anaheim, CA **Oct. 2021**

2. "Decomposition Methods for Small-Data, Large-Scale Discrete Optimization"
   INFORMS Annual Meeting, Virtual **Nov. 2020**
   INFORMS Annual Meeting, Seattle, WA **Oct. 2019**

1. "Extending Search Phases in the Micali-Vazirani Algorithm"
   Symposium on Experimental Algorithms, London, UK **Jun. 2017**

Service

Conference Organization:

- ICCOPT Session Chair 2022, "Tackling Bias in Data-Driven Optimization: Fundamental Limits and New Approaches"
- INFORMS Session Chair 2019, "Emerging Topics in Data-Driven Optimization"

Reviewer/Referee:

- Management Science, Operations Research, Manufacturing & Services Operations Management (MSOM)
- NeurIPS 2022, 2023, 2024
- ICML 2023, 2024
- ICLR 2024

Competition Judge/Reviewer

- Pierskalla Best Paper Award (2024)
- INFORMS Poster Competition (2023)

Computing

Python, R, Julia, C/C++, SQL, Cluster Computing, PyTorch, Gurobi