Ellen Vitercik

Email: vitercik@stanford.edu Website: vitercik.github.io

Employment

2022- Assistant Professor Stanford University

Management Science and Engineering

Computer Science

2021-2022 Miller Fellow University of California, Berkeley

Hosts: Jennifer Chayes and Michael Jordan

Education

PHD in Computer Science Carnegie Mellon University

Advisors: Maria-Florina Balcan and Tuomas Sandholm

Thesis committee: Eric Horvitz, Kevin Leyton-Brown, and Ameet Talwalkar

2018 MS in Computer Science Carnegie Mellon University

BA in Mathematics, summa cum laude Columbia University

Honors and awards

AI2050 Early Career Fellowship

Schmidt Sciences

National Science Foundation CAREER Award

Exemplary Artificial Intelligence Track Paper Award

Awarded to one paper at the ACM Conference on Economics and Computation (EC)

2022-2025 Gabilan Fellowship

Stanford University

Robert N. Noyce Faculty Fellow

Stanford University

Simons-Berkeley Research Fellowship (declined)

2021-2022 Miller Fellowship

University of California, Berkeley

ACM SIGecom Dissertation Award

ACM Special Interest Group on Economics and Computation

Distinguished Dissertation Award

 $Carnegie\ Mellon\ University,\ School\ of\ Computer\ Science$

2021	Victor Lesser Distinguished Dissertation—Honorable Mention International Foundation for Autonomous Agents and Multiagent Systems
2019	Best Presentation by a Student or Postdoctoral Researcher ACM Conference on Economics and Computation (EC)
2019	Early Career Invited Lecture Award UBC Science
2019-2021	IBM PhD Fellowship
2019-2020	Fellowship in Digital Health Carnegie Mellon University's Center for Machine Learning and Health
2019	Exemplary Artificial Intelligence Track Paper Award Awarded to one paper at the ACM Conference on Economics and Computation (EC)
2017	Teaching Assistant of the Year Award Carnegie Mellon University's Machine Learning Department
2016-2019	National Science Foundation Graduate Research Fellowship
2016-2017	Microsoft Research Women's Fellowship
2015-2021	National Physical Science Consortium Fellowship (declined)
2015-2017	Kellett Fellowship (declined) Full scholarship for postgraduate study at Oxford
2014	Phi Beta Kappa Junior Inductee Awarded to the top 2% of the graduating Columbia College class
2012	Columbia University Class of 1956 Scholarship
	Publications
	Journal papers
2024	Maria-Florina Balcan, Dan DeBlasio, Travis Dick, Carl Kingsford, Tuomas Sandholm, and Ellen Vitercik.
	How Much Data is Sufficient to Learn High-Performing Algorithms?
	Journal of the ACM (JACM). Featured paper from JACM 2024. Supersedes the STOC'21 paper below.
2024	Maria-Florina Balcan, Travis Dick, Tuomas Sandholm, and Ellen Vitercik. Learning to Branch: Generalization Guarantees and Limits of Data-Independent Discretization. <i>Journal of the ACM (JACM)</i> . Supersedes the ICML'20 and ICML'18 papers below.

Maria-Florina Balcan, Tuomas Sandholm, and Ellen Vitercik.

Generalization Guarantees for Multi-Item Profit Maximization: Pricing, Auctions, and Randomized Mechanisms.

Operations Research (OR).

Supersedes the EC'18 paper below.

Conference papers

Judy Hanwen Shen, Ellen Vitercik, and Anders Wikum.
Algorithms with Calibrated Machine Learning Predictions.
International Conference on Machine Learning (ICML).
Spotlight (2.6% of all submissions).

Yu He and Ellen Vitercik.

Primal-Dual Neural Algorithmic Reasoning *International Conference on Machine Learning (ICML).* **Spotlight** (2.6% of all submissions).

Jingruo Sun, Wenzhi Gao, Ellen Vitercik, and Yinyu Ye.
Wait-Less Offline Tuning and Re-solving for Online Decision Making.
International Conference on Machine Learning (ICML).

Haotian Zhai, Connor Lawless, Ellen Vitercik, and Liu Leqi.

FauiyaMan: Leveraging LLMs for Automatic Fauiyalence Checking of Optimi

EquivaMap: Leveraging LLMs for Automatic Equivalence Checking of Optimization Formulations. *International Conference on Machine Learning (ICML)*.

Connor Lawless, Yingxi Li, Anders Wikum, Madeleine Udell, and Ellen Vitercik.

LLMs for Cold-Start Cutting Plane Separator Configuration.

Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR).

New Sequence-Independent Lifting Techniques for Cutting Planes and When They Induce Facets. Siddharth Prasad, Ellen Vitercik, Maria-Florina Balcan, and Tuomas Sandholm.

International Joint Conference on Artificial Intelligence (IJCAI).

Joon Suk Huh, Ellen Vitercik, and Kirthevasan Kandasamy.
Bandit Profit-Maximization for Targeted Marketing.

ACM Conference on Economics and Computation (EC).

Alexandre Hayderi, Amin Saberi, Ellen Vitercik, and Anders Wikum.

MAGNOLIA: Matching Algorithms via GNNs for Online Value-to-Go Approximation.

International Conference on Machine Learning (ICML).

Wenshuo Guo, Nika Haghtalab, Kirthevasan Kandasamy, and Ellen Vitercik.
Leveraging Reviews: Learning to Price with Buyer and Seller Uncertainty.

ACM Conference on Economics and Computation (EC).

Exemplary Artificial Intelligence Track Paper Award (awarded to one paper at EC 2023).

Christian Borgs, Jennifer Chayes, Christian Ikeokwu, and Ellen Vitercik.
 Disincentivizing Polarization in Social Networks.
 ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimization (EAAMO).

Maria-Florina Balcan, Siddharth Prasad, Tuomas Sandholm, and Ellen Vitercik.
Structural Analysis of Branch-and-Cut and the Learnability of Gomory Mixed Integer Cuts.

Conference on Neural Information Processing Systems (NeurIPS).

Wenshuo Guo, Michael I. Jordan, and Ellen Vitercik.
No-Regret Learning in Partially-Informed Auctions.

International Conference on Machine Learning (ICML).

2021

Maria-Florina Balcan, Siddharth Prasad, Tuomas Sandholm, and Ellen Vitercik.
Improved Sample Complexity Bounds for Branch-and-Cut.
International Conference on Principles and Practice of Constraint Programming (CP).

Maria-Florina Balcan, Siddharth Prasad, Tuomas Sandholm, and Ellen Vitercik. Sample Complexity of Tree Search Configuration: Cutting Planes and Beyond. Conference on Neural Information Processing Systems (NeurIPS).

Ellen Vitercik and Tom Yan.

Revenue Maximization via Machine Learning with Noisy Data.

Conference on Neural Information Processing Systems (NeurIPS).

Maria-Florina Balcan, Dan DeBlasio, Travis Dick, Carl Kingsford, Tuomas Sandholm, and Ellen Vitercik.

How Much Data Is Sufficient to Learn High-Performing Algorithms? Generalization Guarantees for Data-Driven Algorithm Design.

ACM Symposium on Theory of Computing (STOC).

Andrés Muñoz Medina, Umar Syed, Sergei Vassilvitskii, and Ellen Vitercik.
Private Optimization without Constraint Violations.

International Conference on Artificial Intelligence and Statistics (AISTATS).

Maria-Florina Balcan, Tuomas Sandholm, and Ellen Vitercik. Generalization in Portfolio-Based Algorithm Selection.

AAAI Conference on Artificial Intelligence.

Maria-Florina Balcan, Tuomas Sandholm, and Ellen Vitercik.
Refined Bounds for Algorithm Configuration: The Knife-Edge of Dual Class Approximability. *International Conference on Machine Learning (ICML).*

Maria-Florina Balcan, Tuomas Sandholm, and Ellen Vitercik.
Learning to Optimize Computational Resources: Frugal Training with Generalization Guarantees.

AAAI Conference on Artificial Intelligence.

Maria-Florina Balcan, Tuomas Sandholm, and Ellen Vitercik.
Estimating Approximate Incentive Compatibility.

ACM Conference on Economics and Computation (EC).

Exemplary Artificial Intelligence Track Paper Award (awarded to one paper at EC 2019).

Best Presentation by a Student or Postdoctoral Researcher (EC 2019).

Invited to the ACM Transactions on Economics and Computation (TEAC) Special Issue for EC 2019.

Daniel Alabi, Adam Kalai, Katrina Ligett, Cameron Musco, Christos Tzamos, and Ellen Vitercik. Learning to Prune: Speeding Up Repeated Computations.

*Conference on Learning Theory (COLT).

2019	Christian Borgs, Jennifer Chayes, Nika Haghtalab, Adam Kalai, and Ellen Vitercik. Algorithmic Greenlining: An Approach to Increase Diversity.
	AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES).
2018	Maria-Florina Balcan, Travis Dick, and Ellen Vitercik.
	Dispersion for Data-Driven Algorithm Design, Online Learning, and Private Optimization. <i>IEEE Symposium on Foundations of Computer Science (FOCS).</i>
2018	Maria-Florina Balcan, Tuomas Sandholm, and Ellen Vitercik.
	General Theory of Sample Complexity for Multi-Item Profit Maximization. ACM Conference on Economics and Computation (EC).
2018	Maria-Florina Balcan, Travis Dick, Tuomas Sandholm, and Ellen Vitercik. Learning to Branch.
	International Conference on Machine Learning (ICML).
2018	Bernhard Haeupler, Amirbehshad Shahrasbi, and Ellen Vitercik. Synchronization Strings: Channel Simulations and Interactive Coding for Insertions and Deletions. International Colloquium on Automata, Languages and Programming (ICALP).
2017	Maria-Florina Balcan, Vaishnavh Nagarajan, Ellen Vitercik, and Colin White. Learning-Theoretic Foundations of Algorithm Configuration for Combinatorial Partitioning Problems Conference on Learning Theory (COLT).
2016	Maria-Florina Balcan, Tuomas Sandholm, and Ellen Vitercik. Sample Complexity of Automated Mechanism Design. Conference on Neural Information Processing Systems (NeurIPS).
2016	Maria-Florina Balcan, Ellen Vitercik, and Colin White. Learning Combinatorial Functions from Pairwise Comparisons. Conference on Learning Theory (COLT).
	Manuscripts
2025	Mika Sarkin Jain, Stefanie Jegelka, Ishani Karmarkar, Luana Ruiz, and Ellen Vitercik. Subsampling Graphs with GNN Performance Guarantees.
2025	Emilio Calvano, Nika Haghtalab, Ellen Vitercik, and Eric Zhao.
	Algorithmic Content Selection and the Impact of User Disengagement.
2024	Vaggos Chatziafratis, Ishani Karmarkar, and Ellen Vitercik. From Large to Small Datasets: Size Generalization for Clustering Algorithm Selection.
	Tutorials
2024	Machine Learning for Discrete Optimization: Theoretical Guarantees and Applied Frontiers AAAI Conference on Artificial Intelligence
2023	Machine Learning for Algorithm Design: Theoretical Guarantees and Applied Frontiers Cargese-Porquerolles Workshop on Combinatorial Optimization
2021	New Frontiers of Automated Mechanism Design for Pricing and Auctions AAAI Conference on Artificial Intelligence
	with Maria-Florina Balcan and Tuomas Sandholm

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Simons Institute, Data-Driven Decision Processes Reunion Stanford University, Statistics Seminar	
Stanford University, Statistics Seminar	
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University of Wisconsin-Madison, Systems, Information, Learning and Optimization Se	eminar
INFORMS Annual Meeting	
University of Chicago, Booth School of Business, Operations Workshop Series	
Stanford Graduate School of Business, Operations, Information & Technology Seminar	r
University of Massachusetts, Amherst, CS Theory Seminar	
Cornell Tech, Urban Tech Workshop	

2023	IPAM Workshop on Artificial Intelligence and Discrete Optimization
	Machine Learning for Algorithm Design
2023	Stanford University, CS & EE New Research Directions Workshop
2022	Simons Institute, Data-Driven Decision Processes Boot Camp
	How Much Data is Sufficient to Learn High-Performing Algorithms?
	University of Massachusetts, Amherst, Algorithms with Predictions Seminar
2022	Worcester Polytechnic Institute, Computer Science Colloquium
2021	Purdue University, Theory Seminar
2021	Stanford University, Statistics Seminar
2021	Machine Learning for Algorithms Workshop, Foundation of Data Science Institute
2021	ACM Symposium on Theory of Computing (STOC)
2021	IPAM Workshop on Deep Learning and Combinatorial Optimization
2021	NeurIPS Workshop on Learning Meets Combinatorial Algorithms
2020	Stanford University, CS Theory Lunch
2020	Columbia University, Theory Seminar
	Comprehing tion Comprehens For Welt: Home Profit Maximization, Principe Austions, And Pondon
	Generalization Guarantees For Multi-item Profit Maximization: Pricing, Auctions, And Randon ized Mechanisms
2022	Google, Mountain View, Search-Ads Auction Spotlight Series
2021	INFORMS Annual Meeting
	Theoretical Foundations of Machine Learning for Cutting Plane Selection
2022	Stanford University, Women's Theory Forum
	Machine Learning for Tree Search Configuration: Cutting Planes and Beyond
2022	Simons Foundation Symposium on New Directions in Theoretical Machine Learning
	Automated Algorithm and Mechanism Configuration
2022	Conference on Economics and Computation (EC)
	Estimating Approximate Incentive Compatibility
2022	Algorithmic Game Theory: Past, Present, and Future (Workshop for Noam Nisan's 60th Birthday)
2020	Young Researcher Workshop on Economics and Computation, Tel-Aviv University
2019	INFORMS Annual Meeting
2019	Carnegie Mellon University, Theory Lunch
2019	Conference on Economics and Computation (EC)
2019	EC Workshop on Machine Learning in the Presence of Strategic Behavior
	Sample Complexity of Tree Search Configuration: Cutting Planes and Beyond
2022	AAAI Workshop on Machine Learning for Operations Research
2022	STOC Workshop on Algorithms with Predictions
	Private Optimization Without Constraint Violations
2022	Workshop on Algorithms for Learning and Economics (WALE)
2021	International Conference on Artificial Intelligence and Statistics (AISTATS)
2021	memational comprehens on the michiganes and statistics (rational)
	Data-Driven Auction Design
2022	Miller Institute, UC Berkeley
	Theoretical Foundations of Data-Driven Algorithm Design
2021	Google Learning Theory Workshop

	Automated Parameter Optimization for Integer Programming
2021	AutoML Workshop at the International Conference on Machine Learning
	Integrating Machine Learning into Algorithm Design
2021	University of Texas at Austin, Computer Science Seminar
2021	New York University, Computer Science Colloquium
2021	Columbia University, Computer Science Colloquium
2021	University of British Columbia, Computer Science Seminar
2021	University of Waterloo, Computer Science Seminar
2021	Harvard University, Computer Science Colloquium
2021	Princeton University, Computer Science Department Colloquium
2021	University of California, Los Angeles, Computer Science Seminar
2021	California Institute of Technology, Frontiers in Computing and Mathematical Sciences Symposium
2021	MIT Sloan, Operations Research and Statistics Seminar
2021	Stanford University, Management Sciences and Engineering Seminar
2021	Georgia Institute of Technology, School of Computer Science Seminar
2021	Microsoft Research New England, Seminar
2020	Columbia University, Industrial Engineering and Operations Research Seminar
	Generalization in Portfolio-Based Algorithm Selection
2021	AAAI Conference on Artificial Intelligence
	Refined Bounds for Algorithm Configuration: The Knife-Edge of Dual Class Approximability
2020	INFORMS Annual Meeting
	International Conference on Machine Learning
2020	international Conference on Macrime Learning
	Machine Learning as a Tool for Algorithm Design
2020	Carnegie Mellon University, Open House for Admitted PhD Students
2019	University of British Columbia, Early Career Invited Lecture
	Learning to Prune: Speeding up Repeated Computations
2020	Carnegie Mellon University, Open House for Admitted PhD Students
2019	Conference on Learning Theory (COLT)
	Learning to Branch
2019	Cornell ORIE Young Researchers Workshop
2018	Carnegie Mellon University
2018	International Conference on Machine Learning (ICML)
	A Company I Theory of Company Company for Multi-Itam Droft Maximization
	A General Theory of Sample Complexity for Multi-Item Profit Maximization
2019	EC ACM/INFORMS Workshop on Market Design
2018	INFORMS Annual Meeting
2018	China Theory Week
2018	AAMAS-IJCAI Workshop on Agents and Incentives in Artificial Intelligence
2018	Conference on Economics and Computation (EC)
	Dispersion for Data-Driven Algorithm Design, Online Learning, and Private Optimization
2018	Northwestern Quarterly Theory Workshop
	Learning-Theoretic Foundations of Algorithm Configuration for Combinatorial Partitioning Prob- lems
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2018	INFORMS Annual Meeting

2017	Sample Complexity of Multi-Item Profit Maximization Harvard University, Economics and CS Research Seminar
2017 2017	Dagstuhl Workshop on <i>Game Theory Meets Computational Learning Theory</i> Workshop on Algorithmic Game Theory and Data Science at the Conference on Economics and Computation (EC)
	Differentially Private Algorithm and Auction Configuration
2017	Carnegie Mellon University, Theory Lunch
	Foundations of Application-Specific Algorithm Configuration
2017	Massachusetts Institute of Technology, Machine Learning Tea
2017 2016	Microsoft Research New England, Machine Learning Lunch Carnegie Mellon University, Artificial Intelligence Lunch
2010	
	Learning Submodular Functions from Pairwise Comparisons
2017	Carnegie Mellon University, Open House for Admitted PhD Students
2016	Conference on Learning Theory (COLT)
	Sample Complexity of Automated Mechanism Design
2016	University of Pennsylvania, Theory Lunch
2016	Carnegie Mellon University, Theory Lunch
	Teaching
	Primary instructor
2022-	Introduction to Probability, Stanford MS&E 120
2025	Beyond Worst-Case Analysis, Stanford CS 264 / MS&E 215
2024	Machine Learning for Discrete Optimization, Stanford MS&E 236 / CS 225
2023	Machine Learning for Algorithm Design, Stanford MS&E 331 / CS 331
	Guest lecturer
2018	Machine Learning and Differential Privacy
	Carnegie Mellon University course on Advanced Introduction to Machine Learning
2017	Introduction to Auction Design via Machine Learning
	Carnegie Mellon University course on Advanced Introduction to Machine Learning
2017	Introduction to Research in Machine Learning *Carnegie Mellon University course on Research and Innovation in Computer Science*
	Research mentoring
	Research mentoring
	Postdocs
2024-	Connor Lawless (joint with Madeleine Udell)
	PhD students
2024-	Yu He
2024-	Mika Jain (co-advised with Greg Valiant)
2024-	Nikil Selvam (co-advised with Sanmi Koyejo)
2023-	Yingxi Li
2023-	Anders Wikum
2022-	Ishani Karmarkar (co-advised with Aaron Sidford)
	Masters students
2024-	Jingruo Sun (Stanford University)

2023-2024 Yash Dalmia (Stanford University) 2023-2024 Alexandre Hayderi (Stanford University)

Undergraduate students

Patrick Ye (Stanford)

2021-2023 Korinna Frangias (UC Berkeley)
2021-2023 Andrew Lin (UC Berkeley)
2021-2023 David Zhang (UC Berkeley)

2018-2019 Rong He (Carnegie Mellon University) 2017 Mengxiao Zhang (Peking University)

Outreach

2021- Co-founder of the Learning Theory Alliance

Mentorship initiative for the machine learning theory community.

2024 Co-chair of *Mentoring Chats* at the International Conference on Learning Representations (ICLR)

Teaching Assistant at the Institute for Advanced Studies' Women and Mathematics program

²⁰¹⁵⁻²⁰²⁰ Volunteer Instructor for Carnegie Mellon University TechNights

Workshop for middle school girls.

Sessions led: "Strategic Voting", "Game Theory", "Smashing Computers", and "Logic Puzzles".

Session leader for Carnegie Mellon University OurCS

Workshop for undergraduate women in computer science.

Session led: "Machine Learning for Automated Algorithm Configuration".

2014-2015 Workshop Leader for Columbia University's Computer Science Emerging Scholars Program

Professional activities

Program committee chair

Learning on Graphs Conference (LoG) 2025

Senior program committee

Conference on Learning Theory (COLT) 2024, 2025

Area chair

International Conference on Machine Learning (ICML) 2024

Program committee

Conference on Economics and Computation (EC) 2023, 2025

Conference on Fairness, Accountability, and Transparency (FAccT) 2023

Conference on Web and Internet Economics (WINE) 2021

Innovations in Theoretical Computer Science (ITCS) 2023

International Conference on Algorithmic Learning Theory (ALT) 2022, 2023

Symposium on Discrete Algorithms (SODA) 2024

Journal editorial boards

2024- Associate Editor, INFORMS Journal on Computing

Action Editor, Transactions on Machine Learning Research (TMLR)

Workshop chair

2024-2025 Conference on Economics and Computation (EC)

Awards committees

2024-2025 INFORMS George Nicholson Student Paper Competition

Journal reviewing

ACM Transactions on Economics and Computation (TEAC) 2020, 2021

Artificial Intelligence (AIJ) 2019, 2021

IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2019

INFORMS Journal on Computing 2019

INFORMS Journal on Optimization 2022

Journal of the ACM (JACM) 2020, 2021, 2023

Management Science 2022

Mathematics of Operations Research 2025

Nature Advances 2023

Operations Research (OR) 2020, 2021

SIAM Journal on Mathematics of Data Science (SIMODS) 2019

Conference reviewing

AAAI Conference on Artificial Intelligence 2021

Conference on Artificial Intelligence, Ethics, and Society (AIES) 2019

Conference on Economics and Computation (EC) 2020

Conference on Learning Theory (COLT) 2018

Conference on Neural Information Processing Systems (NeurIPS) 2017, 2018, 2019, 2020, 2021

European Symposium on Algorithms (ESA) 2020

Innovations in Theoretical Computer Science (ITCS) 2021, 2022

International Colloquium on Automata, Languages and Programming (ICALP) 2022

International Conference on Artificial Intelligence and Statistics (AISTATS) 2019

International Conference on Learning Representations (ICLR) 2022, 2025

International Conference on Machine Learning (ICML) 2017, 2018, 2019, 2020, 2025

International Conference on Randomization and Computation (RANDOM) 2018

International Joint Conference on Artificial Intelligence (IJCAI) 2016

Symposium on Discrete Algorithms (SODA) 2018, 2020, 2021, 2023

Symposium on Foundations of Computer Science (FOCS) 2019

Symposium on Principles of Distributed Computing (PODC) 2016

Symposium on Theory of Computing (STOC) 2017, 2020, 2021, 2024

Conference on Web and Internet Economics (WINE) 2018

Session Chair

INFORMS Annual Meeting, 2018, 2025

University service

Stanford University

2022, 2024

2023

PhD Admissions Committee Member, Computer Science Department

Faculty Search Committee Member, Management Science & Engineering Department

Carnegie Mellon University

2017-2018 PhD Admissions Committee Member, Computer Science Department Co-coordinator of the Artificial Intelligence Lunch and Seminar

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