Operations Research Center

Massachusetts Institute of Technology

GRADUATE STUDENT DIRECTORY

November 2023

GABRIEL AFRIAT

Cambridge, MA

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EDUCATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY — Cambridge, MA

PhD Candidate in Operations Research, GPA: 5.0/5.0 — 2022 – Present

- Relevant Coursework: Nonlinear Optimization, Integer Optimization, Statistical Learning Theory and Applications
- Teaching Assistant: Analytics Edge (15.071) and Advanced Analytics Edge (15.072), ML classes with 100+ students

MIT SLOAN SCHOOL OF MANAGEMENT — Cambridge, MA

Master of Business Analytics, MIT Sloan and Operations Research Center, GPA: 5.0/5.0 — 2021 - 2022

- Relevant Coursework: ML under a Modern Optimization Lens, Robust Optimization, Advances in Computer Vision
- Awards: Jean Gaillard Memorial Fellowship from Harvard University

CENTRALESUPELEC (PARIS-SACLAY UNIVERSITY) — Gif-sur-Yvette, France

Master of Science in Engineering, Computer Science, GPA: 4.25/4.33 — 2019 - 2021

Bachelor of Science in Engineering, GPA: 4.33/4.33

- Relevant Coursework: Advanced Statistics, Artificial Intelligence, Statistics and Learning, Algorithmics and Complexity
- Teaching Assistant: Convergence, Integrability and Probability (1SL1000) and Partial Differential Equations (1SL1500)

LYCÉE HENRI IV — Paris, France

Preparatory classes in mathematics and physics for the Grandes Écoles national competitive exam — 2016 - 2019

- Relevant Coursework in linear algebra, abstract algebra, topology, probability, mathematical analysis, multivariable calculus

TECHNICAL SKILLS

- Programming Languages: Python, R, Julia, SQL, Git, OCaml, LaTeX, Powershell
- Software Tools: Pytorch, Tensorflow, Remote Clusters, Data Parallelism, JuMP, Gurobi

RESEARCH AND INDUSTRY EXPERIENCE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY — Cambridge, MA

Doctoral Research Assistant to Professor Rahul Mazumder — 2022 - Present

- Exploring new methods for neural network pruning
- Exploring prediction methods for time series with spatial data using graph neural networks
- Investigating the influence of Edge of Stability and Sharpness-Aware Minimization on the generalization of soft trees
- Developed a new efficient framework for GAMs with interactions using sparsity and structural interpretability constraints
- Created an efficient implementation of soft trees, a type of differentiable decision trees, from scratch using PyTorch

MIT SLOAN SCHOOL OF MANAGEMENT / GRAB — Cambridge, MA

Research Capstone Project, advised by Professor Daniel Freund and Professor Stephen Graves — 2021 - 2022

- Formulated a robust and distributionally robust optimization algorithm for pickup/delivery VRP with travel time uncertainty
- Developed a new approach for clustering, graph pruning and used warm start construction to improve algorithm efficiency
- Reduced maximum order delay by 70% and the proportion of delayed orders by up to 16% on the test set from Grab

MIT SLOAN SCHOOL OF MANAGEMENT — Cambridge, MA

Research Assistant to Professor Dimitris Bertsimas — 2021 - 2022

- Proposed a new way to model node sparsity constraints in neural networks to reproduce the brain's capacity for specialization
- Applied Optimal Decision Trees to improve interpretability of Reinforcement Learning agents

CENTRALESUPELEC (PARIS-SACLAY UNIVERSITY) / AIR FRANCE — Gif-sur-Yvette, France

Student project at CentraleSupélec — 2021

- Solved passenger placement for A320 flights via mixed-integer optimization and presented to the Air France data scientist team
- Built an interface to dynamically propose seats to each passenger group during the boarding process

PAPERS

GRAND-SLAMIN' Interpretable Additive Modeling with Structural Constraints

Shibal Ibrahim, Gabriel Afriat, Kayhan Behdin, Rahul Mazumder

NeurIPS — 2023

ADDITIONAL INFORMATION

- Languages: French (native), German (basic)
- Interests: badminton, cooking, piano and guitar (spirited amateur)

Amine Bennouna

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Education

Massachusetts Institute of Technology 2019 – Present
Ph.D candidate in Operations Research (GPA 5.0/5) *Cambridge, MA*
- Advisor: Bart Van Parys
- Thesis: Optimal Robustness in Learning and Data-driven Decision Making

Ecole Polytechnique 2016 – 2019
Master of Science in Applied Mathematics *Paris, France*
Bachelor of Science in Mathematics and Computer Science
- Advisor: Stéphane Gaubert.

Lycée Louis-le-Grand 2014 – 2016
Classes préparatoires, Mathematics, Physics, Computer Science *Paris, France*
- Intensive undergraduate program leading to nationwide exams.
  Admitted to ENS Ulm and Ecole Polytechnique (4th).

Research Interests

Data-driven Decision-making, Machine Learning, Optimization;
Distributionally Robust Optimization, Reinforcement Learning, Statistics.

Papers

Published or under review:

[1] Certified Robust Neural Networks: Generalization and Corruption Resistance (`link`)
Amine Bennouna, Ryan Lucas & Bart Van Parys.
Accepted in ***ICML 2023***
- ⋆ *Finalist of INFORMS 2023 Data Mining Best Paper Competition (General Track)*
- ⋆ *Best Student Paper Nominee at INFORMS Workshop on Data Science 2023*

[2] Holistic Robust Data-Driven Decisions (`link`)
Amine Bennouna & Bart Van Parys.
Submitted to Management Science

[3] Learning and Decision-Making with Data: Optimal Formulations and Phase Transitions (`link`)
Amine Bennouna & Bart Van Parys.
Major Revision in ***Mathematical Programming***
- ⋆ *Winner of MIT Operations Research Center Best Student Paper 2022*

[4] Optimal Discretization in RL: Learning the Minimal Representation of a Dynamic System from Transition Data (`link`)
Amine Bennouna, Dessislava Pachamanova, Georgia Perakis & Omar Skali Lami.
Major Revision in ***Management Science***

[5] COVID-19: Prediction, Prevalence, and the Operations of Vaccine Allocation (`link`)
Amine Bennouna, Joshua Joseph, David Nze-Ndong, Georgia Perakis, Divya Singhvi, Omar Skali Lami, Yannis Spantidakis, Leann Thayaparan, Asterios Tsiourvas.
Accepted in ***Manufacturing & Service Operations Management 2022***
- ⋆ *Finalist of INFORMS Doing Good with Good OR 2021*
- ⋆ *Honorable Mention Public Sector Operations Research Best Paper Competition 2021*
- ⋆ *INFORMS ICSS Best Conference Paper 2021*

[6] Shallow and Deep Networks are Near-Optimal Approximators of Korobov Functions (`link`)
Moïse Blanchard & Amine Bennouna.
Accepted in ***ICLR 2022***

In preparation for submission:

[7] Robust Two-Stage Optimization with Covariate Data (`link`)
Bart Van Parys & Amine Bennouna.

[8] Robust Statistics Through a Robust Optimization Lens
Gabriel Chan, Bart Van Parys & Amine Bennouna.

[9] Near Optimal Tractable Threshold Policies for Two-stage Robust Optimization Problems (`link`)
Amine Bennouna, Omar El Housni & Vineet Goyal.

⋆ *Winner of Ecole Polytechnique's 1st prize of research internship in Applied Mathematics*

Teaching Experience

Optimization Methods, MIT 15.093/6.255 — Rating
Graduate (Masters, MBAn, PhDs, MBA), 180 students — **6.9/7** (79 ratings)
Head teaching assistant, Fall 2021

Optimization Methods, MIT 15.093/6.255 — Rating
Graduate (Masters, MBAn, PhDs, MBA), 120 students — **6.5/7** (60 ratings)
Teaching assistant, Fall 2020

Mathematical Olympiad, Instructor
Morocco's national team IMO training 2017-2019

Advanced Mathematics, Classes Préparatoires
Instructor and examiner for Institut Bossuet (Lycée Louis-le-Grand, Saint-Louis, Henri IV)

Research Mentorship

Mentored MIT Masters Research Assistants
Ryan Lucas (then MIT ORC PhD), Gabriel Chan, Julien Pinede.

Mentored MIT Undergraduate Research Assistants
Janice Yang (then MIT MEng RA), Lowell Hensgen (then MIT MEng RA), Albert Luo, William Zhao.

Industry Experience

Google Research — Summer 2023
Part-time Student Researcher — *New York, NY*
- Launched a research collaboration on learning under distribution shift.

Google Research — Summer 2022
Research Intern — *New York, NY*
- Designed and implemented novel learning algorithms for image classification under distribution shift.

Crédit Agricole Investement Bank — Summer 2018
Data scientist intern — *Singapore*
- Designed and deployed a prediction-based optimization and pattern detection solution for budget optimization.

Research Experience

Massachusetts Institute of Technology, ORC — Aug 2019 – Present
Doctoral Research Assistant, advised by Prof. Bart Van Parys — *Cambridge, MA*
- Research on robustness in data-driven decision-making and machine learning problems. Designed novel "optimally robust" algorithms, with applications including deep learning and portfolio optimization.
- Theoretical and computational contributions to Distributionally Robust Optimization (DRO). Building novel DRO approaches for robust machine learning.
- Introduced a novel interpretable reinforcement learning approach. Applied the approach to COVID-19 cases and deaths forecasting and later used by the CDC.

Columbia University, IEOR — Summer 2019
Research Intern, advised by Prof. Vineet Goyal — *New York, NY*
- Introduced novel near-optimal policies for two-stage robust optimization problems.

Ecole Polytechnique, CMAP Sep 2018 – Apr 2019

Research Assistant *Paris, France*

- Worked with Prof. Stephane Gaubert & Prof. Xavier Allamigeon on the complexity of interior point methods, with Prof. Emmanuel Gobet on simulation methods of stochastic processes, and with Prof. Igor Kortchemski on random minimal factorizations of large n-cycles.

Awards

Finalist of INFORMS Data Mining Best Paper Competition Award (General Track)	2023
Best Student Paper Nominee at INFORMS Workshop on Data Science	2023
MIT Operations Research Center Best Student Paper Award	2022
Runner-up of INFORMS Doing Good with Good OR Student Paper Competition	2021
Honorable Mention in the Public Sector Operations Research Best Paper Competition	2021
Third Best Talk at CMU YinzOR Flash Talk Competition	2023
ICSS Best Conference Paper Award	2021
1st Prize Operations Research Center's Common Experience Deep Learning Challenge	2021
Top 2% in Kaggle Brain Tumor Classification Competition (Silver Medal)	2021
Robert B. Guenassia Award, MIT Office of Graduate Education	2021
Ecole Polytechnique 1st Prize of Research Internship in Applied Mathematics	2019
Chanoine Pierre Garand Award for Outstanding Undergraduate Pathway, Institut Bossuet	2016
Moroccan Merit Scholarship	2016
Honorable Mention in National French Physics Olympiad	2016
Honorable Mention in International Mathematical Olympiad (IMO)	2014

Service and Outreach

Reviewer: Operations Research.

Session Chair: INFORMS Annual Meeting 2023, ICCOPT 2022 Conference.

Seminar Coordinator: MIT Operations Research Center Seminar Series Spring 2023.

Initiatives: President of the Moroccan Mathematical Olympiad Society (2016-2019),
Co-organizer of the Morocco Solidarity Hackathon (AI/Optimization for mitigating natural disasters risks)

Talks

Holistic Robust Data-Driven Decisions

- *Upcoming:* INFORMS Annual Meeting Data Mining Best Paper Competition, 15 October (SC67), Phoenix AZ
- *Upcoming:* INFORMS Annual Meeting General Session, 16 October (MD38), Phoenix AZ
- CMU YinzOR Selected Flash Talk, August 2023, Pittsburgh PA
- SIAM Conference on Optimization, June 2023, Seattle WA
- Manufacturing & Services Operation Management Conference, June 2023, Montreal
- UM6P ThinkAI Hackathon Guest Speaker, May 2023, Benguerir
- MIT ORC Seminar (Best Paper Award), February 2023, Cambridge MA
- INFORMS Annual Meeting, October 2022, Indianapolis IN
- MoroccoAI Webinar Invited Speaker, October 2022, virtual
- ICCOPT, July 2022, Bethlehem PA
- MIT ORC Student Seminar, October 2022, Cambridge MA

Certified Robust Neural Networks: Bridging Generalization and Corruption Resistance

- *Upcoming:* MILA Invited Talk, 10 November 2023, Montreal
- ICML, July 2023, Honolulu HI/virtual

Learning and Decision-Making with Data: Optimal Formulations and Phase Transitions

- MIT ORC Student Seminar, October 2021, Cambridge MA
- INFORMS Annual Meeting, October 2021, Anaheim CA

Minimal Representation Learning: Toward more Interpretable and Efficient Offline Reinforcement Learning

- INFORMS Healthcare Conference, July 2021, virtual
- Manufacturing & Services Operation Management Conference Conference, June 2021, virtual
- MIT ORC Student Seminar, April 2021, Cambridge MA
- INFORMS Annual Meeting, November 2020, virtual

The Representation Power of Neural Networks

- ICLR, April 2022, virtual (poster session)
- MIT ORC Student Seminar, March 2021, Cambridge MA
- MIT SIAM Student Seminar, December 2020, Cambridge MA

Skills

Languages | *Fluent:* English. *Native:* French, Arabic.
Programming | *Proficient:* Python, Julia. *Prior experience:* SQL, Maple, OCaml, HTML.
Software Tools | PyTorch, TensorFlow, JuMP, Gurobi, MOSEK.

Outside Activities

Soccer, Piano, Biking, Reading, Hiking.

References

Prof. Bart Van Parys
Sloan School of Management
Massachusetts Institute of Technology
vanparys@mit.edu

Prof. Patrick Jaillet
Department of Electrical Engineering and Computer Science
Massachusetts Institute of Technology
jaillet@mit.edu

Prof. Daniel Kuhn
Risk Analytics and Optimization Chair
Swiss Federal Institute of Technology Lausanne
daniel.kuhn@epfl.ch

BENJAMIN BOUCHER

+1 (617) 201-3767 ⋄ bboucher@mit.edu ⋄ Citizenship: USA & France

EDUCATION

Massachusetts Institute of Technology *Aug 2021 - Present*
Ph.D. Candidate in Operations Research
Qualifying Coursework: Mathematical Programming, Nonlinear Optimization, Robust Optimization, Integer and Combinatorial Optimization, Semidefinite Optimization, Statistical Learning Theory, Probability Theory
GPA: 5.0 out of 5.0

CentraleSupélec *Sept 2019 - 2021*
B.S. and M.S. in Engineering
Coursework: Probability Theory, Statistical Theory, Introduction to Optimization, Finance

Lycée Sainte-Geneviève *Sept 2017 - 2019*
Preparatory class in Mathematics & Physics for the French "Grandes Écoles"

RELEVANT WORK EXPERIENCE

Instacart, San Francisco, CA *June 2023 - September 2023*
Machine Learning Engineer Intern.

- Worked on the batching team to design an optimization program to choose and schedule which bundles of deliveries to prepare.
- Improved latency of optimization solve time by tuning a variety of solver parameters, respecting business constraints.
- Productionized and simulated impact of optimization on real time data – demonstrated cost savings and increased worker efficiency.

MIT Sloan School of Management, Cambridge, MA *Aug 2021 - Present*
Research Assistant. Conducted research under Professor Bertsimas

- Construct robust optimization uncertainty sets leveraging probabilities, yielding stronger guarantees while better controlling tail effects of distributions. This theory was applied to flatten the census of recovering patients in hospital beds post-surgery by designing a timetable for surgeons – managing to reduce the maximum weekly census by up to 10%. To do so, the problem was formulated as a Mixed Integer program and solved in Julia using both JuMP and Gurobi. A variety of different formulations and user cuts were added to enhance the solver. The code is being implemented in collaboration with product engineers to deploy my solution at Hartford Hospital's Bone and Joint Institute.
- Developed a new definition for the Sparse PCA problem, focused on capturing the total variance instead of the standard view of a partial, inner variance. Designed a local search algorithm enhanced by a warm start to achieve quality solutions in minutes for instances with 10,000s of variables. Empirically showed the relevance of this definition on classification and regression problems with extensive computations.
- Designing interpretable algorithms for a major American insurance company to communicate with their clients effectively. Used policy trees to suggest what communications to send to a particular client based on his characteristics (such as current tenure or credit score). This method is predicted to increase retention by 1% and is set to be implemented by the end of 2022.

MIT Sloan School of Management, Cambridge, MA *Aug 2022 - Present*
Teaching Assistant for Optimization Methods

- Lead bimonthly recitation sections and weekly office hours for 200+ students.
- Invited to present my robust optimization research work on hospital census reduction as a guest lecturer.

Le Masque Français (Manufacturing Start-up), Île-de-France, France *June 2020 - July 2021*

- Automated production of surgical masks by performing image analysis in OpenCV to detect faulty masks.

TECHNICAL SKILLS AND LANGUAGES

Programming Languages	Python and Julia
Languages	English (native), French (native), Italian (conversational)

ADDITIONAL INFORMATION

Awards	Jean Gaillard Fellowship for Graduate Studies at MIT (2021)
Personal	Piano (14 years), Cinema Enthusiast, Cross-stitching

YUBING CUI

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EDUCATION

Massachusetts Institute of Technology, Ph.D. Sept.2023–May 2028(expected)
Major: Operations Research
Advised by Dimitris Bertsimas.

University of Michigan - Ann Arbor, B.Sc. Sept.2019–Apr.2021, Aug.2022-Apr.2023
Major: Double major in Honors Mathematics and Computer Science
GPA: 3.99 Major GPA: 3.98
Gap year during the 2021-2022 academic year.

University of California San Diego Sept.2018–June 2019
Major: Mathematics (honors sequence)
GPA: 3.88 Major GPA: 4.00
Transferred out.

PUBLICATION

Minimum Cost Adaptive Submodular Cover (with Viswanath Nagarajan). Accepted for publication at SIAM Symposium on Simplicity in Algorithms (SOSA23). `https://arxiv.org/abs/2208.08351`

RESEARCH EXPERIENCE

Approximation Algorithm: Minimum Cost Adaptive Submodular Cover May 2022-Aug.2022
Summer Undergraduate Research in Engineering (SURE)
University of Michigan, College of Engineering
Research mentor(s): Associate Professor Viswanath Nagarajan, University of Michigan IOE and CSE.

- Worked on the stochastic optimization problem, focusing on *Minimum Cost Adaptive Submodular Cover*, and coauthored a paper with the same name, which was accepted for publication at the SIAM Symposium on Simplicity in Algorithms (SOSA 2023).
- Obtained a $4(\ln Q+1)$-approximation algorithm for the problem of minimum cost cover of adaptive-submodular functions, which is nearly the best possible (unless $P = NP$) and the first $O(\ln Q)$-approximation algorithm for the general setting, and further extended the result to multiple adaptive-submodular cover problem, which is introduced for the first time.

Analysis of Partial Differential Equations: Wave Kinetic Equations May 2021-future
NSF Math REU (Research Experiences for Undergraduates)
University of Michigan, Department of Mathematics
Research mentor(s): Professor Zaher Hani and Assistant Professor Ricardo Grande Izquierdo, University of Michigan Math department.

- Worked on wave turbulence theory under the guidance of mentors, focusing on Kolmogorov-Zakharov cascade spectra, which are some highly interesting solutions of the wave kinetic equations (WKE).
- Proved the main theorem by introducing a class of functions (more inclusive than some published works) over which the WKE converges, quantified general bounds on WKE, showed finer bounds for a subclass of nicely behaved functions, and utilized it to give a rigorous mathematical proof to interpret Kolmogorov-Zakharov solutions.

Machine Learning: Family-Wise Loss for Multi-Class SVM Jan.2021-May 2021
Directed Study
University of Michigan, Electrical Engineering and Computer Science
Research mentor(s): Professor Clayton Scott, University of Michigan EECS and Statistics.

- Worked on the topic of multi-class support vector machine (SVM) with family-wise loss, which is one instance of entropic loss and Fenchel-Young loss and holds some promising properties: convex, classification-calibrated, and sum-to-zero-constraint-free.
- Explored to find an exact and/or fast solver by reforming family-wise loss into a maximization over $2^k - 1$ parameterized affine planes and using techniques including Primal-Dual, reparametrization, subproblems, and block coordinate descent.
- Arrived at exponential theoretical bounds and planned to tackle the problem with sparsity conjecture and minimax framework in later works.

Machine Learning: Generative Adversarial Network for Ray Tracing June 2020-Aug.2020

NSF Math REU - Research in Industrial Projects for Students (RIPS)

UCLA Institute for Pure & Applied Mathematics (IPAM)

Research mentor(s): Dr.Paul Bauman, Advanced Micro Devices (AMD) and Dr.Qiujing Lu, UCLA.

- Worked in a group of four on the project sponsored by AMD to explore common frameworks and algorithms in generative modeling to automatically produce images that appear to have been rendered using ray tracing.
- Reproduced Super Resolution Generative Adversarial Network (SRGAN) paper results using PyTorch, generated a dataset with 10k+ images for our neural network model by Blender with Python Scripting, and introduced our modified Ray Tracing GAN (RTGAN), which accomplished the rendering task in the preliminary Blender setting 80+ times quicker than the Blender engine.
- Improved our RTGAN by U-NET with VGG22 loss, introduced shadow-loss, and solved the "checkerboard" problem with the help of Wasserstein GAN with gradient penalty.
- Presented our work in MAA Student Poster Session of Joint Mathematics Meetings 2021 and Southern California Math REU Conference 2020.

HONORS & AWARDS & SCHOLARSHIPS

41st Annual Virginia Tech Regional Mathematics Contest - 1st place of Univ. of Michigan May 2020
Arthur Herbert Copeland, Sr. Memorial Award, University of Michigan Math Department May 2021
Merit Scholarship (the maximal amount), University of Michigan Math Department Aug. 2021
EECS Scholar, University of Michigan College of Engineering Apr. 2021, Apr. 2022
James B. Angell Scholar, University of Michigan LSA Mar. 2021, Mar. 2022, Mar. 2023
University Honors, University of Michigan LSA Dec. 2019, Apr. 2020, Dec. 2020, Apr. 2021, Dec. 2022, Apr. 2023
Outstanding Achievement in Mathematics Award, University of Michigan Math Department April 2023
Provost Honors, UC San Diego Fall Qtr 2018, Winter Qtr 2019, Spring Qtr 2019

WORK EXPERIENCE

Meituan (Beijing)

Machine Learning Engineer Intern in the Operations Research Team Mar.2022-May 2022

- Participated in designing and implementing demand forecasting and dynamic pricing system, which comprises product composition pattern modeling, analysis of price-volume relationship, etc., and applied primary techniques, including XGBoost and Double Machine Learning.
- Explored metrics to quantify the degree of shortage of each SKU on Meituan grocery platform with SQL and analyzed their correlations with prices, GMV, categories, etc., to explore new strategies for the demand forecasting system.

Tencent Holdings Ltd. (Shenzhen)

Product Manager Intern in the QQ Browser Search Group Aug.2021-Nov.2021

SKILLS

Technical:

Proficient: C++, Python, SQL

Intermediate: MATLAB, Java

Basic: R, Pascal, STATA

Packages/others used: TensorFlow, PyTorch, Gurobi Optimizer for Linear Programming, LaTeX

Certificate:

C++ Programming for Financial Engineering offered by Baruch College, City University of New York (CUNY) and QuantNet July 2019

Qingxuan (Max) Jiang

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EDUCATION

Massachusetts Institute of Technology **Cambridge, MA**
Master of Science in Operations Research (GPA: 4.9/5.0) *Sept. 2021 – Dec. 2023*

Cornell University **Ithaca, NY**
Bachelor of Arts in Mathematics and Computer Science, Summa Cum-laude (GPA: 4.11/4.3) *Sept. 2017 – May 2021*
- Award/Scholarship: William Lowell Putnam Competition 2017 (122 out of 4638); Tanner Dean's Scholars

SKILLS & COURSES

Software: Python (Numpy, Pandas, Matplotlib, Scikit-Learn, Pytorch, and Tensorflow), MATLAB, Julia, Optimization Software (JuMP, Gurobi, CVXPY), R, Java
Courses: Machine Learning (Deep Learning, Reinforcement Learning, and Graphical Models for Inference); Linear, Convex and Integer Optimization; Probability Theory; Mathematical Statistics

EXPERIENCE

Operations Research Center **Cambridge, MA**
Research Assistant (Advisor: Retsef Levi and Vivek Farias) *Sept. 2021 - Present*
- Worked on multiple machine learning and optimization projects for revenue management; individually performed data processing, deep learning modeling, and parameter tuning to model customer behavior
- Developed and trained a transformer model from scratch to test its applicability on customer choice predictions; tuned hyperparameters and applied regularization for optimal performance; compared prediction results with decision tree and other neural network models and achieved a 5% improvement in accuracy
- Investigated the nonlinear integer programming problem of revenue optimization on trained transformer model; designed a local search algorithm for choosing an optimal set of products for sale; compared results with random search and greedy algorithm, and achieved 25% more profit on grocery sale datasets
- Invited for presentation at the INFORMS revenue management conference

Undergraduate Artificial Intelligence Research Group, Cornell University **Ithaca, NY**
Research Assistant *Sept. 2018 – May 2021*
- Developed first-order optimization algorithms for batch normalization and its backpropagation in hyperbolic space; incorporated the algorithm as a layer to enhance hyperbolic neural networks and graph convolutional networks and attained 5% improvement in accuracy on citation network datasets; prepared and presented results in a conference paper accepted to ICML
- Contributed to the code implementation of a generative model on manifolds based on the Neural ODE architecture; assisted in writing proofs and preparing a paper accepted to NeurIPS

Department of Computer Science, Cornell University **Ithaca, NY**
Teaching Assistant *Jan. 2018 – May 2021*
- Served as TA for 7 semesters in algorithm, machine learning, and data science courses; taught 300+ students
- Consolidated class materials and commonly asked problems into revision documents for distribution
- Shared lab/research experience and tutored interested students in preparing data competitions and writing papers

Machine Learning Group, Tencent AI Lab **Shenzhen, China**
Research Engineer Intern *July 2018 - Aug. 2018*
- Individually enhanced the exploration in Bayesian optimization: implemented a new class of hyperparameter-free acquisition functions using TensorFlow to optimize finding local minima for non-convex benchmark; attained faster convergence compared to the baseline model, with a 30% reduction in run-time
- Incorporated code into the company codebase and presented the rationale to a group of research scientists

PROJECT

Predicting Effective Argument in Student Essays **Cambridge, MA**
Project Lead *Aug. 2022*
- Led a team of 4 in a Kaggle competition; held daily team connects, managed project timeline, established collaboration norms, and distributed tasks according to each participant's capabilities and interests
- Performed feature engineering, combining handcrafted features with sentence-level embeddings; trained gradient boosting models from scratch and fine-tuned transformer models based on pre-trained BERT architecture; utilized stacking to combine different models into a more robust predictor
- Achieved top 30% among 1500 submissions in a 2-week effort

PUBLICATION

- Aaron Lou*, Isay Katsman*, **Qingxuan Jiang***, Serge Belongie, Ser-Nam Lim, and Christopher De Sa, Differentiating through the Fréchet Mean, International Conference on Machine Learning (ICML), 2020.
- Aaron Lou*, Derek Lim*, Isay Katsman*, Leo Huang*, **Qingxuan Jiang**, Ser-Nam Lim, and Christopher De Sa, Neural Manifold Ordinary Differential Equations, Neural Information Processing Systems (NeurIPS), 2020.

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.
Minors in Applications of Computing, Applied & Computational Mathematics, and Statistics & Machine Learning
Thesis title: *Sequential Stochastic Network Structure Optimization With Applications To Addressing Canada's Obesity Epidemic*

Work Experience

2020 -2023 **Afrodescendent Leadership Alliance**, Montreal, Canada
Founding Board Member and Steering Committee Member
The Afrodescendent Leadership Alliance is a non-profit established to help the Black community in Canada build wealth and reinvest it in their environment. By annually bringing together a cohort of emerging Black leaders with inspiring speakers and industry professionals, the BWC aims to enhance their leadership skills, network, and business acumen.

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.

2022 **Bain Capital Crypto**, San Francisco, CA
Researcher In Residence
Supervisor: Guillermo Angeris
Research focused on tackling central problems in Decentralized Finance and Blockchain scaling using tools from convex analysis, mathematical optimization (convex, discrete, robust, stochastic) and game theory.

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.

Teaching Experience

2022 **Massachusetts Institute of Technology**, Cambridge, MA
(Fall) *Teaching Assistant* for 15.095 Machine Learning Under a Modern Optimization Lens
Duties: preparing and leading recitations, developing and grading assignments and exams, holding office hours, and supervising final projects.

2021 **Massachusetts Institute of Technology**, Cambridge, MA
(Fall) *Teaching Assistant* for 15.060 Data, Models and Decisions
Duties: preparing and leading recitations, developing and grading assignments and exams, holding office hours, and supervising final projects.

Publications

"Sparse Plus Low Rank Matrix Decomposition: A Discrete Optimization Approach", with Dimitris Bertsimas, and Ryan Cory-Wright. Accepted to Journal of Machine Learning Research, October, 2023.

"Compressed Sensing: A Discrete Optimization Approach", with Dimitris Bertsimas. Submitted to Springer Machine Learning, June 2023.

"Concave Pro-rata Games", with Theo Diamandis, Alex Evans, Henry de Valence and Guillermo Angeris. Accepted to Financial Cryptography Decentralized Finance Workshop, March, 2023

"Optimus: a general purpose adaptive optimization engine in R", with Xin Liu, Liezel Tamon, and Aleksandr Sahakyan. Accepted to Oxford University Press Bioinformatics, January, 2022.

"Sequential Stochastic Network Structure Optimization with Applications to Addressing Canada's Obesity Epidemic", with Miklos Racz. Preprint available on arXiv, September, 2021.

"Greek Government School Choice Design", with Dimitris Bertsimas, Michael Lingzhi Li, and Alex Paskov, ongoing work.

"Structured Low Rank Matrix Approximation: A Discrete Optimization Approach", with Dimitris Bertsimas, ongoing work.

"Alternating Current Optimal Power Flow: Novel Low Rank Perspectives", with Dimitris Bertsimas, ongoing work.

Honors and Awards

2023 Google Schwarzman College of Computing Fellowship
Awarded by MIT's Schwarzman College of Computing

2023 MIT-Pillar AI Collective Fellowship

2022 Dr. Angela E. Grant Best Algorithm Award
"Sparse Plus Low Rank Matrix Decomposition: A Discrete Optimization Approach"
Awarded at the 2022 Conference for African American Research in the Mathematical Sciences.

2021 INFORMS Data Mining Section Student Paper Competition 1st Place
"Sparse Plus Low Rank Matrix Decomposition: A Discrete Optimization Approach"
Awarded by the Data Mining Section at INFORMS 2021.

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 Contrary Capital – C20 Talent Fellow
A fellowship awarded to a select group of top early-career engineers and product minds working in technology.

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 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, JavaScript, SQL, Solidity
Optimization Software: JuMP, CPLEX, MOSEK, GUROBI
Languages: English (native), French (fluent)
Extracurriculars: Chess, Basketball, Fitness

Citizenship Citizen of Canada, Bahamas

Karla Mayra Perez Muñoz
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karlampm@mit.edu

EDUCATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY Cambridge, MA
Leaders for Global Operations Fellow 2023 - Present
Candidate for MBA, MIT Sloan School of Management, May 2025
Candidate for SM in Operational Research, MIT School of Engineering, May 2025
- Jeff A. Wike (LGO 93) Fellowship, and LunaCap Foundation Fellow
- Anticipated coursework: Artificial Intelligence, Statistics and Optimization Methods

INSTITUTO TECNOLOGICO AUTONOMO DE MEXICO Mexico City, Mexico
BS in Applied Mathematics 2015 - 2019
- Awarded with honorific mention for thesis "PPTcirc package: Analysis of posterior projected Polya tree for circular data"
- Elected as an Academic Representative for the Student Committee of Applied Mathematics

INSTITUTO TECNOLOGICO AUTONOMO DE MEXICO Mexico City, Mexico
BS in Actuarial Sciences 2015 - 2019
- Academic Excellence, Miguel Mancera Grant and TELMEX Foundation Grant

EXPERIENCE

MASTERCARD Mexico City, Mexico
Consultant, Data & Services – Advisors 2022 - 2023
- Analyzed campaigns performance with A/B testing and created deliverables to clients in order to recommend actions for next campaigns that resulted in optimized and personalized campaigns which increased relevant KPIs such as open rate over 20%
- Led Girls4Tech Mexico initiative expanding the program and impacting and inspiring over 300 girls to pursue STEM careers
- Conduct segmentation models with encrypted large scale transactional data to understand spend patterns and create a personalized value proposition for one the biggest banks in Mexico

Associated Consultant, Data & Services – Advisors 2020 - 2022
- Collaborated and developed action plans with an interdisciplinary team for Mastercard Costa Rica 2025 Strategy to increase +150 % net revenues in the next five years that resulted in strategic pillars that are currently following the leadership team
- Designed of strategy and technical models for loyalty data analytics product to optimize portfolio in order to increase in +50 % annual spend in debit and credit cards

INSTITUTO TECNOLOGICO AUTONOMO DE MEXICO Mexico City, Mexico
Research Assistant 2020 – 2021
- Developed, coded and published a R package in CRAN (pptcirc) that models posterior densities of circular data with non-parametric Bayesian inference (Polya tree distributions) that is currently shared and available on CRAN or github

GNP Insurance Mexico City, Mexico
Analytics Intern 2018 - 2019
- Coded user interface to automatize underwriting analysis and reduce work time into half
- Built predictive time series model to estimate medical inflation in order to define budget for future claims

LEADERSHIP ACTIVITIES

ITAM CONSTRUYE Mexico City, Mexico
Project Coordinator 2018-2019
- Planned goals, syllabus, budget and timeline for computer classes for seniors in a low-income community.
- Impacted over 40 seniors with education and inclusion and awarded for best coordinator of the nine projects.

ADDITIONAL INFORMATION
- Languages: Spanish and English
- Volunteering: Coordinated abroad at Sao Carlos Education Secretary Brazil in a team of four people to empower over 100 kids to go beyond the geographic limits with cultural classes.
- Hobbies/Interests: Hiking, Salsa Dancing (Second place Ruedafest Guadalajara 2019), Boardgames
- Technical Skills: R, Python, SQL, MATLAB, Data Visualization, Microsoft tools

Haoyue Wang

haoyuew@mit.edu 312-478-2738

Education

Massachusetts Institute of Technology, Cambridge, MA, USA — Sep. 2019 - Jun. 2024
Ph.D. Candidate in Operations Research (GPA: 5.0/5.0)
Research Interest: Large-scale optimization and statistical learning.

Fudan University, Shanghai, China — Sep. 2015 - Jun. 2019
B.S. in Applied Mathematics (GPA: 3.8/4.0)
Awards: Silver Medal (Personal) in Probability and Statistics, and Bronze Medal (Team), 2018 S.-T Yau Colledge Student Mathematics Contest.

Professional Experience

LinkedIn Corporation, Sunnyvale, CA — May - Aug. 2022
Research internship: Develop a fast specialized linear program solver for an application in recommendation systems. Achieve 20 times speedup over Gurobi.
Paper: A Light-speed Linear Program Solver for Personalized Recommendation with Diversity Constraints. Haoyue Wang, Miao Cheng, Kinjal Basu, Aman Gupta, Keerthi Selvaraj and Rahul Mazumder. *NeurIPS OPT Workshop*, 2022.

Publications

1. "On the Convergence of CART under Sufficient Impurity Decrease Condition", Rahul Mazumder and Haoyue Wang. *Advances in Neural Information Processing Systems (NeurIPS)*, 2023 (accepcted).
2. "Nonparametric Finite Mixture Models with Possible Shape Constraints: A Cubic Newton Approach", Haoyue Wang, Shibal Ibrahim and Rahul Mazumder, *SIAM Journal on Mathematics of Data Science*, (forthcoming).
3. "Linear Regression with Partially Mismatched Data: Local Search with Theoretical Guarantees", Rahul Mazumder and Haoyue Wang, *Mathematical Programming*, 197(2): 1265-1303, 2023.
4. "Frank-Wolfe Methods with an Unbounded Feasible Region and Applications to Structured Learning", Haoyue Wang, Haihao Lu and Rahul Mazumder, *SIAM Journal on Optimization*, 32(4), 2938-2968, 2022.
5. "Quant-BnB: A Scalable Branch-and-Bound Method for Optimal Decision Trees with Continuous Features", Rahul Mazumder, Xiang Meng and Haoyue Wang, *International Conference on Machine Learning (ICML)*, 2022.
6. "Solving L1-regularized SVMs and Related Linear Programs: Revisiting the Effectiveness of Column and Constraint Generation", Antoine Dedieu, Rahul Mazumder and Haoyue Wang, *Journal of Machine Learning Research (JMLR)*, 23, 1-41, 2022.
7. "An Optimal High-Order Tensor Method for Convex Optimization", Bo Jiang, Haoyue Wang and Shuzhong Zhang, *Mathematics of Operations Research (MOR)*, March 2021.
8. "Interior-point Methods Strike Back: Solving the Wasserstein Barycenter Problem", Dongdong Ge, Haoyue Wang, Zikai Xiong and Yinyu Ye, *Advances in Neural Information Processing Systems (NeurIPS)*, 2019.

Papers under review & working papers

1. "A Cyclic Coordinate Descent Method for Convex Optimization on Polytopes", Rahul Mazumder and Haoyue Wang, Major review at *SIAM Journal on Optimization*.
2. "Linear Programming Using Diagonal Linear Networks", Haoyue Wang, Promit Ghosal and Rahul Mazumder. Submitted to *International Conference on Learning Representations (ICLR)*, 2024.
3. "Pattern Search in Shape Restricted Additive Models: A Mixed Integer Programming Approach", Rahul Mazumder and Haoyue Wang. Under preparation.
4. "Univariate Convex Regression: ℓ_q-Risk Bounds under Heavy-Tailed Noises", Rahul Mazumder and Haoyue Wang. Under preparation.
5. "Convergence Rates of Gradient Boosted Regression Tree Stumps", Rahul Mazumder and Haoyue Wang. Under preparation.

Skills

Coding Language & Packages: Python, Julia, C++, Gurobi, Mosek, cvxpy.

Zikai Xiong

MIT Operations Research Center
77 Massachusetts Avenue
Cambridge, MA 02139
Number: 857-999-7560
Email: zikai@mit.edu
Website: https://zikaixiong.github.io/

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA (expected) June 2025
Ph.D. in Operations Research
GPA: 5.0/5.0
Advisor: Prof. Robert M. Freund

Fudan University, Shanghai, China May 2020
B.S. in Mathematics and Applied Mathematics

RESEARCH INTERESTS

Huge-scale linear programming, first-order methods for optimization, with applications in statistical learning, machine learning, deep learning, transportation, and fairness.

PUBLICATIONS

Publications and working papers in optimization:

- **Zikai Xiong** and Robert Freund, "Improving the Geometry of (Conic) Linear Optimization Problems for the Primal-Dual Hybrid Gradient Method," in preparation.
- **Zikai Xiong** and Robert Freund, "Geometric Condition Measures in First-Order Methods for Linear Programming," in preparation.
- **Zikai Xiong,** Niccolo Dalmasso, Vamsi Potluru, Tucker Balch, Manuela Veloso, "Fair Wasserstein Coresets," submitted.
- **Zikai Xiong,** Niccolo Dalmasso, Alan Mishler, Vamsi Potluru, Tucker Balch, Manuela Veloso, "FairWASP: Fast and Optimal Fair Wasserstein Pre-processing," submitted.
- **Zikai Xiong** and Robert Freund, "Using Taylor-Approximated Gradients to Improve the Frank-Wolfe Method for Empirical Risk Minimization," under revision in SIAM Journal on Optimization. https://zikaixiong.github.io/FWERM.pdf
- Dongdong Ge, Chengwenjian Wang, **Zikai Xiong**, and Yinyu Ye (alphabetical order), "From an Interior Point to a Corner Point: Smart Crossover," under revision in INFORMS Journal on Computing. https://arxiv.org/abs/2102.09420
- Dongdong Ge, Haoyue Wang, **Zikai Xiong**, and Yinyu Ye (alphabetical order), "Interior-Point Methods Strike Back: Solving the Wasserstein Barycenter Problem." *NeurIPS 2019*, 6894-6905, 2019. https://proceedings.neurips.cc/paper/2019/hash/0937fb5864ed06ffb59ae5f9b5ed67a9-Abstract.html
- **Zikai Xiong**, Renjie Xu, Yanwei Xu, and Yimin Wei, "Low-Rank Traffic Matrix Completion with Marginal Information." *Journal of Computational and Applied Mathematics* 410(3):114219, 2022. https://doi.org/10.1016/j.cam.2022.114219

Other:

- Zhengqi Gao, Fan-Keng Sun, Mingran Yang, Sucheng Ren, **Zikai Xiong**, et al. "Learning from Multiple Annotator Noisy Labels via Sample-wise Label Fusion." *ECCV 2022*. https://arxiv.org/abs/2207.11327
- **Zikai Xiong**, Jiacheng Guo and Bo Jiang, "Effect of Hidden-City Ticketing in Revenue Management," in preparation.

WORK EXPERIENCE

Research Intern, J.P.Morgan Chase AI Research 2023 Summer

- Developed a preprocessing method on datasets to improve fairness for downstream models, via proposing a fast algorithm on the huge-scale linear programming subproblem
- Developed a data distillation algorithm that distills the knowledge of large models and ensures the fairness for downstream models

Research Assistant, MIT 2020 – Present

Operations Research Center

Supervisor: Robert M. Freund (MIT)

- Studied the condition numbers for first-order methods (such as primal-dual hybrid gradient method) for general huge-scale linear programming problems, aimed at deriving practical enhancements on huge-scale linear programming methods
- Developed new algorithms for improving the geometry of (conic) linear programming problems, to improve the convergence rates of first-order methods on them, in theory and practice
- Developed new stochastic Frank-Wolfe methods for solving empirical risk minimization problems, yielding reduced dependence on sample size and demonstrating robust performance in real-world applications.

Research Assistant, Shanghai University of Finance and Economics (SUFE) 2018 - 2022

Research Institute for Interdisciplinary Sciences (RIIS)

Supervisors: Yinyu Ye (Stanford), Dongdong Ge (SUFE)

- Developed new crossover methods for linear programming (LP), now in a new commercial LP solver that won first place in Hans Mittelmann benchmark of barrier LP solvers.
- Developed a matrix-based interior-point method to solve the large-scale linear programming problems in Wasserstein barycenter problems.
- Studied the effects of hidden-city ticketing practices on airline revenues.

PRESENTATIONS

- "Improving the Geometry of (Conic) Linear Optimization Problems for the Primal-Dual Hybrid Gradient Method (PDHG)," Workshop on Modern Continuous Optimization, Cambridge, 2023; INFORMS Annual Meeting, Phoenix, 2023
- "Geometric Condition Measures in the Primal-Dual Hybrid Gradient Method for Linear Programming," SIAM Conference on Optimization (OP23), Seattle, 2023; Operations Research Center, Cambridge, 2023; SUFE, Shanghai, 2023
- "Using Taylor-Approximated Gradients to Improve the Frank-Wolfe Method for Empirical Risk Minimization," ICCOPT, Bethlehem, 2022; and MIT Operations Research Center, Cambridge, 2022; and INFORMS Annual Meeting, Indianapolis, 2022
- "From an inner point to a corner point: Smart Crossover," INFORMS Annual Meeting, Indianapolis, 2022

- "Interior-Point Methods Strike Back: Solving the Wasserstein Barycenter Problem," INFORMS Annual Meeting, Seattle, 2019; and Shanghai University of Finance and Economics, 2019

PROFESSIONAL SERVICE

Reviewer:

Journal: *SIAM Journal on Optimization (SIOPT)*

Conference: *ICML 2021/2022*; *NeurIPS 2022*

HONORS & AWARDS

First Place, MIT OR Center Common Experience Presentation Competition	2021
SIAM Travel Award	2021
Fudan Graduation Star	2020
The highest award of Fudan University, for only 10 graduates every year	
Outstanding Graduate of Shanghai City	2020
Fudan Outstanding Student Pacesetter Award	2019
The highest annual award of Fudan University, for only 10 undergraduate students	
National Scholarship	2018
The highest annual scholarship for top students (1%)	

OTHER

Teaching Assistant:

Massachusetts Institute of Technology graduate courses:

- 15.081 Introduction to Mathematical Programming — Fall 2023
- 15.081 Introduction to Mathematical Programming — Fall 2022
- 15.077 Statistical Machine Learning and Data Science — Summer 2022
- 15.071 The Analytics Edge — Spring 2022

Shanghai University of Finance and Economics graduate courses:

- International Summer Courses (Stochastic Modeling; From Machine Learning to Decision-making: Bandit Learning and Reinforcement Learning; Stochastic Process and Financial Risk Analysis) — Summer 2019

Programming languages: Julia, Python, MATLAB, R, C++

Hobbies: Hiking, Kayaking, Skiing

Jiayu Kamessi Zhao

Operations Research Center (ORC)
Massachusetts Institute of Technology

Email: kamessi@mit.edu
Webpage: https://kamessizhao.github.io/

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA
Candidate for PhD in Operations Research 2020 - 2025 (Expected)
GPA: 5.0/5.0 Advisor: Daniel Freund

Columbia University, New York, NY 2016 - 2020
B.S. in Operations Research: Financial Engineering
Summa Cum Laude

RESEARCH INTERESTS

My research focuses on platform operations and market design problems in online marketplaces. In tackling these challenges, my works lie at the intersection of online algorithms, stochastic decision-making, and game theory.

PUBLICATIONS AND PREPRINTS

"Two-sided Platform Flexibility", with D. Freund and S. Martin. 2023. Working Paper.

"On the Supply of Autonomous Vehicles in Open Platforms", with D. Freund and I. Lobel. 2023. Under review.

"End-of-Horizon Load Balancing Problems: Algorithms and Insights", with D. Freund and C. Hssaine. 2023. Under review.

"Overbooking with Bounded Loss", with D. Freund. 2022. Mathematics of Operations Research 48(3): 1344-1363. An earlier version appeared at the Twenty-Second ACM Conference on Economics and Computation (EC'21).

SELECTED TALKS

"On the Supply of Autonomous Vehicles in Open Platforms." Presented at INFORMS 2023; Cornell Young Reseachers Workshop, 2023; MSOM Conference 2023; Marketplace Innovation Workshop 2023; INFORMS 2022.

"Overbooking with Bounded Loss." Presented at EC'21; INFORMS 2021; ORC Student Seminar, 2022.

WORK EXPERIENCE

Uber Technologies, Inc., San Francisco, CA Summer 2023
Applied Scientist PhD Intern
Conducted convex optimization for UberEats' real-time pricing algorithm; devised solutions to enhance the chained supply model used for dampening surge demand.

AllianceBernstein L.P., New York, NY Summer 2019
Quantitative Research Intern
Formulated a market timing strategy to adopt stock-bond relative return before month end as a trading signal by verifying the existence of month-end re-balancing flows.

Columbia Business School, New York, NY Summer 2018
Summer Research Intern
Validated the tendency for active funds to trade against passive flows by applying econometric and statistical tools to historical data on mutual fund portfolio disclosures.

TEACHING EXPERIENCE

Massachusetts Institute of Technology, Cambridge, MA 2022-2023
Teaching Assistant for *(i) Common Experience in OR* and *(ii) Intro to Operations*
Held recitation sessions and prepared materials on (i) pricing, contracting, and inventory management and (ii) deep-learning for computer vision and NLP models.

Columbia University, New York, NY Fall 2018
Teaching Assistant for Ordinary Differential Equations/Probability for Engineers

Graded courses materials, held office hours, drafted homework solutions, and administered course logistics.

MIT ACTIVITIES

MIT ORC Seminar Series student coordinator	2023 Fall
MIT Operations Management Seminar student co-organizer	2021-2023

PROFESSIONAL SKILLS

Programming Skills: Python, Julia, Gurobi, SQL, MATLAB, R
Softwares: LaTeX, Word, Excel, PowerPoint
Languages: English (proficient), Mandarin (native)