Operations Research Center

Massachusetts Institute of Technology

GRADUATE STUDENT DIRECTORY

November 2021

Vassilis Digalakis Jr.

Operations Research Center
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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, May 2023. GPA: 4.9/5.0
Advisor: Dimitris Bertsimas

Technical University of Crete, Chania, Greece
Diploma in Electrical and Computer Engineering (5-year degree, MEng equivalent, 300 ECTS credits), July 2018. GPA: 9.65/10.0, Valedictorian (ranked first).
Thesis title: *Data Analytics with Differential Privacy*
Advisor: Minos Garofalakis

Work Experience

2021 (Summer)
Alexa Entertainment SLU, Amazon Science, Cambridge, MA
Research Scientist Intern
Mentor: Masha Belyi
Developed models that allow for granular, offline categorization of defects in Alexa's entertainment utterances (e.g., differentiate between defects in natural language understanding versus in automatic speech recognition). To address scarcity and inconsistencies in defect type-annotated data, the proposed solution involved a novel automated labeling algorithm and a robust-to-label-uncertainty classifier.

2018-2021
OCP Maintenance Solutions, Cambridge, MA
Research Assistant
Advisor: Dimitris Bertsimas
Conducted research on using machine learning for preventive maintenance. Problems considered included predicting the failure patterns of the equipment that an equipment maintenance company is managing and designing optimal preventive maintenance and replacement strategies for such equipment. The objective was to minimize the expected cost of maintaining the equipment and provide the highest quality service.

Research Experience

2018–Present
Massachusetts Institute of Technology, Cambridge, MA
Research Assistant
Advisor: Dimitris Bertsimas.
Conducting research at the intersection of machine learning and optimization, with application to big-data settings. Recent research has focused on developing scalable and interpretable methods to address central problems in the machine learning literature (e.g., sparse regression, decision tree induction, clustering, time-series forecasting), and on using machine learning to augment and enhance the performance of classical algorithms (e.g., hashing).

2017-2018 **TUC SoftNet Laboratory**, Chania, Greece
Research Assistant
Supervisor: Minos Garofalakis and George Karystinos
Worked on developing differentially-private algorithms to analyze distributed and streaming data. Focused on the problems of distributed learning of Bayesian networks and data stream density estimation, respectively.

2016 **MIT Media Lab**, Cambridge, MA
(Summer) *Visiting Researcher*
Supervisor: Michail Bletsas
Participated in an attempt to extend the Gestures Everywhere project, which is a dynamic framework for multi-modal sensor fusion, pervasive analytics and gesture recognition, implemented as part of the MIT Media Lab's Glass Infrastructure. Worked on the gesture recognition module.

Teaching Experience

2021, 2020 **Massachusetts Institute of Technology**, Cambridge, MA
(Fall) *Teaching Assistant* for Machine Learning Under a Modern Optimization Lens (15.095)
Instructor in charge: Dimitris Bertsimas
Teaching assistant for a class which provides MIT graduate students with a modern treatment of machine learning using the lenses of convex, robust, and mixed-integer optimization. Duties included preparing and leading recitations, developing and grading assignments and exams, holding office hours and supervising final projects; has had major contribution in developing class content. 2020 class size: 96, Student evaluation score: 6.5/7.0.

2020 **Massachusetts Institute of Technology**, Cambridge, MA
(Spring) *Teaching Assistant* for The Analytics Edge (15.071)
Instructor in charge: Rama Ramakrishnan
Teaching assistant for a class which introduces MIT graduate and MBA students to data analytics. Duties included preparing and leading recitations, developing and grading assignments, holding office hours and supervising final projects. Class size: 105, Student evaluation score: N/A (no evaluations due to COVID-19 pandemic).

2020 **Massachusetts Institute of Technology**, Cambridge, MA
(IAP) *Teaching Assistant* for Computing in Optimization and Statistics (15.S60)
Prepared and taught a 3-hour session to MIT graduate students covering advanced topics in optimization (discrete and nonlinear optimization) and state-of-the-art software tools for optimization.

2016 **Technical University of Crete**, Chania, Greece
(Fall) *Teaching Assistant* for Mathematics I (MATH101)
Instructor in charge: Daphne Manoussaki
Teaching assistant for a class that introduces engineering students to calculus. Duties included tutoring students during their weekly practice tests, reporting common mistakes to the instructor.

Publications

"*Slowly Varying Regression under Sparsity*", with Dimitris Bertsimas, Michael Lingzhi Li, and Omar Skali Lami, submitted to Operations Research, June 2021.
"*The Backbone Method for Ultra-High Dimensional Sparse Machine Learning*", with Dimitris Bertsimas, minor revision at Machine Learning, first submission June 2020.

"*Frequency Estimation in Data Streams: Learning the Optimal Hashing Scheme*", with Dimitris Bertsimas, IEEE Transactions on Knowledge and Data Engineering, August 2021 (first submission July 2020).

"*Where to Locate COVID-19 Mass Vaccination Facilities?*", with Dimitris Bertsimas, Alexander Jacquillat, Michael Lingzhi Li, and Alessandro Previero, Naval Research Logistics, June 2021 (first submission March 2021).

"*From Predictions to Prescriptions: A Data-Driven Response to COVID-19*", with Dimitris Bertsimas, Leonard Boussioux, Ryan Cory-Wright, Arthur Delarue, Alexandre Jacquillat, Driss Lahlou Kitane, Galit Lukin, Michael Li, Luca Mingardi, Omid Nohadani, Agni Orfanoudaki, Theodore Papalexopoulos, Ivan Paskov, Jean Pauphilet, Omar Skali Lami, Bartolomeo Stellato, Hamza Tazi Bouardi, Kimberly Villalobos Carballo, Holly Wiberg and Cynthia Zeng, Health Care Management Science, February 2021 (first submission June 2020).

Honors and Awards

2020-2021 Theodore Vassilakis Graduate Research Fellowship, Operations Research Center, MIT.

2020 Pierskalla Best Paper Award by INFORMS.
"*From Predictions to Prescriptions: A Data-Driven Response to COVID-19*"

2018 Award of Academic Excellence by the Limmat Foundation, Zurich, Switzerland.
Graduated from the ECE School of TUC with the highest grade in 2018. (Grant: 3,000 euros.)

2018 GPA Distinction, School of ECE by TUC.
One of four students in the 28-year history of the ECE School of TUC (1990-2018) to graduate with GPA greater than 9.5/10. The total number of diplomas awarded up to 7/2018 is 1251.

2013-2018 Award of Academic Performance by TUC.
Completed each and every one of the 5 years in the ECE School of TUC and graduated with the highest grade in his class (among 168 students).

2013 Award of Admission by the Greek Ministry of Education.
Admitted at TUC with the highest grade in the National Entrance Exams.

Skills and Activities

Service: Reviewer for INFORMS Journal on Computing and INFORMS Journal on Optimization (2020-present), Session Chair (INFORMS 2021), Coordinator (MIT Seminar Series (Spring 2022).
Secretary and Member of the Board of the MIT Hellenic Student Association (2019-2021).
Programming Languages: Python, Julia, Java, C, C++, MATLAB, R, SQL.

Other software: Unix, Hadoop, PostgreSQL, PySpark, Optimization Solvers and Languages (esp. JuMP, cvxpy, Gurobi, CPLEX, MOSEK, IPOPT).
Languages: Greek (native), English (proficient), French (beginner).
Activities: Tennis, Basketball, Drums.

Citizenship Citizen of Greece

Emma Gibson

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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, May 2022. GPA: 5.0/5.0
Research topics: Optimization, healthcare, HIV diagnostics, survival analysis.
Advisor: Jónas Jónasson

Stellenbosch University, Stellenbosch**,** South Africa
MSc in Logistics, 2015-2016.
Thesis: *Patient flow and congestion in the out-patient department at Zithulele Hospital*
Advisor: Stephen Visagie

University of the Witwatersrand, Johannesburg**,** South Africa
BSc Hons in Computational Applied Mathematics and Statistics, 2011-2014.

Work Experience

2013-2014 **TMS Research**, Johannesburg, South Africa
Analyst
Market research (financial sector).

2012 **Randburg Boxing Club**, Johannesburg, South Africa
Assistant Coach
Fitness training, group classes.

Research Experience

2018–Present **Massachusetts Institute of Technology**, Cambridge, MA
Research Assistant
Advisor: Jónas Jónasson
Analysis and optimization of healthcare systems in Sub-Saharan Africa; design and implementation of an optimized transport system for medical samples.

2016-2018 **Massachusetts Institute of Technology**, Cambridge, MA
Research Assistant
Supervisor: Dimitris Bertsimas
Survival analysis models, personalized treatment models for breast cancer.

2015-2016 **Stellenbosch University**, Stellenbosch, South Africa
MSc thesis
Supervisor: Stephan Visagie
Collaboration with staff at Zithulele Hospital to improve patient flow and reduce waiting times in the out-patient department. Methods: discrete event simulation, numerical analysis of differential equations, mixed-integer optimization and metaheuristics.

2014 **University of the Witwatersrand**, Johannesburg, South Africa
BSc Honors thesis
Supervisor: Dario Fanucchi
Strategies to reduce congestion and improve efficiency in a large-scale pharmaceutical warehouse. Methods: simulation, optimization.

2016 **University of the Witwatersrand**, Johannesburg, South Africa
South African Mathematics in Industry Study Group
Supervisor: Ashleigh Hutchinson
The utility pricing death spiral: Analysis of differential pricing strategies in a national electricity grid.

2015 **African Institute for Mathematical Sciences**, Cape Town, South Africa
South African Mathematics in Industry Study Group
Supervisor: Graeme Hocking, Richard Loubser
An energy efficiency index for the South African sugar industry: Modeling of energy usage in sugar refineries in South Africa.

2014 **University of the Witwatersrand**, Johannesburg, South Africa
South African Mathematics in Industry Study Group
Supervisor: Montaz Ali
Wastage minimization of aluminium lengths in window and door industry.

Teaching Experience

2021 **Massachusetts Institute of Technology**, Cambridge, MA
(Spring) *Teaching Assistant* for 15.071: The Analytics Edge (MBA)
Head TA for a class of 300 MBA students. Responsibilities included developing new homework assignments, coordinating a team of four teaching assistants, managing online content (Canvas), and weekly office hours.

2019 **Massachusetts Institute of Technology**, Cambridge, MA
(Summer) *Instructor* for Master of Business Analytics Orientation Software Training
Developed and presented a 3-hour introductory coding workshop on optimization methods using Julia and JuMP.

2018 **Massachusetts Institute of Technology**, Cambridge, MA
(Spring) *Teaching Assistant* for 15.071: The Advanced Analytics Edge (Masters/PhD)
Conducted weekly recitations, developed homework assignments, and advised student projects.

2017 **Massachusetts Institute of Technology**, Cambridge, MA
(Summer) *Teaching Assistant* for 15.089: Analytics Capstone Projects
Mentored two teams of MBAn students working on Capstone projects with StubHub.

Publications

"Redesigning Sample Transportation in Malawi Through Improved Data Sharing and Daily Route Optimization", with S. Deo, J. Jónasson, M. Kachule, and K. Palamountain. Submitted to M&SOM, September, 2020.

"An Unstructured Supplementary Service Data System for Daily Tracking of Patient Samples and Diagnostic Results in a Diagnostic Network in Malawi: System Development and Field Trial", with J. Bangoh, S. Deo, J. Jónasson, D. Killian, M. Kachule, and K. Palamountain. Appeared in JMIR, July, 2021.

"Optimal Survival Trees", with D. Bertsimas, J. Dunn, and A. Orfanoudaki. Submitted to Machine Learning, 2018.

"Utility Pricing Death Spiral", with A. Hutchinson and T. Phaweni. Proceedings of the 2016 Mathematics in Industry Study Group.

"An Energy Efficiency Index for the South African Sugar Industry", with G. Hocking, and S. Mitchell. Proceedings of the 2015 Mathematics in Industry Study Group.

"Personalized Prognosis and Treatment Strategies for Breast Cancer Patients", with D. Bertsimas. Working paper.

"Impact of Diagnostic Network Optimization on Health Outcomes in Patients on Antiretroviral Therapy", with S. Deo and J. Jónasson. Working paper.

Honors and Awards

2021 M&SOM Practice-Based Research Competition (first place)
for "*Redesigning Sample Transportation in Malawi Through Improved Data Sharing and Daily Route Optimization*".

2021 POMS Health Applications Society Best Paper Competition (runner up)
for "*Redesigning Sample Transportation in Malawi Through Improved Data Sharing and Daily Route Optimization*".

2020 INFORMS Doing Good with Good OR student competition (first place)
for "*Sample Transport Optimization*".

2016 Operations Research Society of South Africa Best Student Presentation Award
for "*Improving patient flow at Zithulele Hospital*".

2011-2014 BSc. Hons. awards, University of the Witwatersrand
Samuel Goodman Memorial Medal for the top student in the Faculty of Science (2014); South African Mathematical Society Medal for the top student in Applied Mathematics (2014); Colin James Young Prize in mathematical sciences (2014); Starfield Prize in Computational and Applied Mathematics (2013, 2014); Merck Medal for Interdisciplinary Excellence (2011).

Grants and Scholarships

2019 Finalist: Seth Bonder Scholarship for Applied OR in Health Services
2016 Fulbright Foreign Student Grant
2015 National Research Foundation Scholarship, South Africa
2014 Postgraduate Merit Award and Scholarship, University of the Witwatersrand
2013 University Council Merit Scholarship, University of the Witwatersrand

Service and Leadership

2019-2022	ORC REFS Peer support and advocacy for graduate students. Trained in mediation and conflict management.
2018-2020	Sustainability Officer on the Eastgate Executive Committee Organized sustainability initiatives in MIT campus housing including a composting program, community garden, and junk-mail opt-out drive.
2018-2019	MIT Graduate Council Sustainability Committee
2012-2013	University of the Witwatersrand Science Students' Council

Skills and Activities

Programming: Julia, R, Shiny, Python, MATLAB, SAS
Optimization: JuMP, Gurobi, Tensorflow, CPLEX
mHealth application design and management (CommCare, USSD, SMS)
Google developer scripts & APIs
Languages: English, French (B2), Afrikaans

Citizenship Citizen of South Africa

Victor Gonzalez

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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, May 2023. GPA: 5.0/5.0
Advisor: Patrick Jaillet

Rice University, Houston, Texas
BA in Computational and Applied Math (CAAM) and Mathematics, May 2019.

Work Experience

2016 (Summer)
Racon Capital, Milwaukee, WI
Intern
Researched energy companies and worldwide factors to determine catalysts for movement in stock prices.

Research Experience

2019–Present
Massachusetts Institute of Technology, Cambridge, MA
Research Assistant
Advisor: Patrick Jaillet
Our research is focused on multi-stage optimization problems where we learn new information as we move through the stages. One particularly interesting problem we are looking at is navigating drones to find survivors in need of rescue in a disaster situation

Teaching Experience

2021 (Fall)
Massachusetts Institute of Technology, Cambridge, MA
Teaching Assistant for 6.255: Optimization Methods
Helped in the organization of the course, making sure students understand the information, and grading of the course.

2016-2019
Rice University, Cambridge, MA
Teaching Assistant for CAAM 210: Introduction to Engineering Computation
Helped in the organization of the course. I was also the person in charge of a group of students in the class. This meant that if they had any questions, I was the person they asked, and I also helped teach them concepts and grade their work.

Publications

"Relating Single-Scenario Facets to the Convex Hull of the Extensive Form of a Stochastic Single-Node Flow Polytope", with David Mildebrath, Mehdi Hemmati, and Andrew Schaefer, submitted to Operations Research Letters, February, 2020.

Honors and Awards

2021 (Summer)	Kaggle silver RSNA-MICCAI Brain Tumor Radiogenomic Classification Kaggle competition
2019	Summa Cum Laude GPA in top 5%
2019 (Spring)	James W. Waters award Award for creativity in research in engineering at Rice
2018 (Spring)	CAAM Chevron award Awarded for particularly outstanding performances in a class, notable contributions in undergraduate research, or excellence in outreach activity

Skills and Activities

Programming: Python, Matlab, Gurobi, Julia, LaTeX
Formulating mathematical optimization problems
Problem solving
LIDS Mentoring Committee member, 2019-2020

Citizenship Citizen of the United States of America

Gauthier Guinet

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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, May 2024. GPA: 5.0/5.0
Advisor: Professors Saurabh Amin and Patrick Jaillet

Ecole Polytechnique, Paris, France
MS and BS in Applied Mathematics, completion July 2020. GPA: 3.96/4.0
First Class Honours; Top 5% of Class

Prépa at Lycée Sainte-Genevieve, Versailles, France
Mathematics, Computer Science and Physics, completion July 2016 GPA: 4.0/4.0.
Salutatorian
Two-year undergraduate program leading to nationwide entrance examinations to the French Grandes Ecoles for scientific studies.

Work Experience

2020 **Amazon Web Services**, Berlin, Germany
Applied Science Intern
Research on Cost-Aware Bayesian Optimization for Automated Machine Learning (AutoML). Work resulted in a publication and implementation of algorithms in the AWS Autopilot product.

2019 **Chorus, AXA Investment Managers**, Hong-Kong, China
Junior Quantitative Researcher
Developed Deep Learning algorithms for Forecasting Combination. Work resulted in +22% gain in performance compared to benchmark. Established and automated statistical analytic reports for research and investment team.

2018-2020 **Cabinet Start-UP**, Paris, France
President of Ecole Polytechnique's entrepreneurial society
Managed a team of 23 people for monthly events, Technical advising to several Start-Up.
Key events organized: Get Started (Job Fair involving 500+ participants meeting with 42 startup), Start MeUp (Europe biggest Start-Up Weekend).

2017-2018 **Paris Fire Brigade**, Paris, France
Firefighter Cadet Officer - Emergency Medical Service vehicle crew leader
Led rescuers and policemen (3 to 20 people) in 500+ first-aid emergency operations. Provided medical support for the local population. Instructor in math and physics for servicemen preparing internal examinations.

Research Experience

2020–Present **Massachusetts Institute of Technology**, Cambridge, MA
Research Assistant
Advisor: Prof. Saurabh Amin and Patrick Jaillet
Research focusing on theoretical and algorithmic contributions to Decision Marking under uncertainty (Multi-arms Bandits) with applications in pricing and transportation systems. Particular focus on the interface between Optimization, Information and Misspecification.

2019-2020 **INRIA**, Paris, France
Research Intern
Supervisor: Prof. Iona Manolescu
Developed and implemented novel Deep Learning Algorithms (Learning to Rank and Graph Neural Networks) for automated journalistic Fact-Checking. Project was carried out in collaboration with French leading newspaper "Le Monde".

2019-2020 **Ecole Polytechnique**, Paris, France
Research Assistant
Supervisor: Prof. Laurent Massoulié
Research focused on combining Learning to Rank , Optimization and Optimal Transport for Unsupervised Translation. Developed state-of-the-art algorithm for a 14 language benchmark and contributed to new theoretical results.

2018 **Institut Pasteur**, Paris, France
Research Intern
Supervisor: Prof. Guillaume Dumas and Jean-Pierre Changeux
Formulated and experimentally validated a dynamic, multi-scale model of the human brain through mechanisms of synaptic plasticity combining Hebbian and Reinforcement learning.

Teaching Experience

2018-2020 **Lycée Sainte-Genevieve**, Versailles, France
Teaching Assistant for "Classes Préparatoires" students
Provided weekly training courses for 83 undergraduates in Mathematics over 2 years.

Publications

"Sequential Decision-Making under Censored Environments", with Patrick Jaillet and Saurabh Amin, Working paper.

"Pareto-efficient Acquisition Functions for Cost-Aware Bayesian Optimization", with Valerio Perrone and Cédric Archambeau, Accepted at 4th Workshop on Meta-Learning, NeurIPS 2020, Vancouver, Canada.

"Semi-Supervised Learning for Bilingual Lexicon Induction", with Paul Garnier and Laurent Massoulié, Working paper.

"Epigenesis of the Global Neural Workspace: From local Hebbian to global Reinforcement Learning", with Guillaume Dumas, Jean-Pierre Changeux and al., Accepted at Neural networks – From brains to machines and vice versa Symposium, October 2018.

Honors and Awards

2020 Student Outstanding Leadership and Investment Award, Ecole Polytechnique

2018 Defense Ministry Bronze medal recipient, Paris Fire Brigade

2011 Silver Medal (top 20), Spain's National Mathematics Contest

Skills and Activities

Programming: Python, Julia, R, C++, SQL
Optimization/Machine Learning: Gurobi, PyTorch, TensorFlow
Reviewer: Neurips 2020, 2021, IEEE Transactions on Automatic Control 2021
Languages: French (mothertongue), English (fluent), Spanish (fluent)
Extracurriculars: Handball (National competitions for 11 years), Kitesurfing

Citizenship Citizen of France

Nicholas André G. Johnson

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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, June 2024. GPA: 5.0/5.0
Advisor: Dimitris Bertsimas

Princeton University, Princeton, NJ
BS in Engineering, June 2020. GPA: 4.0/4.0. Summa Cum Laude. Valedictorian.
Thesis title: *Sequential Stochastic Network Structure Optimization With Applications To Addressing Canada's Obesity Epidemic*

Work Experience

2020 (Summer)
D. E. Shaw Group, New York City, NY
Hybrid Quantitative Research and Software Developer Intern
Developed a simulated exchange environment and studied the optimal trading behavior of reinforcement learning agents trading against each other in this environment when given various forecasts.

2018-2020
Princeton University - Whitman College, Princeton, NJ
Residential College Adviser (RCA)
Worked closely with a group of first year advisees to help them transition to life as Princeton students and develop responsible personal, academic, and social decision-making skills.

2017-2020
Princeton University Writing Center, Princeton, NJ
Writing Fellow
Offered 150+ individual 50-minute conferences to undergraduate and graduate students across all disciplines to workshop various forms of written work and develop their writing skills.

2019 (Summer)
Google, Mountain View, CA
Machine Learning Software Engineering Intern
Developed a pipeline to incorporate the image content of image based advertisements when deciding which advertisement(s) to display to a user following a Google search query. This enhances user experience and optimizes Google's advertisement revenue, which comprises 70% of total revenue.

Research Experience

2020–Present
Massachusetts Institute of Technology, Cambridge, MA
Research Assistant
Advisor: Dimitris Bertsimas

Research focused on making methodological and algorithmic contributions to discrete optimization and leveraging modern advances in discrete optimization to solve central machine learning problems exactly at scale without using heuristics.

2019-2020 **Princeton University**, Princeton, NJ
Research Assistant
Supervisor: Miklos Racz, Yacine Ait-Sahalia and Prateek Mittal
Research broadly focused on sequential decision problems in healthcare and in finance, and research focused on developing privacy preserving machine learning methods.

2018-2019 **Oxford University**, Oxford, United Kingdom
Research Intern
Supervisor: Aleksandr Sahakyan
Research focused on developing novel combinatorial optimization techniques to solve specific problem of interest in computational biology.

2018 **Montreal Institute of Learning Algorithms**, Montreal, Quebec
Research Intern
Supervisor: Yoshua Bengio
Research focused on reproducing and expanding upon state of the art ResNet results for Computer Vision.

Publications

"Sparse Plus Low Rank Matrix Decomposition: A Discrete Optimization Approach", with Dimitris Bertsimas, and Ryan Cory-Wright, submitted to Journal of Machine Learning Research, September, 2021.

Honors and Awards

2020 INFORMS Undergraduate Operations Research Prize Honorable Mention
"Sequential Stochastic Network Structure Optimization With Applications To Addressing Canada's Obesity Epidemic"
The award honors a group of students who conducted significant applied or theoretical work in operations research as undergraduate students.

2020 The James Hayes-Edgar Prize in Engineering
Awarded by Princeton University to the engineering student who has best manifested excellent scholarship, capacity for leadership and the promise of achievement in engineering.

2020 The Frank Castellana Prize
Established in 1999, the prize is awarded by the Princeton Operations Research and Financial Engineering department to a senior for outstanding scholarship and academic achievement.

2020 Richard D. Challener '44 Senior Thesis Prize in Canadian Studies
Established in 2000 in honor of Professor Richard D. Challener, Princeton Class of 1944, the Challener prize is awarded by the Faculty Committee on Canadian Studies to an undergraduate senior in any department or program who's senior thesis is of outstanding quality on a topic having substantial relevance to Canadian culture, themes, experiences or issues.

2019 Rhodes Scholarship Finalist
Selected as one of 12 finalists for the 2020 Quebec Rhodes Scholarship.

2019 The Class of 1939 Princeton Scholar Award
Awarded each year by Princeton University to the undergraduate who, at the end of junior year, has achieved the highest academic standing for all preceding college work at the University.

2019 Dr. Angela E. Grant Best Modelling Poster Award
"Optimus: A General Purpose Monte Carlo Optimisation Engine in R"
Awarded at the 2019 Conference for African American Research in the Mathematical Sciences.

Skills and Activities

Programming Languages: Java, Python, C, C++, R, Julia, Matlab, SQL, Solidity
Optimization Software: JuMP, CPLEX, MOSEK
Languages: English (native), French (fluent)
Extracurriculars: Chess, Basketball, Fitness

Citizenship Citizen of Canada, Bahamas

Lea Kapelevich

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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, September 2022. GPA: 4.9/5.0
Advisor: Juan Pablo Vielma

University of Auckland, Auckland, New Zealand
Bachelor of Engineering with Honors, 2016.

Work Experience

2016 (Summer) **Fisher and Paykel Healthcare**, Auckland, New Zealand
Assistant Product Development Engineer
Implemented PDE models for human ventilation to guide development of medical devices.

2015 (Summer) **EROAD**, Auckland, New Zealand
Analytics Intern
Applied analytics tools to build reports and models for monitoring system quality and reliability.

Research Experience

2018–Present **Massachusetts Institute of Technology**, Cambridge, MA
Research Assistant
Advisor: Professor Juan Pablo Vielma
Developing computational tools for convex optimization problems. My group is currently working on an open source conic optimization solver.

2017-2018 **Massachusetts Institute of Technology**, Cambridge, MA
Research Assistant
Supervisor: Professor Dimitris Bertsimas
Developed an integer-programming based algorithm for sparse regression with clustered data.

2016-2017 **University of Auckland** , Auckland, New Zealand
Summer Scholarship Student
Supervisor: Professor Andy Philpott
Applied a distributionally robust optimization approach to a multistage stochastic problem in the New Zealand electricity system.

2016-2016 **University of Auckland**, Auckland, New Zealand
Undergraduate Thesis
Supervisor: Professor Andy Philpott and Dr. Ziming Guan
Built a new software implementation of a model for the New Zealand hydrothermal scheduling problem.

Teaching Experience

2020 (IAP) **Massachusetts Institute of Technology**, Cambridge, MA
Teaching Assistant for Computing for Optimization and Statistics 15.S60
Taught session on Introduction to Julia and JuMP.

2018 (Fall) **Massachusetts Institute of Technology**, Cambridge, MA
Teaching Assistant for Data, Models, and Decisions 15.060
Organized tutorials and office hours, and graded exercises.

Publications

"Conic Optimization with Spectral Functions on Euclidean Jordan Algebras", with Chris Coey and Juan Pablo Vielma, Working paper, 2021.

"Sum-Of-Squares Generalizations for Conic Sets", with Chris Coey and Juan Pablo Vielma, Submitted, 2021.

"Performance Enhancements for a Generic Conic Interior Point Algorithm", with Chris Coey and Juan Pablo Vielma, Submitted, 2021.

"Solving Natural Conic Formulations with Hypatia.jl", with Chris Coey and Juan Pablo Vielma, Submitted, 2021.

"Sparse Regression Over Clusters: SparClur", with Dimitris Bertsimas, Jack Dunn, Rebecca Zhang, Optimization Research Letters, 2021.

"SDDP.jl: a Julia Package for Stochastic Dual Dynamic Programming", with Oscar Dowson, INFORMS Journal on Computing, 2020.

"Distributionally Robust SDDP", with Andy Philpott, Vitor de Matos, Computational Management Science, 2018.

Skills and Activities

Programming languages: Julia, MATLAB, C, R, VBA, SQL
Languages: English, Russian

Citizenship Citizen of New Zealand and Israel

Michael Lingzhi Li

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Interests Scalable Algorithms for Predictive Analytics, Inference for Machine Learning, Healthcare, Epidemiology, Operations

Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion: 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

Research Experience

2017–Present **Massachusetts Institute of Technology**, Cambridge, MA
Research Assistant
Advisor: Dimitris Bertsimas
Primary research interests fall under two fields: (1) Scalable machine learning algorithms with an interpretability focus, and (2) Application of machine learning and optimization in healthcare and logistics. Past work includes using ideas from discrete optimization to develop new algorithms for regression and matrix completion. Currently focusing on precision healthcare and supply chain automation.

Work Experience

2019–Present **Lineage Logistics, San Francisco, CA**
Machine Learning Scientist
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

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

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)

Publications

Methodological Contributions for Machine Learning (ML)

Scalable ML Algorithms	*Fast Exact Matrix Completion: A Unifying Optimization Framework*", with D. Bertsimas, Journal of Machine Learning Research 21 (231): 1-43.
	"Interpretable Matrix Completion: A Discrete Optimization Approach", with D. Bertsimas, Submitted to Machine Learning.
	"*Stochastic Cutting Planes for Data-Driven Optimization*", with D. Bertsimas, Submitted to INFORMS Journal on Computing.
	"*Scalable Holistic Linear Regression*", with D. Bertsimas, Operations Research Letters 48(3), 203-208.
	"*Slowly Varying Regression under Sparsity*", with D. Bertsimas, V. Digalakis, and O. S. Lami, Submitted to Operations Research.
Inference for ML	*Experimental Evaluation of "Individualized Treatment Rules"*, with K. Imai Accepted at Journal of American Statistical Association.
	"Robust Inference for Machine Learning under Observational Data", with D. Bertsimas, K. Imai, In preparation.

Industry 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 and Advanced Analytics Group of Pediatric Urology) 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 and Advanced Analytics Group of Pediatric Urology, Journal of Urology 2019 Apr; 202(1): 144–152.

COVID-19

"Forecasting COVID-19 and Analyzing the Effect of Government Interventions", with H. Tazi Bouardi, O. Skali Lami, T. Trikalinos, N. Trichakis, and D. Bertsimas. Minor Revision 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 Be Submitted to Health Care Management Science.
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.

"Ensemble Forecasts of Coronavirus Disease 2019 (COVID-19) in the U.S.", with E. Ray, N. Wattanachit, J. Niemi, A. Kanji, K. House, E. Cramer, J. Bracher, et al. Submitted to PNAS.

"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.

Operation Analytics

"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).

"Duration-of-Stay Storage Assignment under Uncertainty", with E. Wolf, D. Wintz, ICLR 2020 Spotlight, US Patent #10,796,278 (Second Named Inventor).

Selected Talks

2020-21

"Data-Driven COVID-19 Vaccine Development for Janssen", INFORMS 2021 Doing Good with Good OR Finalist (Session: VSA84/TE39)

"Forecasting COVID-19 with Application to Vaccine Trial Design", INFORMS 2021 Annual Meeting (Session: VWD12/MB22) & Healthcare Meeting, ACM SIGMETRICS 2021 "Highlights beyond Sigmetrics"

"DELPHI: Modeling the COVID-19 Crisis", INFORMS 2020 Annual Meeting Cambridge University Judge Business School Seminar University of Southampton CORMSIS Seminar Swiss Re COVID-19 Summit.

"Experimental Evaluation of Individualized Treatment Rules", Joint Statistical Meetings 2020, Invited Session, Atlantic Causal Inference Conference 2020.

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.

Honors and Awards

2021 INFORMS Doing Good with Good OR Competition Finalist (Final Round Pending)
INFORMS Innovative Applications in Analytics Award (1st 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)

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 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

Zhen Lin

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Cambridge, MA 02139
617-909-7881

Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, May 2024. GPA: 5.0/5.0
Advisor: Prof. Dimitris Bertsimas

The Chinese University of Hong Kong, Shenzhen, Shenzhen, China
BS in Statistics, May 2019.

Research Experience

2019–Present **Massachusetts Institute of Technology**, Cambridge, MA
Research Assistant
Advisor: Prof. Dimitris Bertsimas
Research focuses on Optimization and Machine Learning.

2017-2019 **Shenzhen Research Institute of Big Data**, Shenzhen, China
Research Intern
Supervisor: Prof. Zhi-Quan Luo
Designed, analyzed, and applied optimization algorithms.

Teaching Experience

2021 **Massachusetts Institute of Technology**, Cambridge, MA
(Fall) *Teaching Assistant* for 15.081/6.251 Introduction to Mathematical Optimization (PhD level)
TA duties: Holding weekly recitations on advanced optimization topics for PhD students and masters; Creating and grading problem sets, midterm exam, final exam; Holding weekly office hours to assist students.

2021 **Massachusetts Institute of Technology**, Cambridge, MA
(Spring) *Teaching Assistant* for 15.076 Analytics for a Better World (undergraduate level)
TA duties: Holding weekly recitations on machine learning and optimization topics for undergraduate students; Mentoring and grading final projects; Creating and grading problem sets; Holding weekly office hours to assist students.

2020 **Massachusetts Institute of Technology**, Cambridge, MA
(Fall) *Teaching Assistant* for Machine Learning under a Modern Optimization Lens (15.095) (Grad level)
TA duties: Held weekly recitations on advanced optimization and machine learning topics for PhD students and masters; Mentored and graded final projects; Created and graded problem sets, midterm exam, final exam; Held weekly office hours to assist students.

2019 **The Chinese University of Hong Kong, Shenzhen**, Shenzhen, China
(Spring) *Teaching Assistant* for Linear Algebra (MAT2040) (Language of instruction: English)

Gave weekly tutorials (in English), held weekly office hours, answered students' questions online.

2018 (Fall)
The Chinese University of Hong Kong, Shenzhen, Shenzhen, China
Teaching Assistant for Linear Algebra (MAT2040) (Language of instruction: English)
Gave weekly tutorials (in English), held weekly office hours, answered students' questions online.

2018 (Spring)
The Chinese University of Hong Kong, Shenzhen, Shenzhen, China
Teaching Assistant for Linear Algebra (MAT2040) (Language of instruction: English)
Gave weekly tutorials (in English), held weekly office hours, answered students' questions online.

2017 (Fall)
The Chinese University of Hong Kong, Shenzhen, Shenzhen, China
Teaching Assistant for Calculus I (MAT1001) (Language of instruction: English)
Gave weekly tutorials (in English), held weekly office hours, answered students' questions online.

2017 (Spring)
The Chinese University of Hong Kong, Shenzhen, Shenzhen, China
Teaching Assistant for Probability and Statistics I (STA2001) (Language of instruction: English)
Gave weekly tutorials (in English), held weekly office hours, answered students' questions online.

2016 (Fall)
The Chinese University of Hong Kong, Shenzhen, Shenzhen, China
Teaching Assistant for Calculus I (MAT1001) (Language of instruction: English)
Gave weekly tutorials (in English), held weekly office hours, answered students' questions online.

Publications

"Minimax Design of Constant Modulus MIMO Waveforms for Active Sensing", with Wenqiang Pu, and Zhi-Quan Luo, published in IEEE Signal Processing Letters, October, 2019.

"Minimax Design of Constant Modulus MIMO Waveforms", with Wenqiang Pu, and Zhi-Quan Luo, published in The 52nd Asilomar Conference on Signals, Systems, and Computers, October, 2018.

Honors and Awards

2019 (Spring)
Presidential Award for Outstanding Students 2019
This Award represents the highest honor the University can bestow on its graduates who have a proven track record of academic excellence and leadership over the period time of their undergraduate study at The Chinese University of Hong Kong, Shenzhen. (The Chinese University of Hong Kong, Shenzhen)

2016-2017
Undergraduate Research Awards
Awarded three times. Awarded RMB 10,000 in total. (The Chinese University of Hong Kong, Shenzhen)

2016
Student Outstanding Performance and Leadership Award

The award is to recognize students who have best demonstrated, and have been recognized for, their achievements or contributions in areas such as leadership, student activities, creative and performing arts, campus involvement, or career accomplishments. (The Chinese University of Hong Kong, Shenzhen)

2015, 2018 Academic Performance Scholarship – Class C
Awarded twice. Awarded RMB 20,000. (The Chinese University of Hong Kong, Shenzhen)

2016, 2017 Academic Performance Scholarship – Class A
Awarded twice. Awarded RMB 80,000 each time. (The Chinese University of Hong Kong, Shenzhen)

2015-2018 Dean's List
Awarded four times due to outstanding academic performance. (The Chinese University of Hong Kong, Shenzhen)

2017, 2018 Master's List of Shaw College
Awarded twice due to outstanding academic performance. Awarded RMB 1,000. (The Chinese University of Hong Kong, Shenzhen)

2014 Entrance Scholarship
Awarded RMB 47,500. (The Chinese University of Hong Kong, Shenzhen)

Skills and Activities

Programming Skills: Julia, Python, MATLAB, R, C++, C.
Optimization/Machine Learning: JuMP, Gurobi, MOSEK, CPLEX
Software: Latex
Editorial Team, Fall 2014 – Fall 2015, The Chinese University of Hong Kong, Shenzhen
Student Helper for Orientation Activities, Fall 2014, Summer 2015, Fall 2015, The Chinese University of Hong Kong, Shenzhen
Student Helper and Volunteer of Admission Office, Summer 2015, Fall 2016, The Chinese University of Hong Kong, Shenzhen

Citizenship Citizen of China

Xinming (Lily) Liu

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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, May 2025. GPA: 5.0/5.0
Advisors: Professor Karen Zheng and Professor Retsef Levi

Cornell University, Ithaca**,** NY
BS in Operations Research and in Computer Science, May 2020. GPA: 4.0/4.3
Academic distinctions: summa cum laude with Honors

Work Experience

2019 **Blackstone**, New York, NY
Summer Technology Analyst
Completed a full-stack development in Java Script, C# and SQL for a private equity fund accounting tool.

2018 **Amazon Robotics**, North Reading, MA
Data Engineer Coop
Automated data validation and utilized lambda function in Amazon web Service to enable incremental updates in databases. Built Tableau dashboards used by 30 internal teams for production managers to monitor the performance metrics.

2017 **ODH, Inc.**, Princeton, NJ
Information Security Analyst
Built dashboards to monitor and analyze online activities and user patterns for potential security concerns.

Research Experience

2020–Present **Massachusetts Institute of Technology**, Cambridge, MA
Research Assistant
Advisors: Professor Karen Zheng, Professor Retsef Levi
Technology adoption within small-holder famers' social network: analyze social network data collected for 75 villages in India and formulate multi-layer leader-follower network structures; model the principal-agent problem for the central planner to schedule influencers to maximize technology adoption rate and for influencers to choose their effort level strategically.

2019-2020 **Cornell University**, Ithaca, NY
Undergraduate Research Assistant
Supervisor: Joe Halpern

Human behavior modeling and bounded rationality: (1) formulated slot machines as a multi-armed bandit problem and used probabilistic finite automaton to model bounded rationality; designed human-like protocols and showed by simulations that they perform nearly-optimally with only finite states. (2) Formulated the ranger-poacher game as a two-player zero-sum game and proved the Nash equilibrium (NE) is unique; modeled the resource-bounded players as probabilistic finite automaton (PFAs) and showed that they play NE with large memory; designed and conducted human subject experiments on Amazon Mechanical Turk and showed by simulations that PFAs capture human-like behaviors as the number of memory states used decreases.

2017-2018 **Cornell Computer Systems Laboratory**, Ithaca, NY
Undergraduate Research Assistant
Supervisor: Christopher Studer
Designed an optimized greedy feature selection algorithm, which reaches 95% accuracy using only 32 features out of 256 in total.

Teaching Experience

2021 **Massachusetts Institute of Technology**, Cambridge, MA
(Summer) *Teaching Assistant* for System Optimization and Analysis for Manufacturing (15.066)
Held weekly office hours and two recitations, graded assignments, midterms and projects.

2020 **Cornell University**, Ithaca, NY
(Spring) *Teaching Assistant* for Engineering Stochastic Processes (ORIE 3510)
Designed the course project and prepared solution code, held weekly office hours, answer students' questions online.

2019 **Cornell University**, Ithaca, NY
(Spring) *Teaching Assistant* for Optimization II (ORIE 3310)
Held weekly office hours, gave weekly recitations, graded weekly assignments.

2018 **Cornell University**, Ithaca, NY
(Spring) *Teaching Assistant* for Networks II: Market Design (CS 4852)
Graded weekly assignments.

2018 **Cornell University**, Ithaca, NY
(Spring) *Teaching Assistant* for Discrete Structure (CS 2800)
Held weekly one-on-one tutoring sessions.

Publications

"Strategic Play by Resource-Bounded Agents in Security Games", with Joe Halpern, submitted to International Joint Conference on Autonomous Agents and Multi-agent Systems (AAMAS), October, 2020.

"Bounded Rationality in Las Vegas: Probabilistic Finite Automata Play Multi-Armed Bandits", with Joe Halpern, published in 36th Conference on Uncertainty in Artificial Intelligence (UAI), May, 2020.

"Analog-to-Feature (A2F) Conversion for Audio-Event Classification", with Emre Gonultas, and Christoph Studer, published in 26th European Signal Processing Conference (EUSIPCO), May, 2018.

Honors and Awards

2021 Accenture Fellowship

2021 Tau Beta Pi Fellowship

2019 Tau Beta Pi Scholarship

2019 Cornell Diversity Programming in Engineering Corporate Award
The recognition of diversity and inclusion of Cornell engineering students.

2019 Omega Rho Membership
A scholastic honor society that recognizes academic achievement among students in the fields of operations research and management science.

2018 Tau Beta Pi Membership
The oldest engineering honor society for engineering students in American universities who have shown a history of academic achievement as well as a commitment to personal and professional integrity.

2017 Cornell Early Career Research Scholarship

2017-2020 Cornell College of Engineering Dean's List

Skills and Activities

Programming Skills: Python, Julia, R, SQL, MATLAB, Java
Softwares: Latex, Tableau, Word, Excel, PowerPoint
Languages: English (proficient), Mandarin Chinese (native)
Co-chair of Graduate Womxn at MIT, 2021-present
Department Representative of Graduate Womxn at MIT, 2020-2021
President of INFORMS Cornell Chapter, 2019-2020
Professional Development Chair of Tau Beta Pi Cornell Chapter, 2019

Citizenship Citizen of China

Holly Wiberg

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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, May 2022. GPA: 5.0/5.0
Thesis title: *Data-Driven Healthcare Via Constraint Learning and Analytics*
Research interests: Analytics, Healthcare, Machine Learning, Optimization
Advisor: Dimitris Bertsimas

Cornell University, College of Engineering, Ithaca, NY
BS in Operations Research and Engineering, May 2016.
Summa Cum Laude; Cumulative GPA 4.17/4.3, Major GPA 4.24/4.3

University of Edinburgh, Edinburgh, Scotland
Semester Abroad, May 2015.
Coursework in Mathematics and Statistics

Work Experience

2016-2017 **athenahealth**, Watertown, MA
Member of Technical Staff, Data Science
Served as an analytics liaison for a major product release. Built self-serve reporting tools to provide key stakeholders with high visibility into provider performance and migration progress for the project, enabling targeted support for clients and facilitating smooth completion of the migration.

2015 (Summer) **athenahealth**, Watertown, MA
Intern, Data Engineering
Developed a metric to quantify the productivity of healthcare providers, and established benchmarks for productivity based on identified key drivers. Delivered recommendations for application of the metric in both internal reporting and client-facing evaluation.

Research Experience

2017–Present **Massachusetts Institute of Technology**, Cambridge, MA
Research Assistant
Advisor: Dimitris Bertsimas
Building a prescriptive framework for leveraging machine learning in optimization via constraint learning. Leveraging clinical data to improve treatment response predictions and prescriptions using data-driven algorithms, specifically applied to oncology, pediatric trauma, and COVID-19. Developing interpretable machine learning methods that allow for greater model transparency and utility to practitioners.

2015-2016 **Cornell University**, Ithaca, NY
Research Assistant
Supervisor: David Shmoys, Shane Henderson
Collaborated with doctoral students in design of a simulation optimization model to improve the allocation of docks and bikes across stations in a New York City bike-sharing system using gradient-like heuristic methods. Improved model runtime and constructed a fluid model starting solution based on historical data.

Teaching Experience

2021 (Fall) **Massachusetts Institute of Technology,** Cambridge, MA
Co-instructor for 15.003 Software tools
Instructor for graduate-level computing course to ramp up incoming Master of Business Analytics students on core computing competencies. Developed and taught material on R and Julia/JuMP.

2021 (January) **Massachusetts Institute of Technology,** Cambridge, MA
Co-instructor for 15.S60 Computing in Optimization and Statistics
Instructor for graduate-level computing seminar. Taught lecture on machine learning in Python.

2019-2020 (Spring) **Massachusetts Institute of Technology**, Cambridge, MA
Teaching Assistant for 15.727 The Analytics Edge
TA for an Executive MBA course in Spring 2019 and Spring 2020. Led recitations and weekly office hours. Advised student teams on final projects and technical topics.

2020 (January) **Hartford HealthCare**, Hartford, CT
Teaching Assistant for The Analytics Edge in Healthcare
Co-developed an Executive Education course introducing analytics methods to 100 healthcare professionals (medical and administrative) at Hartford Hospital. Created course syllabus and lecture content, and worked on course administration. Co-wrote an accompanying textbook detailing analytics methods and case studies with a focus on healthcare applications.

2016 **Cornell University**, Ithaca, NY
Teaching Assistant for ENGR 1101 Engineering Applications of Operations Research
TA for an introductory undergraduate OR course. Led lab sessions and weekly office hours. Graded homework and exams.

Publications

"*Towards an Optimized Staging System for Pancreatic Ductal Adenocarcinoma: A Clinically Interpretable, Artificial Intelligence-Based Model"*, with Dimitris Bertsimas, Antonis Margonis, Yifei Huang, Nikos Andreatos, Yu Ma, et al. JCO Clinical Cancer Informatics (To appear).

"*Prediction of Neutropenic Events in Chemotherapy Patients: A Machine Learning Approach*", with Peter Yu, Pat Montanaro, Jeff Mather, Suzi Birz, Michelle Schneider, and Dimitris Bertsimas. JCO Clinical Cancer Informatics, 2021.

"*Personalized Prescription of ACEI/ARBs for Hypertensive COVID-19 Patients*", with Dimitris Bertsimas, Alison Borenstein, Luca Mingardi, Omid Nohadani, Agni Orfanoudaki, Bartolomeo Stellato, Pankaj Sarin, Dirk J. Varelmann, Vicente Estrada, Carlos Macaya, and Iván J. Nuñez Gil. Health Care Management Science, 2021.

"*From Predictions to Prescriptions: A Data-Driven Response to COVID-19*", with Dimitris Bertsimas, Leonard Boussioux, Ryan Cory Wright, Arthur Delarue, Vassilis Digalakis Jr., Alexandre Jacquillat, Driss Lahlou Kitane, Galit Lukin, Michael L Li, Luca Mingardi, Omid Nohadani, Agni Orfanoudaki, Theodore Papalexopolous, Ivan Paskov, Jean Pauphilet, Omar Skali Lami, Bartolomeo Stellato, Hamza Tazi Bouardi, Kimberly Villalobos Carballo, and Cynthia Zeng. Health Care Management Science, 2021.

"*COVID-19 Mortality Risk Assessment: An International Multi-Center Study*", with Dimitris Bertsimas, Galit Lukin, Luca Mingardi, Omid Nohadani, Agni Orfanoudaki, Bartolomeo Stellato, Sara Gonzalez-Garcia, Carlos Luis Parra-Calderón, The Hellenic COVID-19 Study Group, Kenneth Robinson, Michelle Schneider, Barry Stein, Alberto Estirado, Lia a Beccara, Rosario Canino, Martina Dal Bello, Federica Pezzetti, and Angelo Pan. PLOS One, 2020.

"*Machine Learning in Oncology: Methods, Applications, and Challenges*", with Dimitris Bertsimas. JCO Clinical Cancer Informatics, 2020.

"Interpretable Clustering: An Optimization Approach", with Dimitris Bertsimas and Agni Orfanoudaki. Machine Learning, July 2020.

"Prediction of Cervical Spine Injury in Young Pediatric Patients: An Optimal Trees Artificial Intelligence Approach", with Dimitris Bertsimas, Peter Masiakos, and Konstantinos Mylonas, Journal of Pediatric Surgery, March 2019.

"Simulation Optimization for a Large-Scale Bike-Sharing System", with Nanjing Jian, Daniel Freund, and Shane Henderson, 2016 Winter Simulation Conference in Washington, D.C., December 2016.

Honors and Awards

2020 William Pierskalla Best Paper Award, 2020 INFORMS Annual Meeting

2019-Present National Science Foundation Graduate Student Research Fellowship

2017 Henry Gabbay Fellowship, MIT Operations Research Center

2016 Byron W. Saunders Prize, Cornell University

2015 Omega Rho Honor Society, Cornell University ORIE Department

2014 Tau Beta Pi, Cornell University

Skills and Activities

Search Committee Member, Schwarzman College of Computing Assistant Dean for Diversity, Equity, and Inclusion, 2021
ORC Seminar Series Coordinator, Spring 2021.
ESL Tutor, 2018-Present.
MIT INFORMS Chapter President, 2017-2018.
Graduate Student Council Representative, 2017-2018.

Academic Reviewer: INFORMS Journal on Optimization, JAMIA, JCO Clinical Cancer Informatics, NPJ Digital Medicine, Scientific Reports, Sloan Sports Analytics Conference Research Competition
Programming: Julia, R, Python, SQL.

Citizenship Citizen of the United States of America

Qingyang Xu

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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research; expected completion, June 2022. GPA: 5.0/5.0
Member of MIT Laboratory for Financial Engineering (LFE).
Advisor: Andrew W. Lo

Stanford University, Stanford, CA
BS in Physics (Honors) and in Mathematical and Computational Science, June 2017.
University Distinction

Work Experience

2020 (Summer)
DAMO Academy, Alibaba Group, Seattle, WA
Research Intern
Applied self-supervised learning models for time series forecast and anomaly detection.

Research Experience

2018–Present
Massachusetts Institute of Technology, Cambridge, MA
Research Assistant
Advisor: Andrew W. Lo
Current research spans four areas: (1) apply financial engineering to design a large portfolio of high-risk investments in novel drug candidates; (2) develop novel Bayesian framework to optimize clinical trials for highly infectious epidemic such as COVID-19; (3) analyze trader behavior from their real-time physiological characteristics; (4) identify and mitigate bias in machine learning models to predict drug approval. Program in Python/R/MATLAB.

2017-2018
Cornell University, Ithaca, NY
Research Assistant
Supervisor: James Sethna
Research in the intersection of theoretical physics and machine learning.

2016-2017
Stanford Institute for Theoretical Physics, Stanford, CA
Research Assistant
Supervisor: Peter Graham
Investigated cosmological implications (such as axion dark matter density) of the Relaxion model as a viable solution to Electroweak Hiearchy Problem.

2014-2016
Enrich Xenon Observatory, Stanford, CA
Research Assistant
Supervisor: Giorgio Gratta

Applied machine-learning algorithms to improve data analysis of the EXO-200 experiment to detect neutrinoless double-beta decay. Program in Python/C++.

Teaching Experience

2020 (Fall) **Massachusetts Institute of Technology**, Cambridge, MA
Teaching Assistant for Healthcare Finance (15.482)
Held weekly recitation, updated lecture notes and textbook, created assignment, developed novel Zoom class teaching technologies. Received end-of-semester ratings of 6.9/7 from the students.

2018 (Spring) **Cornell University**, Ithaca, NY
Teaching Assistant for Mechanics and Heat (PHYS 1112)
Organized weekly discussion sessions and hands-on labs. Graded homework assignments and exams.

2015 (Spring) **Stanford University**, Stanford, CA
Teaching Assistant for Practical Computing for Scientists (Physics 91SI)
Taught scientific Python programming with emphasis on physics research skills.

Publications

"*Identifying and Mitigating Potential Biases in Predicting Drug Approvals*", with E. Ahmadi, A. Amini, D. Rus, A. W. Lo, 2021. Submitted.

"*Real-Time Extended Psychophysiological Analysis of Financial Risk Processing*", with M. Singh, S. J. Wang, T. Hong, M. M. Ghassemi, A. W. Lo, 2021. Submitted.

"*Accelerating Therapeutic Innovation in Glioblastoma Treatments via NBTS Venture Fund*", with K. W. Siah, K. Tanner, O. Futer, J. J. Frishkopf, and A. W. Lo, 2021. Drug Discovery Today 26(7).

"*Two-Stage Framework for Seasonal Time Series Forecasting*", with Q. Wen, L. Sun
IEEE International Conference on Acoustics, Speech, & Signal Processing (ICASSP) 2021.

"*Bayesian Adaptive Clinical Trials for Anti-Infective Therapeutics during Epidemic Outbreaks*", with S. Chaudhuri, D. Xiao, A. W. Lo, 2020. Harvard Data Science Review, Special Issue of COVID-19.

"*Fair and responsible drug pricing: A cast study of Radius Health and abaloparatide*", with A. W. Lo, 2020. Journal of Investment Management, 18(1), 90-98.

"*Visualizing probabilistic models in Minkowski space: an analytical coordinate embedding*", with H. Teoh, K. Quinn, J. Kent-Dobias, C. Clement, J. Sethna, 2020. Physical Review Research, 2, 03321.

"*Search for 2νββ decay of 136Xe to the 01+ excited state of 136Ba with the EXO-200 liquid xenon detector*", with J. Albert and EXO collaboration, 2016. Physical Review C, 93, 035501.

Honors and Awards

2019 (Spring) 2nd Place, MIT FinTech Datathon
Designed novel quantitative trading strategy for fixed-income securities using Random Forest and Cox–Ingersoll–Ross model.

2017 (Fall)	Cornell Graduate Fellowship Award to outstanding incoming graduate students.
2017 (Spring)	University Distinction, Class of 2017 Awarded to the top 15% of the graduating class based on cumulative GPA.
2016 (Spring)	David S. Levine Award Presented annually in recognition of the top physics undergraduate student.
2016 (Spring)	Undergraduate Major Research Grant "Cosmological Relaxation Solution to the Electroweak Hierarchy Problem" Presented to outstanding research proposals of undergraduate Honors Theses.

Skills and Activities

Reviewer: Harvard Data Science Review, Journal of Finance, IEEE International Conference on Data Mining (ICDM) 2020
Languages: Fluent in Chinese (native), English and Japanese
Programming: Python, Julia, R, MATLAB, C++, SQL
Optimization/Machine Learning: Gurobi, PyTorch, TensorFlow
President and Co-Founder, MIT Chinese Music Ensemble, 2018 to present
Interests: Gu-zheng, Running, Reading, Chinese Art and Culture

Citizenship Citizen of People's Republic of China