

# Michael Lingzhi Li

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**Research Interests** Inference for Machine Learning, Scalable Algorithms with Probabilistic Guarantees, Applications to Precision Healthcare, Healthcare Policy & Epidemiology

**Education** **Massachusetts Institute of Technology**, Cambridge, MA  
PhD in Operations Research; February 2022. GPA: 5.0/5.0  
Master's in Business Analytics, June 2018. GPA: 5.0/5.0  
Advisor: Prof. Dimitris Bertsimas

**University of Cambridge**, Cambridge, UK  
Bachelor of Arts (Hons.) in Mathematics, June 2017.  
1st Class Honors (Wrangler); Top 10% of Class

## Employment

**2023+** **Harvard Business School**, Boston, MA

*Assistant Professor*

- Tenure-track Assistant Professor working on frameworks and algorithms to help artificial intelligence and machine learning deliver real-world impact in healthcare and beyond

**2022–Present** **Waffle Labs**, Boston, MA

*Cofounder, Chief Data Officer & Chief Actuary*

- Technical cofounder for data-driven insurance startup aimed to transform buying and owning insurance into a pleasant and one-stop shop experience. I am responsible for all our data infrastructure and machine learning algorithms.

**2019–2022** **Lineage Logistics**, San Francisco, CA

*Machine Learning Scientist (Remote)*

- Led development of Lineage Logistics' first machine learning system to predict duration-of-stay of shipments; Patent Granted (USPTO Patent Number: 10,796,278, Second Named Inventor)

**2018** **StubHub (Ebay)**, San Francisco, CA

*Machine Learning & Quantitative Analyst*

- Led development of StubHub's first machine learning system to predict ticket pricing

**2017** **Boston Consulting Group**, London, UK

*Summer Associate*

- Led data analytics effort in a 9-person team for a \$50 million operational transformation case

**2016-17** **Royal Dutch Shell**, London, UK

*Remote Quantitative Analyst*

**2016** **J.P. Morgan Chase**, London, UK

*Structuring Intern*

## Publications

### *Methodological Contributions for Statistics and Machine Learning (ML)*

*Inference for ML*    **Experimental Evaluation of Individualized Treatment Rules**  
(with K. Imai)  
Accepted at Journal of American Statistical Association.

**Statistical Inference for Heterogeneous Treatment Effects in Randomized Experiments**  
(with K. Imai)  
Submitted to Journal of American Statistical Association.

**Pricing for Heterogeneous Products: Analytics for Ticket Reselling**  
(with M. Alley, M. Biggs, R. Hariss, C. Hermann, G. Perakis)  
Accepted at Manufacturing and Services Operations Management (MSOM).

**Robust Inference for Machine Learning with Observational Data**  
(with D. Bertsimas, K. Imai)  
In preparation.

*Scalable ML Algorithms*    **Fast Exact Matrix Completion: A Unifying Optimization Framework**  
(with D. Bertsimas)  
Journal of Machine Learning Research 21 (231): 1-43

**Scalable Holistic Linear Regression**  
(with D. Bertsimas)  
Operations Research Letters 48(3), 203-208

**Stochastic Cutting Planes for Data-Driven Optimization**  
(with D. Bertsimas)  
Accepted at INFORMS Journal on Computing.

**Slowly Varying Regression under Sparsity**  
(with D. Bertsimas, V. Digalakis, and O. S. Lami)  
Submitted to Operations Research.

**Holistic Deep Learning**  
(with D. Bertsimas, L. Boussioux, K. V. Carballo, A. Paskov, I. Paskov)  
Submitted to Journal of Machine Learning Research.

**Interpretable Matrix Completion: A Discrete Optimization Approach**  
(with D. Bertsimas)  
Submitted to INFORMS Journal on Computing

### *Healthcare and Epidemiology Applications*

*Personalized Healthcare*    **Selecting Children with VUR Who Are Most Likely to Benefit from Antibiotic Prophylaxis: Application of Machine Learning to RIVUR**  
(with D. Bertsimas, C. Estrada, C. Nelson, and H. S. Wang)  
Journal of Urology 2021 Apr; 205(4): 1170-1179.

**Prescriptive Analytics for Reducing 30-day Hospital Readmissions after General Surgery**  
(with D. Bertsimas, I. Paschalidis, and T. Wang)  
PLOS One 15(9), e0238118

**Targeted Workup after Initial Febrile Urinary Tract Infection: Using a Novel Machine Learning Model to Identify Children Most Likely to Benefit from VCUG**  
(with D. Bertsimas, J. Dunn, D. Zhuo, C. Estrada, C. Nelson, and H. S. Wang)  
Journal of Urology 2019 Apr; 202(1): 144–152.

**A Machine Learning Algorithm Predicting Risk of Dilating VUR**  
(with H. S. Wang, D. Cahill, J. Panagides, T. Logvineko, J. Chow, C. Nelson)  
Submitted to Journal of Urology.

*Epidemiology* **Forecasting COVID-19 and Analyzing the Effect of Government Interventions**  
(with H. Tazi Bouardi, O. Skali Lami, T. Trikalinos, N. Trichakis, and D. Bertsimas.)  
Accepted at Operations Research  
Reported by [New York Times](#) and [FiveThirtyEight](#)

**From Predictions to Prescriptions: A Data-driven Response to COVID-19**  
(with D. Bertsimas, L. Boussioux, R. Cory Wright, A. Delarue, V. Digalakis, A. Jacquillat, et al.)  
Health Care Management Science 24, 253-272

**Data-Driven COVID-19 Vaccine Development for Janssen**  
(with D. Bertsimas, S. Soni, H. Tazi Bouardi)  
To Submit to Nature.  
Reported by [MIT News](#)

**Where to Locate COVID-19 Mass Vaccination Facilities?**  
(with D. Bertsimas, V. Digalakis Jr., A. Jacquillat, A. Previero)  
Naval Research Logistics 10.1002/nav.22007

**Short-term Forecasting of COVID-19 in Germany and Poland During the Second Wave - A Preregistered Study**  
(with J. Bracher, D. Wolffram, J. Deuschel, K. Goergen, J. L. Ketterer, et al.)  
Accepted at Nature Communications

**Evaluation of individual and ensemble probabilistic forecasts of COVID-19 mortality in the United States**  
(with E. Y. Cramer, E.L. Ray, V.K. Lopez, J. Bracher, A. Brennen, et al.)  
Proceedings of the National Academy of Sciences 119 (15), e2113561119

**The United States COVID-19 Forecast Hub Dataset**  
(with E.Y. Cramer, Y. Huang, Y. Wang, E. L. Ray, M. Cornell, et al.)  
Accepted at Scientific Data

**THEMIS: A Framework for Cost-Benefit Analysis of COVID-19 Non-Pharmaceutical Interventions**  
(with D. Bertsimas, S. Soni)  
Submitted to Proceedings of National Academy of Sciences.

## Honors and Awards

- 2022** INFORMS Edelman Award Finalist
- 2021** INFORMS Doing Good with Good OR Competition Finalist  
INFORMS Innovative Applications in Analytics Award (1<sup>st</sup> Prize)  
Highly Commended Solution for the Trinity Challenge
- 2020** INFORMS Pierskalla Best Paper Award (Health Applications)  
Mixed Integer Programming (MIP) Workshop Best Student Poster Competition Finalist
- 2018** INFORMS MSOM Practice-Based Paper Competition Finalist
- 2015, 2016** Christine and Hermann Bondi Prize for Mathematics (Top of College)
- 2015** Finalist in Mathematical Competition in Modeling (Top 0.2%)
- 2014** Longmeng Scholarship (Surpassing All-time High School Academic Record)

## Teaching Experience

- 2021 Fall** **Massachusetts Institute of Technology**, Cambridge, MA  
*Teaching Assistant* for MBA core class Data, Models, and Decisions (15.060)
- 2020 Fall** **Massachusetts Institute of Technology**, Cambridge, MA  
*Head Teaching Assistant* for Machine Learning under a Modern Optimization Lens (15.095)  
Led a group of 4 TAs to help design, prepare, and teach an online/in-person hybrid teaching class for a core class of Master of Business Analytics (MBAn) and PhDs. Student Rating: 6.8/7.0
- 2019 Fall** **Massachusetts Institute of Technology**, Cambridge, MA  
*Teaching Assistant* for Machine Learning under a Modern Optimization Lens (15.095)  
Student Rating: 6.2/7.0
- 2019 Spring** **Massachusetts Institute of Technology**, Cambridge, MA  
*Teaching Assistant* for The Analytics Capstone (15.089)  
Mentored two MBAn students on capstone project with Quest Diagnostics. (Course not rated)

## Selected Talks

- 2020-21** **Data-Driven COVID-19 Vaccine Development for Janssen**  
*INFORMS 2021 Doing Good with Good OR Finalist (Session: VSA84)*
- Forecasting COVID-19 with Application to Vaccine Trial Design**  
*INFORMS 2021 Annual Meeting (Session: VWD12) & Healthcare Meeting*  
*ACM SIGMETRICS 2021 "Highlights beyond Sigmetrics"*
- Experimental Evaluation of Individualized Treatment Rules**  
*Joint Statistical Meetings 2020, Invited Session*
- DELPHI: Modeling the COVID-19 Crisis**  
*INFORMS 2020 Annual Meeting*

*Cambridge University Judge Business School Seminar  
University of Southampton CORMSIS Seminar*

**2018-19**      **Fast Exact Matrix Completion: A Unifying Optimization Framework**  
*INFORMS 2018, 2019 Annual Meeting*

**2017**            **Selecting Children with VUR Who Are Likely to Benefit from Antibiotic Prophylaxis**  
*INFORMS 2017 Annual Meeting*

### **Service and Outreach**

**2021**            Operations Research Seminar Co-Organizer

**2020–2021**    Student Representative of the MIT Legal, Ethical, and Equity Committee

**2018–Present** Reviewer for *Biometrika*, *BMC Health Service Research*, *Scientific Reports* (x2), *Frontiers in Digital Health*, *European Journal of Operational Research*, *OMEGA*, *Preventive Medicine*, *Harvard Data Science Review*, *Management Science*, and *PLOS One*

### **Professional Qualifications and Activities**

Fellow of the Institute and Faculty of Actuaries

*Programming:* Python, Julia, R, Matlab, SQL

*Optimization/Machine learning:* Gurobi, Tensorflow, Pytorch, CPLEX

*Languages:* Mandarin, English (Native), Japanese (Intermediate, N3)

*Interests:* Piano (ABRSM Grade 8), Swimming, Diving, Mountain Biking

**Citizenship**    Citizen of Canada