

AARON POTECHIN

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POSITIONS

University of Chicago Assistant Professor	2018 - Present Chicago, IL
Kungliga Tekniska Högskolan Postdoc	2017 - 2018 Stockholm, Sweden
Cornell University and the Institute for Advanced Study Postdoc	2015 - 2017 Ithaca, NY and Princeton, NJ

EDUCATION

Massachusetts Institute of Technology Ph.D. in Mathematics Dissertation: "Analyzing Monotone Space Complexity Via the Switching Network Model"	2015
University of Cambridge (Part III of the Math Tripos) Master of Advanced Study	2010
Princeton B.A. in Mathematics (summa cum laude with high honors) Dissertation: "Bounds on Monotone Switching Networks for Directed Connectivity"	2009

AWARDS AND HONORS

NSF SMALL grant: Further Investigation of the Sum of Squares Hierarchy	2020
"A Nearly Tight Sum-of-Squares Lower Bound for the Planted Clique Problem" invited to SICOMP FOCS 2016 Special Issue	2016
"On the Integrality Gap of Degree-4 Sum of Squares for Planted Clique" invited to TALG special issue for SODA 16	2016
"Bounds on Monotone Switching Networks for Directed Connectivity" invited to JACM FOCS 2010 Special Issue	2011
Machtey award for the best student paper at FOCS 2010	2010
NSF Graduate Research Fellowship	2010
George B. Covington Prize (Outstanding Senior Research in Mathematics)	2009
Churchill Scholarship	2009
Barry M. Goldwater Scholarship	2008
Class of 1861 Prize (highest scoring sophomore at Princeton on the Putnam examination)	2007

CURRENT STUDENTS

Students for whom I am the primary advisor: Neng Huang, Chris Jones, Zelin Lv, Goutham Rajendran (co-advised by Madhur Tulsiani), and Aaron Zhang
Students for whom I am a secondary advisor: Wenjun Cai (advised by Sasha Razborov), Bohdan Kivva (advised by Laci Babai), and Joseph Tsang (advised by Andy Drucker)

JOURNAL PAPERS

- A. Potechin and J. Shallit. Lengths of Words Accepted by Nondeterministic Finite Automata. *Information Processing Letters*. Volume 162. 2020
- B. Barak, S. Hopkins, J. Kelner, P. Kothari, A. Moitra, and A. Potechin. A Nearly Tight Sum-of-Squares Lower Bound for the Planted Clique Problem. *SIAM Journal on Computing*, Volume 48 No. 2 p. 687-735. 2019
- S. Hopkins, P. Kothari, A. Potechin, P. Raghavendra, and T. Schramm. On the Integrality Gap of Degree-4 Sum of Squares for Planted Clique. *ACM Transactions on Algorithms (TALG) - Special Issue on SODA'16 and Regular Papers*. Volume 14 Issue 3, Article No. 28. p.1-31. 2018
- S. Chan and A. Potechin. Tight Bounds for Monotone Switching Networks Via Fourier Analysis. *Theory of Computing* Vol. 10 Article 15, p. 389-419. 2014
- A. Potechin. Bounds on Monotone Switching Networks for Directed Connectivity. *Journal of the ACM (JACM)* Volume 64, Issue 4, Article No. 29. p.1-48. 2017
- A. Berget, A. Manion, M. Maxwell, A. Potechin, and V. Reiner. The Critical Group of a Line Graph. *Annals of Combinatorics* Volume 16, Issue 3, p.449-488. 2012
- A. Potechin. Maximal Caps in $AG(6,3)$. *Designs, Codes, and Cryptography*, Volume 36, Issue 3, p.243-259. 2008

CONFERENCE PAPERS

- C. Jones, A. Potechin, G. Rajendran, M. Tulsiani, and J. Xu. Sum-of-Squares Lower Bounds for Sparse Independent Set. *FOCS 2021*
- A. Kurpisz, A. Potechin, and E. S. Wirth. SoS certification for symmetric quadratic functions and its connection to constrained Boolean hypercube optimization. *ICALP 2021*
- J. Brakensiek, N. Huang, A. Potechin, and U. Zwick. On the Mysteries of MAX NAE-SAT. *SODA 2021*
- M. Ghosh, F. G. Jeronimo, C. Jones, A. Potechin, and G. Rajendran. Sum-of-Squares Lower Bounds for Sherrington-Kirkpatrick via Planted Affine Planes. *FOCS 2020*
- N. Huang and A. Potechin. On the Approximability of Presidential Type Predicates. *APPROX 2020*
- A. Potechin. Sum of squares bounds for the total ordering principle. *CCC 2020*
- A. Potechin. On the Approximation Resistance of Balanced Linear Threshold Functions. *STOC 2019*
- A. Potechin. Sum of squares lower bounds from symmetry and a good story. *ITCS 2019*
- S. Hopkins, P. Kothari, A. Potechin, P. Raghavendra, T. Schramm, and D. Steurer. The Power of Sum-of-Squares for Detecting Hidden Structures. *FOCS 2017*
- A. Potechin and D. Steurer. Exact Tensor Completion with Sum of Squares. *COLT 2017*
- A. Potechin. A Note on Amortized Branching Program Complexity. *CCC 2017*
- D. Medarametla and A. Potechin. Bounds on the Norms of Uniform Low Degree Graph Matrices. *RANDOM 2016*
- R. Meka, A. Potechin, and A. Wigderson. Sum of Squares Lower Bounds for Planted Clique. *STOC 2015*

PREPRINTS

- G. Cohen, D. Minzer, S. Peleg, A. Potechin, and A. Ta-Shma. Expander Random Walks: The General Case and Limitations. *ECCC Report TR21-091*. 2021
- B. Kivva and A. Potechin. Exact nuclear norm, completion, and decomposition for random overcomplete tensors via degree-4 SOS. *arXiv 2011.09416*. 2020
- A. Potechin and G. Rajendran. Machinery for Proving Sum-of-Squares Lower Bounds on Certification Problems. *arXiv 2011.04253*. 2020
- W. Cai and A. Potechin. The Spectrum of the Singular Values of Z-Shaped Graph Matrices. *arXiv 2006.14144*. 2020
- A. Potechin and H. Y. Tsang. A Conjecture on Induced Subgraphs of Cayley Graphs. *arXiv 2003.13166*. 2020
- K. Ahn, D. Medarametla, and A. Potechin. Graph Matrices: Norm Bounds and Applications. *arXiv*

1604.03423. 2020 (Note: This is a major update of the paper “Bounds on the Norms of Uniform Low Degree Graph Matrices.”)

A. Potechin and L. Yang. A Note on Property Testing Sum of Squares and Multivariate Polynomial Interpolation. arXiv 1709.03198. 2017

A. Potechin. A Note on a Problem of Erdős and Rothschild. arXiv 1412.1838. 2014

A. Potechin. Improved Upper and Lower Bound Techniques for Monotone Switching Networks for Directed Connectivity. arXiv 1302.3726. 2013

J. Brakensiek and A Potechin. Bounds on the Size of Sound Monotone Switching Networks Accepting Permutation Sets of Directed Trees. arXiv 1301.3780. 2013

K. Carde, J. Loubert, A. Potechin, and A. Sanborn. Proof of Han’s Hook Expansion Conjecture. arXiv 0808.0928. 2008

HIGH SCHOOL RESEARCH MENTORING

PRIMES student: Dhruv Medarametla (Intel semifinalist)	2014-2015
RSI students:	
Joshua Brakensiek (won a Davidson fellowship) and Gil Goldshlager (Intel semifinalist)	2013
Eric Mannes (Intel semifinalist) and Jessica Ohrlein	2012