Michael Huang

https://mh3166.github.io/

Contact Information

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Education

University of Southern California, Los Angeles, CA **2017-2023** (Expected)
Ph.D. Student in Data Sciences and Operations
Thesis: Data-driven Optimization for the Small-Data 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

Professional Experience

IBM, Yorktown Heights, NY **2020**
Research Intern
- Developed a gradient-based, end-to-end learning decision tree framework for classification and regression settings specialized for high dimensional settings

Mora, Boston, MA **2019**
Co-founder and Chief Data Scientist
- Mora focuses on designing efficient and scalable platforms to help patients seeking mental healthcare find providers
- Start-up accepted into Harvard Business School Rock Incubator Venture Program
- Developing a matching algorithm to improve the quality of behavioral healthcare experience and referral process
- Collaborated with Harvard University Health Services to improve recommendations generated from existing referral database

Aquant Capital Management, LLC, New York, NY **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

Research Interests

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

Honors and Awards

Marshall PhD Teaching Award **2022**
- Awarded to a student instructor (including Ph.D. 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 $10000 given to PhD students in their 4th, 5th and 6th years from Marshall selected on the basis of the quality of their dissertation proposal, their CV, and research progress to date.

Marshall Outstanding Researcher Award **2021**

- One of two fellowship awards of $500 given to PhD students exemplifying excellence in research

2nd Place, Correlation One Datathon, West Coast Regional **2020**

- Won 2nd prize of $2500 in data science competition with over 1000 total applicants that used real datasets to answer open-ended problems in urban transportation.
- Our project looked to identify the causal effects of introducing a bike share system in New York. We primarily focused on the green benefits of bike share by estimating the reduction in taxi usage after the introduction of Citibike. This was achieved by using weather, the presence of rain, as an instrumental variable to identify what proportion of Citibike users originally used taxis as their primary mode of transportation. This helped identify which neighborhoods would benefit the most from having more Citibike stations.

1st Place, Correlation One Datathon, Southern California **2017**

- Won 1st prize of $20000 in data science competition with over 1000 total applicants that used real datasets to answer open-ended problems in urban transportation.
- Our winning project identified neighborhoods in NYC that needed more access to public transportation by studying how the introduction of Uber impacted travel. We measured the benefits of investing in more transportation for a specific neighborhood by constructing a metric that quantified the excess demand growth in transportation usage as a result of the introduction of Uber.

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 $5000 to support M.S. students in the Columbia IEOR department, who have demonstrated academic excellence and professional promise in engineering and its business applications.

Publications

1. "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-app for Weill Cornell Medicine which reduced length of stay up to 25% hours

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

Working Papers

3. "Debiasing In-Sample Policy Performance in the Small-Data, Large-Scale Optimization." with V. Gupta, and P. Rusmevichientong.
Targeted Journal: Management Science, July 2021

Work in Progress

4. "Debiasing In-Sample Performance for Weakly-Coupled Optimization Problems with Uncertain Objectives, " with V. Gupta and P. Rusmevichientong,
Targed Journal: Mathematical Programming (July 2021). ("A"-journal publication venue by Marshall tenure standards.

5. "Decomposition Methods for Urban Transportation in the Small-Data, Large-Scale Regime." with V. Gupta and P. Rusmevichientong,
Targeted Journal: Operations Research

6. "End-to-end learning for Classification and Regression Trees in High Dimensional Settings." with P. Murali, L.M. Lam, D. T. Phan

Teaching Experience

Instructor

BUAD 311 Operations Management **Fall 2020**
USC Marshall School of Business
Undergraduate Core
Marshall PhD Teaching Award, Rating: 4.63/5.00
Core class with 28 students covering fundamental concepts in process analysis, queueing, decision analysis, revenue management, and supply chain

Teaching Assistant

BUAD 311 Operations Management **Spring 2020**
USC Marshall School of Business
Undergraduate Core
Supported 500+ students across all sessions including office hours three times a week and coordinated with teaching team to create exams

CSOR 4231 Analysis of Algorithms I **Fall 2016**
Columbia University
Undergraduate and Graduate Core
Supported 100+ students with weekly office hours and coordinated with instructor to design homework and exam questions

Other

IEOR 4405 Production Scheduling **Spring 2016**
Columbia University
Undergraduate Core
Course assistant in charge of grading homework and exams for 45 students

Projects

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

- The project studied how improving logistics in for the Brazilian e-commerce company Olist can improve customer satisfaction. Using analysis which applied instrumental variables, matching for causal inference, and natural language processing, we identified two important operations levers that improve customer satisfaction: earlier package arrival and reducing the number of shipments. Using these insights, we prescribed potential regions in Brazil where Olist should expand their existing supply chain to improve customer satisfaction while optimizing their growth in the Brazilian market.

Emergency Department Nurse Scheduler **2016-2017**

- Implemented web application to schedule nurses for a trial at Weill Cornell Medicine which reduced length of stay up to 2.5 hours.
- Developed data-driven nurse scheduling policies based on "Dynamic server assignment in multiclass queues with shifts, with application to nurse staffing in emergency departments."

Invited Talks

1. "Learning Policy Performance for Weakly-Coupled Linear Optimization in the Small-Data, Large-Scale Regime"
   INFORMS Annual Meeting **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**

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

SERVICE — Conference Organization: INFORMS Session Chair 2019, "Emerging Topics in Data-Driven Optimization"

COMPUTING — Python, R, Julia, C/C++, SQL, Mathematica, Matlab, Gurobi