Curriculum Vitae

Daniel Freund

Sloan Department:
Operations Management

Month/Year of Birth: September 1990

Place of Birth: Cologne, Germany

Citizenship: German
Immigration Status: Permanent Resident

I. Education

PhD, Applied Mathematics	Cornell University	2018
MSc, Applied Mathematics	Cornell University	2016
BSc, Mathematics	University of Warwick	2013

II. Title of Doctoral Thesis and Name of Thesis Advisor

Models and Algorithms for Transportation in the Sharing Economy
Advisor: David B. Shmoys

III. Principal Field(s) of Interest

Operations, Optimization, Analytics, Transportation, Platforms

IV. Name and Rank of other Sloan Faculty in Same Field

Name	*Rank*
Joann de Zegher	Assistant Professor
Steven Eppinger	Professor
Vivek F. Farias	Professor
Charles Fine	Professor
Negin Golrezaei	Assistant Professor
Stephen C. Graves	Professor
Jónas Oddur Jónasson	Associate Professor (without Tenure)
Retsef Levi	Professor
Thodoris Lykouris	Assistant Professor
Georgia Perakis	Professor
Nikos Trichakis	Associate Professor (with Tenure)
Y. Karen Zheng	Associate Professor (with Tenure)

V. Non-MIT Employment

Employer	*Position*	*Start*	*End*
Lyft	Research Fellow	2018	2019
Motivate International	Data Scientist	2015	2016

VI. History of MIT Appointments

Rank	*Start*	*End*
Class of 1947 Career Development Assistant Professor	07/2021	Present
Assistant Professor	09/2019	Present

VII. MIT Activities

	Start	*End*
MIT Operations Management Seminar co-organizer	2021	2022
Committees		
Operations Research Center (ORC) MSc Admissions Committee	2022	2023
Transportation PhD Admissions Committee (’21, ‘23)	2021	2023
ORC PhD Admissions Committee (‘21)	2021	2021
Wilmers Reappointment Committee	2020	2020
Master of Business Analytics (MBAn) Admissions Committee	2020	2023
MBAn Capstone advisor		
Rui Rae Tongyu, Aarushi Bagga, Shaun Gan, Stephanie Franklin	2021	2021
Ryan Trusler, Kyle Mana, Gabriel Afriat, Mariana Suarez	2022	2022
Vassili Chesterkine, Alexandre Berkovic, Shreya Gupta, Sri Reddy	2023	2023

VIII. Governmental Committees and Service

IX. Consulting Activities

Technical Consultant, Lyft	8/2021	2/2022

X. Other Activities

XI. Awards

***** Refers to student paper prizes received by student coauthors for joint work

	Year
MSOM Best OM Paper in Operations Research	2023
Management Science Meritorious Service Award	2022
* INFORMS Applied Probability Society Student Paper Competition (Finalist)	2022
INFORMS Applied Probability Society Best Publication Award	2021
Management Science Distinguished Service Award	2021
INFORMS Wagner Prize for Excellence in OR and Analytics (Finalist)	2020
Best Paper Award, ACM SIGCAS Computing and Sustainable Societies	2018
INFORMS George B. Dantzig Dissertation Award	2018
Production and Operations Management Applied Research Challenge (Finalist)	2018
INFORMS Wagner Prize for Excellence in OR and Analytics	2018
INFORMS Applied Probability Society Student Paper Competition (Finalist)	2017
INFORMS George Nicholson Student Paper Competition (Finalist)	2017
Grants	
‘’Efficient, reliable and equitable deployment of urban charging infrastructure toward large-scale vehicle electrification’’, MIT Mobility Initiative ($150,000, co-PI: Alex Jacquillat)	2023
MIT Buchsbaum grant ($90,000)	2023
Sloan Junior Faculty Research Assistance Program ($33,000)	2023
Sloan Junior Faculty Research Assistance Program ($30,000)	2020

XII. Professional Membership and Activities

Memberships

The Institute for Operations Research and the Management Sciences (INFORMS)
Association for Computing Machinery (ACM)

Conference Program Committees

INFORMS Revenue and Management Section Cluster Chair	2023
ACM Conference on Equity and Access in Algorithms, Mechanism and Optimization (EEAMO)	2023
ACM Conference on Economics and Computation (EC)	2019-2023
Manufacturing & Service Operations Management (MSOM) Conference	2022, 2023
Revenue Management and Pricing Conference	2022
ACM EC Workshop on Design of Online Platforms	2021
ACM EC Workshop on the Operation of People-Centric Operations	2021
Mechanism Design for Social Good Workshop (Area Chair)	2020
The Web Conference (WebConf)	2020

Award Committees

Judge, APS Student Paper Competition	2024 & 2025
Judge, George Nicholson Student Paper Competition	2023
Judge, MSOM Best Student Paper Prize	2021-2023

Journal reviewer

Management Science, Operations Research, Mathematics of Operations Research, Manufacturing and Service Operations Management, Transportation Science, Naval Research Logistics, Production and Operations Management, INFORMS Journal on Computing, INFORMS Journal on Optimization, OR Letters

XIII. Subjects Taught

15.090	Common Experience in Operations Research	Summer ’22, ‘23
15.761	Introduction to Operations Management (2 sections)	Spring ‘20, ‘22
15.066	System Optimization and Analysis for Operations	Summer ‘20, ‘21
15.764	Theory of Operations Management	Spring ‘21

XIV. Thesis Supervision

1. Doctoral Theses Supervised

2. Master’s Theses Supervised

Gulsagar Singh Jassar	SDM	MSc	2021
Katherine Suzanne Rawden	LGO	MBA/MSc	2021
Gustavo Castillo	LGO	MBA/MSc	2022
Michael J. Lunny	LGO	MBA/MSc	2022
Wren Jiang	LGO	MBA/MSc	2022
Regina Ceballos Mondragon	LGO	MBA/MSc	2024
Brandon Meehan	LGO	MBA/MSc	2024

3. Bachelor’s Theses Supervised

4. Theses in Progress

Benjamin Barrientos	ORC	PhD	2027
Wentao Weng	EECS	PhD	2026
Jiayu (Kamessi) Zhao	ORC	PhD	2025

XV. Publications *(including order of co-authors, if any)*

Authors in alphabetical order as per convention of the field unless otherwise indicated by *

1. Theses

Models and Algorithms for Transportation in the Sharing Economy

2. Refereed Journal Articles

Freund, Daniel, Thodoris Lykouris, and Wentao Weng. “Efficient Fully Decentralized Multi-agent Learning in Asymmetric Bipartite Queuing Systems,” Accepted in *Operations Research*. Available at Arxiv: 2206.03324 (2022)

Freund, Daniel, and Jiayu (Kamessi) Zhao. "Overbooking with bounded loss." Forthcoming in *Mathematics of Operations* Research. (2022) Available at ArXiv 2204.11148.

Freund, Daniel, Shane G. Henderson, and David B. Shmoys. “Minimizing Multimodular Functions and Allocating Capacity in Bike-sharing Systems.” *Operations* Research 70(5):2715-2731 (2022). Available at ArXiv 1611.09304.

Banerjee, Siddhartha, Daniel Freund, and Thodoris Lykouris. “Pricing and Optimization in Shared Vehicle Systems: An Approximation Framework.” *Operations Research* 70(3):1783-1805 (2021). Available at ArXiv 1608.06819.

* Ong, HaoYi, Daniel Freund, and Davide Crapis. “Driver Positioning and Incentive Budgeting with an Escrow Mechanism for Ridesharing Platforms.” *INFORMS Journal on Applied Analytics* 51, no. 5 (2021): 373-390. Available at ArXiv 2104.14740.

* Paul, Alice, Daniel Freund, Aaron Ferber, David B. Shmoys, and David P. Williamson. "Budgeted Prize-Collecting Traveling Salesman and Minimum Spanning Tree Problems." *Mathematics of Operations Research* 45, no. 2 (2020): 576-590.

Freund, Daniel, Shane G. Henderson, Eoin O’Mahony, and David B. Shmoys. "Analytics and Bikes: Riding Tandem with Motivate to Improve Mobility." *INFORMS Journal on Applied Analytics* 49, no. 5 (2019): 310-323.

* Carla Gomes et al. "Computational sustainability: Computing for a better world and a sustainable future." *Communications of the ACM* 62, no. 9 (2019): 56-65.

Freund, Daniel, and David P. Williamson. "Rank aggregation: New bounds for MCx." *Discrete Applied Mathematics* 252 (2019): 28-36.

Freund, Daniel, Matthias Poloczek, and Daniel Reichman. "Contagious sets in dense graphs." *European Journal of Combinatorics* 68 (2018): 66-78.

3. Articles in Refereed Conference Proceedings

Freund, Daniel, Thodoris Lykouris, Bradley Sturt, Elisabeth Paulson, and Wentao Weng. “Group fairness in dynamic refugee assignment,” In Proceedings of the ACM Conference on Computation and Economics (EC). 2023. *Acceptance rate (Applied Modeling track): 20%*

Freund, Daniel, Thodoris Lykouris, and Wentao Weng. “Efficient Fully Decentralized Multi-agent Learning in Asymmetric Queuing Systems,” 35th Annual Conference on Learning Theory (COLT). 2022. *Acceptance rate: 33%*

Freund, Daniel, and Jiayu (Kamessi) Zhao. "Overbooking with bounded loss." In Proceedings of the ACM Conference on Computation and Economics (EC). 2021. *Acceptance rate: 26%*

Banerjee, Siddhartha, and Daniel Freund. "Uniform Loss Algorithms for Online Stochastic Decision-Making With Applications to Bin Packing." In Proceedings of the ACM SIGMETRICS Conference. 2020. *Acceptance rate: 18%*

Chung, Hangil, Daniel Freund, and David B. Shmoys. "Bike Angels: An Analysis of Citi Bike's Incentive Program." In Proceedings of the 1st ACM SIGCAS Conference on Computing and Sustainable Societies. 2018. *Best paper out of 25 accepted submissions*

* Paul, Alice, Daniel Freund, Aaron Feber, David B. Shmoys, David P. Williamson. "Prize-collecting TSP with a budget constraint." In Proceedings of the 25th Annual European Symposium on Algorithms (ESA). 2017. *Acceptance rate: 25%*

Banerjee, Siddhartha, Daniel Freund, and Thodoris Lykouris. " Pricing and Optimization in Shared Vehicle Systems: An Approximation Framework." In Proceedings of the ACM Conference on Computation and Economics (EC). 2017. *Acceptance rate: 29%*

Freund, Daniel, Shane G. Henderson, David B. Shmoys. " Minimizing Multimodular Functions and Allocating Capacity in Bike-sharing Systems." In Proceedings of the International Conference on Integer Programming and Combinatorial Optimization (IPCO). *Acceptance rate: 29%*

* Jian, Nanjing, Daniel Freund, Holly M. Wiberg, and Shane G. Henderson. "Simulation Optimization for a Large-scale Bike-Sharing System." In Proceedings of the 2016 Winter Simulation Conference (WSC), pp. 602-613. 2016. *Acceptance rate: 67%*

Fisch, Ben A., Daniel Freund, and Moni Naor. "Secure physical computation using disposable circuits." In Theory of Cryptography Conference, pp. 182-198. Springer, Berlin, Heidelberg, 2015. *Acceptance rate: 26%*

Fisch, Ben, Daniel Freund, and Moni Naor. "Physical zero-knowledge proofs of physical properties." In Annual Cryptology Conference, pp. 313-336. Springer, Berlin, Heidelberg, 2014. *Acceptance rate: 33%*

4. Articles in Non-Refereed Conference Proceedings

5. Papers/Articles in Progress or Under Review

Banerjee, Siddhartha, and Daniel Freund. "Good prophets know when the end is near," Minor revision in *Management Science*. Available at SSRN 3479189 (2023).

Freund, Daniel and Garrett J. van Ryzin. “Pricing Fast and Slow: Limitations of Dynamic Pricing Mechanisms in Ride-Hailing,” Major revision in *Management Science*. Available at SSRN 3931844 (2021).

Freund, Daniel, Ilan Lobel, and Jiayu (Kamessi) Zhao. “On the Supply of Autonomous Vehicles in Open Platforms.” Available at SSRN 4178508 (2022)

Freund, Daniel, Thodoris Lykouris, Bradley Sturt, Elisabeth Paulson, and Wentao Weng. “Group fairness in dynamic refugee assignment.” Available at Arxiv: 2301.10642 (2023)

Freund, Daniel, and Chamsi Hssaine. “Fair Incentives for Repeated Engagement.” Available at Arxiv: 2111.00002 (2022)

Freund, Daniel, Thodoris Lykouris, and Wentao Weng. “Quantifying the Cost of Learning in Queueing Systems,” Available upon request.

Amanihamedani, Alireza, Ali Aouad, and Daniel Freund. “Spatial Matching under Resource Competition,” Available at SSRN 4488342 (2023).

Freund, Daniel, and Samuel B. Hopkins. “Towards Practical Robustness Auditing for Linear Regression,” Available upon request.

Freund, Daniel, Chamsi Hssaine, and Jiayu (Kamessi) Zhao. “End-of-Horizon Load Balancing Problems: Algorithms and Insights.” Available at Arxiv:2306.01968.

Freund, Daniel, Sebastien Martin, and Jiayu (Kamessi) Zhao. “Managing multi-sided flexibility,” In progress.

Barrientos, Benjamin, Daniel Freund, and Daniela Saban. “The price of delayed feedback in online stochastic matching,” In progress.

6. Other Publications

* Freund, Daniel, Ashkan Norouzi-Fard, Alice Paul, Carter Wang, Shane G. Henderson, and David B. Shmoys. "Data-driven rebalancing methods for bike-share systems." In Analytics for the Sharing Economy: Mathematics, Engineering and Business Perspectives, pp. 255-278. Springer, Cham, 2020.

Freund, Daniel, Shane G. Henderson, and David B. Shmoys. "Bike sharing." In Sharing Economy, pp. 435-459. Springer, Cham, 2019.

7. Technical Reports

XVI. Invited Oral Presentations

“Group fairness in dynamic refugee assignment,” Rutgers University, 2023 (scheduled).

“Group fairness in dynamic refugee assignment,” CMU, 2023 (scheduled).

“On the Supply of Autonomous Vehicles for Open Platforms,” NYU, 2023 (scheduled).

“Efficient Fully Decentralized Multi-agent Learning in Asymmetric Queuing Systems,” SNAPP Seminar Series, 2023.

“Efficient Fully Decentralized Multi-agent Learning in Asymmetric Queuing Systems,” Dagstuhl Seminar on Scheduling, 2023.

“On the Supply of Autonomous Vehicles for Open Platforms,” MIT Mobility Forum, 2022.

"Constant Regret in Exchangeable Action Models: Overbooking, Bin Packing, and Beyond," UC Berkeley, Simons Institute for the Theory of Computing, 2022.

"On the Supply of Autonomous Vehicles for Open Platforms," Anderson School of Management at UCLA, 2022.

"On the Supply of Autonomous Vehicles for Open Platforms," Rideshare Seminar Series, Lyft, 2022.

"The Inefficiency of Dynamic Pricing in Ridehailing," USC Marshall School of Business, 2022.

"AI and Social Justice," Panel at Tsinghua University with the United Nations Development Programme, 2021.

"The Inefficiency of Dynamic Pricing in Ridehailing," Bilkent University, 2021.

"The Inefficiency of Dynamic Pricing in Ridehailing," Cornell University, ORIE, 2021.

"From 2 Wheels to 4: Design and Optimization of Shared Transportation Platforms," MIT ILP Webinar, 2020.

"The Inefficiency of Dynamic Pricing in Ride-hailing Systems," MIT Mobility Forum, 2020.

"The Inefficiency of Dynamic Pricing in Ride-hailing Systems," MIT IDE Seminar, 2020.

"The Inefficiency of Dynamic Pricing in Ride-hailing Systems," Wharton School of the University of Pennsylvania, Operations Management, 2020.

"The Inefficiency of Dynamic Pricing in Ride-hailing Systems," Networks, Matching, and Platforms Workshop, Ontario, 2020.

"Uniform Loss Algorithms for Online Stochastic Decision-Making With Applications to Bin Packing," UMass Amherst, Discrete Mathematics Seminar, 2019.

"Uniform Loss Algorithms for Online Stochastic Decision-Making With Applications to Bin Packing," UC Berkeley, Simons Institute for the Theory of Computing, 2019.

"Uniform Loss Algorithms for Online Stochastic Decision-Making With Applications to Bin Packing," Carnegie Mellon University, Plenary at YinzOR Student Conference, 2019.

"Models and Algorithms for Transportation in the Sharing Economy," Tel Aviv University, Industrial Engineering, 2019.

"A demand-agnostic Mechanism to Smooth Driver Pay in a Ride Hailing System," Brownbag Seminar at IBM Research, 2019.

"Models and Algorithms for Transportation in the Sharing Economy," Yale School of Management, Operations Management, 2018.

"Pricing and Optimization in Shared Vehicle Systems," Booth School of Business at Chicago University, 2018.

"Models and Algorithms for Transportation in the Sharing Economy," Columbia University, IEOR/DRO Seminar, 2018.

"Models and Algorithms for Transportation in the Sharing Economy," Stanford University,

Management Science & Engineering, 2018.

"Models and Algorithms for Transportation in the Sharing Economy," Anderson School of Management at UCLA, 2018.

"Models and Algorithms for Transportation in the Sharing Economy," Massachusetts Institute of Technology, Operations Research and Statistics, 2018.

"Models and Algorithms for Transportation in the Sharing Economy," Stanford University, Graduate School of Business, 2018.

"Models and Algorithms for Transportation in the Sharing Economy," Northwestern University, Industrial Engineering and Management Sciences, 2018.

"Models and Algorithms for Transportation in the Sharing Economy," Microsoft Research, Seattle, 2018.

"Models and Algorithms for Transportation in the Sharing Economy," Fuqua Business School at Duke University, 2018.

"Models and Algorithms for Transportation in the Sharing Economy," Georgia Institute of Technology, Industrial and Systems Engineering, 2017.

"Models and Algorithms for Transportation in the Sharing Economy," Massachusetts Institute of Technology, Operations Management, 2017.

"Pricing and Optimization in Shared Vehicle Systems," DIMAP Seminar at the University of Warwick, 2017.

"Pricing and Optimization in Shared Vehicle Systems," CS Theory Seminar at Cornell University, 2017.