

Pravesh K. Kothari

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INTERESTS	Convex Relaxations in Algorithm Design, Machine Learning, Pseudorandomness.	
CURRENT POSITION	Princeton University and the Institute for Advanced Study , Princeton, NJ, USA. Research Instructor in Computer Science (Schmidt Fellow)	2016-2019
EDUCATION	The University of Texas at Austin , Austin, TX, USA Ph.D. in Computer Science Adviser: Adam Klivans	2011 - 2016
	Indian Institute of Technology, Kanpur , Kanpur, India Bachelor of Technology in Electrical Engineering Adviser: Surender Baswana	2006– 2010
PAST EMPLOYMENT	The University of California Berkeley, CA, USA Visiting Student Researcher (Host: Prasad Raghavendra)	Sep-Dec 2015 and June-Aug 2014
	Microsoft Research New England, Cambridge, MA, USA Research Intern (Mentors: Boaz Barak and Madhu Sudan)	May-Aug 2015 and Sep-Dec 2014
	Microsoft Research, Bangalore, India Research Intern (Mentor: Prateek Jain)	July-Sep 2013
	IBM Almaden Research Center, San Jose, CA, USA Research Intern (Mentors: Jan Vondrák and Vitaly Feldman)	May-Aug 2012
	Microsoft Research Redmond, WA, USA Research Intern (Mentors: Madanlal Musuvathi and Sebastian Burckhardt)	May-July 2009
TEACHING	Advanced Algorithms Co-taught with Sanjeev Arora	Fall 2016
	Proofs, Beliefs and Algorithms through the Lens of Sum-of-Squares Co-taught with David Steurer .	Fall 2016
PREPRINTS	1. <i>SoS Lower Bounds for Hard Constraints: Think Global, Act Local</i> with Ryan O’Donnell and Tselil Schramm 2017.	
	2. <i>Expansion in Degree 2 Shortcode Graph and the 2-to-1 Games Conjecture</i> with Boaz Barak and David Steurer 2017 (see related blog post at Windows on Theory .)	
PUBLICATIONS	1. <i>Outlier-Robust Moment Estimation Using Sum-of-Squares</i> with David Steurer STOC 2018 (conf. version to be merged with the paper below).	
	2. <i>Better Agnostic Clustering via Relaxed Tensor Norms</i> with Jacob Steinhardt STOC 2018 (conf. version to be merged with the paper above).	
	3. <i>Sum-of-Squares Meets Nash: Lower Bounds on Finding any Equilibrium</i> with Ruta Mehta STOC 2018 .	

4. *Limits on Low-Degree Pseudorandom Generators (Or: Sum-of-Squares Meets Program Obfuscation)*
With Boaz Barak, Zvika Brakerski and Ilan Komargodski.
EUROCRYPT 2018 (to appear). [IACR]
5. *Learning by Refuting*
with Roi Livni
ITCS 2018 [Arxiv]
6. *The power of sum-of-squares for detecting hidden structures*
with Samuel B. Hopkins, Aaron Potechin, Prasad Raghavendra, Tselil Schramm and David Steurer
FOCS 2017 [Arxiv]
7. *Quantum Entanglement, Sum-of-Squares and the Log-Rank Conjecture*
with Boaz Barak and David Steurer
STOC, 2017[Arxiv].
8. *Sum-of-Squares Lower Bounds for Refuting Any CSP*
with Ryuhei Mori, Ryan O'Donnell and David Witmer.
STOC, 2017 [Arxiv].
9. *Approximating Rectangles by Juntas and a Weakly Exponential Lower Bound for LP Relaxations of CSPs*
with Raghu Meka and Prasad Raghavendra.
STOC, 2017 [Arxiv].
10. *A Nearly Tight Sum-of-Squares Lower Bound for the Planted Clique Problem*
with Boaz Barak, Samuel B. Hopkins, Jon Kelner, Ankur Moitra and Aaron Potechin
FOCS, 2016. [Arxiv] (see related blog post at [Windows on Theory](#))
Invited to the **Siam Journal of Computing**, *Special Issue for FOCS 2016*
11. *SoS and Planted Clique: Tight Analysis of MPW Moments for all Degrees and an Optimal Lower Bound at Degree 4*
with Samuel B. Hopkins and Aaron Potechin
SODA, 2016.[Arxiv]
Invited to the **ACM Transactions on Algorithms**, *Special Issue for SODA 2016*
(Conference version to be merged with *Tight Lower Bounds for Planted Clique in the Degree 4 SoS Program* by Prasad Raghavendra and Tselil Schramm).
12. *Communication With Contextual Uncertainty*
with Badih Ghazi, Ilan Komargodski and Madhu Sudan.
SODA, 2016. [Arxiv]
13. *Sum of Squares Lower Bounds from Pairwise Independence*
with Boaz Barak and Siu On Chan
STOC, 2015.[Arxiv]
14. *Almost Optimal Pseudorandom Generators for Spherical Caps*
with Raghu Meka
STOC 2015.[Arxiv]
15. *Provable Submodular Minimization Using Wolfe's Algorithm*
with Deeparnab Chakrabarti and Prateek Jain
NIPS (Oral Presentation), 2014.[Arxiv]
16. *Agnostically Learning Disjunctions on Symmetric Distributions*
with Vitaly Feldman
JMLR, 2015.[Arxiv]

17. *Nearly Tight Bounds on ℓ_1 Approximation of Self Bounding Functions*
with Vitaly Feldman and Jan Vondrák
ALT, 2017.[Arxiv]
18. *Embedding Hard Learning Problems into Gaussian Space*
with Adam Klivans
RANDOM, 2014.[Arxiv]
19. *Learning Coverage Functions and Private Release of Marginals*
with Vitaly Feldman
COLT, 2014.[Arxiv]
20. *Testing Surface Area*
with Amir Nayyeri, Ryan O'Donnell and Chenggang Wu
SODA, 2014. [Arxiv]
21. *Constructing Hard Functions from Learning Algorithms*
with Adam Klivans and Igor Oliveira
CCC, 2013.[Arxiv]
22. *Representation, Approximation and Learning of Submodular Functions using Low Rank Decision Trees*
with Vitaly Feldman and Jan Vondrák
COLT, 2013.[Arxiv]
23. *An Explicit VC-Theorem for Low Degree Polynomials*
with Eshan Chattopadhyay and Adam Klivans
RANDOM, 2012.[Arxiv]
24. *Submodular Functions are Noise Stable*
with Adam Klivans, Homin K. Lee, Mahdi Cheraghchi
SODA, 2012.[Arxiv]
25. *Differentially Private Online Learning*
with Prateek Jain, Abhradeep G. Thakurta
COLT, 2012.[Arxiv]
26. *A Randomized Scheduler with Probabilistic Guarantees of Finding Bugs*
With Santosh Nagarakatte, Madanlal Musuvathi and Sebastian Burckhardt.
ASPLOS, 2010. [PDF]

PATENT **Concurrency Software Testing with Probabilistic Bounds on Finding Bugs**

with Madanlal Musuvathi, Sebastian Burckhardt and Santosh Nagarakatte
USPTO, Filing Date: December 1, 2009, Application number: 12/628,223.

HONORS

1. **Simons Award** for Graduate Students in Theoretical Computer Science 2015.
2. Invited speaker at the **China Theory Week 2013** (Center for Theory of Interactive Computation, Aarhus University, Denmark) and **China Theory Week 2015** (Shanghai Jiao Tong University, Shanghai, China).
3. **O P Jindal (OPJEMS) Engineering Scholarship** , for years 2008 and 2009.

SERVICE

PC Member - RANDOM/APPROX 2018

Served as reviewer and subreviewer for journals (Journal of the ACM, Computational Complexity, ACM Transactions on Algorithms, Mathematics of Operations Research, Transactions on Knowledge Discovery and Engineering) and conferences (STOC, FOCS, CCC, SODA, COLT, ITCS).

INVITED TALKS ICTS Algorithms and Optimization Meeting, Bangalore, Jan 2018
MIT Theory of Computation Colloquium Series, Dec 2017
Simons Workshop on Hierarchies, Extended Formulations and Matrix-Analytic Techniques, Berkeley, CA Nov 2017
Seminar on New Directions in Theoretical Machine Learning, Princeton, Oct 2017
Columbia University Theory Seminar, Oct 2017
Oberwolfach Workshop on Proof Complexity and Beyond, August 2017
Stanford Crypto Seminar May 2017
Stanford Theory Seminar May 2017
Theory Lunch, Princeton University May 2017
Institute for Quantum Computing Colloquium, University of Waterloo, Waterloo, ON, Canada, March 2017
Theory Lunch, Carnegie Mellon University, March 2017.
Quantum Information and Computer Science Seminar, University of Maryland, College Park, MD, USA, February 2017.
University of Illinois, Urbana Champaign Theory Seminar, Urbana, February 2017
Columbia University Theory Seminar, New York, January 2017
Simons Algorithms and Geometry Meeting, New York, January 2017
Member Seminar, Institute for Advanced Study, Princeton December, 2016
Theory Seminar, University of Maryland, College Park, MD, USA, February 2017.
Member Seminar, Institute for Advanced Study, Princeton, December 2016.
University of Chicago Theory Seminar, Chicago, November 2016
Princeton University Theory Lunch, Princeton, September 2016
Rutgers University Theory Seminar, Piscataway, November 2016
Algorithms and Complexity Seminar, MIT, Cambridge, April 2016
CS/DM Seminar, Institute for Advanced Study Princeton, Princeton, March 2016
Workshop on Semidefinite Optimization, NUS, Singapore, February, 2016
Cornell University Theory Seminar, Ithaca, March 2016
University of Texas at Austin Theory Seminar, Austin, March 2015
Microsoft Research, Harvard and MIT, Theory Reading Group, Cambridge, July 2015
China Theory Week, Shanghai Jiao Tong University, Shanghai, China, August 2015
Machine Learning Reading Group, Microsoft Research Cambridge, Cambridge, November 2014
China Theory Week, Aarhus University, Aarhus, Denmark, August 2013