

JASON ALTSCHULER

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EDUCATION

Massachusetts Institute of Technology (PhD) Electrical Engineering and Computer Science Advisor: Pablo Parrilo	<i>2018-2022 (expected)</i>
Massachusetts Institute of Technology (MS) Electrical Engineering and Computer Science Advisor: Pablo Parrilo Thesis: <i>Greed, hedging, and acceleration in convex optimization.</i> GPA: 5.0/5.0	<i>2016-2018</i>
Princeton University (BSE) Major: Computer Science Minors: Applied and Computational Mathematics; Statistics and Machine Learning CS thesis: <i>Online learning with limited decision changes.</i> Advisor: Elad Hazan. Math thesis: <i>Probabilistic linear Boolean classification.</i> Advisor: Emmanuel Abbe. GPA 3.99/4.0, Major GPA: 4.0/4.0, highest honors	<i>2012-2016</i>
Oxford University (undergrad semester abroad) Math and Computer Science GPA 4.0/4.0 (converted to US)	<i>Spring 2015</i>

SELECTED ACADEMIC AWARDS

TwoSigma Ph.D. Fellowship	<i>2020-2022</i>
Best talk, MIT LIDS Student Conference	<i>2021</i>
NeurIPS Best Reviewers Award	<i>2019</i>
ICML Best Reviewers Award	<i>2019</i>
National Science Foundation Graduate Fellowship	<i>2016-2021</i>
ICML Travel Award	<i>2016</i>
James Hayes-Edgar Palmer Prize in Engineering (Princeton)	<i>2016</i>
Highest honors, summa cum laude (Princeton)	<i>2016</i>
Sigma Xi Honor Society (Princeton)	<i>2016</i>
Accenture Prize in Computer Science (Princeton)	<i>2015</i>
Goldwater Scholarship Honorable Mention	<i>2015</i>
Phi Beta Kappa Honor Society, early induction (Princeton)	<i>2015</i>
Tau Beta Pi Engineering Honor Society, early induction (Princeton)	<i>2014</i>
Shapiro Award for Academic Excellence (Princeton)	<i>2013, 2014</i>

PUBLICATIONS

Preprints under review

- P1 Jason Altschuler, Pablo Parrilo. Kernel approximation on algebraic varieties. *SIAM Journal on Applied Algebra and Geometry*, minor revision, 2021. Preprint available at arXiv:2106.02755.
- P2 Jason Altschuler, Enric Boix-Adserà. Polynomial-time algorithms for Multimarginal Optimal Transport problems with structure. *Mathematical Programming*, under revision, 2020. Preprint available at arXiv:2008.03006.
- P3 Jason Altschuler, Pablo Parrilo. Approximating Min-Mean-Cycle for low-diameter graphs in near-optimal time and memory. *SIAM Journal on Optimization*, minor revision, 2020. Preprint available at arXiv:2004.03114.

Journal articles

- J1 Jason Altschuler, Jonathan Niles-Weed, Austin Stromme. Asymptotics for semi-discrete entropic optimal transport. *SIAM Journal on Mathematical Analysis*, to appear in 2022.
- J2 Jason Altschuler, Pablo Parrilo. Near-linear convergence of the Random Osborne algorithm for Matrix Balancing. *Mathematical Programming*, to appear in 2022.
- J3 Jason Altschuler, Enric Boix-Adserà. Wasserstein barycenters are NP-hard to compute. *SIAM Journal on Mathematics of Data Science*, to appear in 2022.
- J4 Jason Altschuler, Enric Boix-Adserà. Wasserstein barycenters can be computed in polynomial time in fixed dimension. *Journal of Machine Learning Research*, 2021.
- J5 Jason Altschuler, Enric Boix-Adserà. Hardness results for Multimarginal Optimal Transport problems. *Discrete Optimization*, 2021.
- J6 Jason Altschuler, Pablo Parrilo. Lyapunov exponent of rank one matrices: ergodic formula and inapproximability of the optimal distribution. *SIAM Journal on Control and Optimization*, 2020. (Preliminary conference version in C3.)
- J7 Jason Altschuler, Kunal Talwar. Online learning over a finite action set with limited switching. *Mathematics of Operations Research*, 2021. (Preliminary conference version in C4.)
- J8 Jason Altschuler, Victor-Emmanuel Brunel, Alan Malek. Best arm identification for contaminated bandits. *Journal of Machine Learning Research*, 2019.
- J9 Jason Altschuler, Elizabeth Yang. Inclusion of forbidden minors in random representable matroids. *Discrete Mathematics*, 2017.
- J10 Benjamin Pavie, Satwik Rajaram, Austin Ouyang, Jason Altschuler, Robert Steininger, Lani Wu, Steven Altschuler. Rapid analysis and exploration of fluorescence microscopy images. *Journal of Visualized Experiments*, 2014.

Conference proceedings

- C1 Jason Altschuler, Sinho Chewi, Patrik Gerber, Austin Stromme. Averaging on the Bures-Wasserstein manifold: dimension-free convergence of gradient descent. *Neural Information Processing Systems Conference*, 2021. **selected for spotlight presentation** (top 3% of papers)
- C2 Jason Altschuler, Francis Bach, Alessandro Rudi, Jonathan Weed. Massively scalable Sinkhorn distances via the Nyström method. *Neural Information Processing Systems Conference*, 2019.
- C3 Jason Altschuler, Pablo Parrilo. Lyapunov exponent of rank one matrices: ergodic formula and inapproximability of the optimal distribution. *Conference on Decision and Control*, 2019.
- C4 Jason Altschuler, Kunal Talwar. Online learning over a finite action set with limited switching. *Conference on Learning Theory*, 2018.

C5 Jason Altschuler, Jonathan Weed, Philippe Rigollet. Near-linear time approximation algorithms for optimal transport via Sinkhorn iteration. *Neural Information Processing Systems Conference, 2017*. **selected for spotlight presentation** (top 3% of papers)

C6 Jason Altschuler, Aditya Bhaskara, Gang Fu, Vahab Mirrokni, Afshin Rostamizadeh, Morteza Zadimoghaddam. Greedy column subset selection: new bounds and distributed algorithms. *International Conference on Machine Learning, 2016*.

TEACHING EXPERIENCES

MIT — Teaching Assistant

· 6.255/15.093/IDS.200: Optimization Methods (graduate course) *Fall 2019*

Princeton — Undergrad Teaching Assistant

· COS 511: Theoretical Machine Learning (graduate course) *Spring 2016*

· MAT 340: Applied Algebra *Fall 2015*

· MAT 216: Accelerated Honors Real Analysis *Fall 2014*

· MAT 217: Honors Linear Algebra *Spring 2014*

· MAT 215: Honors Real Analysis *Fall 2013*

Chess.com — chess coach. Over 40,000 hits on coaching profile. *2007 - 2014*

SUMMER INTERNSHIP EXPERIENCES

Apple Research — Research Intern *Summer 2021*

DE Shaw — Quant Intern *Summer 2016*

Google Research — Research Intern *Summer 2015*

Google — Software Engineering Intern *Summer 2014*

Tower Research Capital — Quant Intern *Summer 2013*

UT Southwestern Medical Center — Research Intern *Summer 2012*

SERVICE AND LEADERSHIP

External

Co-organizer, NeurIPS workshop
“Optimal Transport and Machine Learning” *December 2021*

Co-organizer, SIAM Conference on Optimization mini-symposium
“Optimal Transport: Theory and Algorithms” *July 2021*

Reviewer: SIAM Journal on Mathematics of Data Science (SIMODS), Journal of Machine Learning Research (JMLR), Foundations of Computational Mathematics (FOCM), Mathematical Programming (MAPR), Information and Inference, American Mathematical Society book chapter, Neural Information Processing Systems (NeurIPS), International Conference on Machine Learning (ICML), Conference on Learning Theory (COLT), Symposium on Foundations of Computer Science (FOCS), Conference on Decision and Control (CDC)

Internal

Mentor underrepresented minorities in MIT’s Graduate Application Assistance Program (GAAP) *2020-2022*

Mentor year-long undergraduate research project (UROP) on extended formulations *2020*

Reader for MIT EECS PhD applications *2019-2020*

SELECTED TALKS

INFORMS Conference, Optimal Transport session (Anaheim, CA)	<i>October 2021</i>
Caltech, Computational Mathematics special seminar (Pasadena, CA)	<i>October 2021</i>
NYU Courant, Numerical Analysis and Scientific Computing seminar (virtual)	<i>October 2021</i>
Stanford Statistics, group talk (Stanford, CA)	<i>September 2021</i>
Simons Institute, graduate student seminar (Berkeley, CA)	<i>September 2021</i>
Apple Research, weekly seminar series (virtual)	<i>August 2021</i>
SIAM Conference on Optimization, Optimal Transport session (virtual)	<i>July 2021</i>
MIT, LIDS & Stats Tea (virtual)	<i>April 2021</i>
Institut national de recherche en informatique et en automatique (INRIA)/Centre national de la recherche scientifique (CNRS)/Université Paris-Dauphine, joint MokaMeeting seminar (virtual)	<i>March 2021</i>
MIT, LIDS Student Conference (virtual) best talk award	<i>January 2021</i>
MIT, LIDS & Stats Tea (virtual)	<i>October 2020</i>
MIT, LIDS & Stats Tea (virtual)	<i>April 2020</i>
MIT, Applied Mathematics graduate student seminar (Cambridge, MA)	<i>March 2020</i>
Conference on Decision and Control, contributed talk (Nice, France)	<i>December 2019</i>
Harvard, Center for Mathematical Sciences and Applications, workshop on “Noncommutative Analysis, Computational Complexity, and Quantum Information” (Cambridge, MA)	<i>October 2019</i>
Google Brain, invited seminar (Mountain View, CA)	<i>August 2019</i>
Conference on Learning Theory, contributed talk (Stockholm, Sweden)	<i>June 2018</i>
International Conference on Machine Learning, contributed talk (New York, NY)	<i>June 2016</i>
INFORMS Optimization Conference, contributed talk (Princeton, NJ)	<i>March 2016</i>
Google Research, summer seminar series (New York, NY)	<i>August 2015</i>

OTHER ACTIVITIES

Chess

- US National Scholastic Champion *4 times*
- “International Master” norm at Blau Escacs Open (Spain) *2015*
- “National Master” title at age 15 *2010*
- “Expert” title at age 12 *2007*
- Ranked top 5 in world for speed-chess (bullet and blitz) on chess.com *2013*
- Won 2014 US Amateur Team Championship with Princeton team *2014*
(featured in New York Times and US Chess news articles)

Swimming

- Varsity swim team at Oxford University *Spring 2015*