

Sushant Sachdeva

Postdoctoral Associate, Yale University

CONTACT INFORMATION	Department of Computer Science Yale University sachdeva@cs.yale.edu www.cs.yale.edu/homes/sachdeva/	Yale University P.O.Box 208263 Yale Institute for Network Science New Haven, CT 06520, USA
RESEARCH INTERESTS	Algorithms, and its connections to learning, optimization, and statistics My recent research has focused on the design of fast algorithms, using techniques from convex optimization, numerical linear algebra, and approximation theory.	
APPOINTMENTS	Yale University <i>Postdoctoral Associate</i> , Department of Computer Science Supervisor: Prof. Daniel Spielman <i>Lecturer</i> , Department of Computer Science	New Haven, CT Jan 2014 - present Jan 2015 - May 2015
	UC Berkeley , Simons Institute for the Theory of Computing <i>Simons Research Fellow</i> Program: Real Analysis in Computer Science	Berkeley, CA Aug 2013 - Dec 2013
EDUCATION	Princeton University <i>Ph.D., Department of Computer Science</i> Thesis: New Results in the Theory of Approximation – Fast Graph Algorithms and Inapproximability Adviser: Prof. Sanjeev Arora Area of study: Theoretical Computer Science <i>M.A., Department of Computer Science</i> GPA: 4.0/4.0	Princeton, NJ Sep 2008 - Sep 2013 Sep 2008 - Jun 2010
	Indian Institute of Technology Bombay <i>B.Tech., Department of Computer Science and Engineering</i> Adviser: Sundar Vishwanathan CPI: 9.97/10.00	Mumbai, India Jul 2004 - Aug 2008
HONORS AND AWARDS	Awarded President of India Gold Medal for topping the class of 2008 (of 500+ students) Ranked 1st all over India in IIT Entrance Examination 2004 (among 170,000+ students) Bronze Medalist at 36 th International Chemistry Olympiad (IChO) 2004, Kiel, Germany Represented IIT Bombay at ACM ICPC World Finals, Tokyo 2007 Scored a perfect SPI of 10.0 in 7 semesters out of 8 at IIT Bombay Awarded a grade of AP for outstanding performance in ten courses at IIT Bombay Awarded Jayanti Deshmukh Memorial Gold Medal for being the most outstanding B.Tech. student in the computer science class of 2008 (out of 35 students) Awarded Aditya Birla Scholarship 2004-08, covering my undergraduate studies. It is awarded to only 10 engineering students each year. Awarded Dhirubai Ambani Scholarship 2004-08 for being among the top 10 students of Maharashtra state in AISSCE 2004. Awarded Kishore Vaigyanik Protsahan Yojana (KVPY) fellowship 2002-04. Awarded to around 50 students each year; aimed at promoting research careers in the sciences.	

- MONOGRAPHS *Faster Algorithms via Approximation Theory*
S. Sachdeva, N. K. Vishnoi
In Foundations and Trends in Theoretical Computer Science 9.2 (FTTCS) 2014, pp. 125-210
- REFEREED
JOURNAL
PUBLICATIONS *Provable ICA with Unknown Gaussian Noise, and Implications for Gaussian Mixtures and Autoencoders*
S. Arora, R. Ge, A. Moitra, S. Sachdeva
In Algorithmica 72.1 (May 2015), pp. 215-236
- Inapproximability of Minimum Vertex Cover on k -Uniform k -Partite Hypergraphs*
V. Guruswami, S. Sachdeva, R. Saket
In SIAM Journal on Discrete Mathematics 29.1 (SIDMA) 2015, pp. 36-58
- An Arithmetic Analogue of Fox's Triangle Removal Argument*
P. Hatami, S. Sachdeva, M. Tulsiani
In Online Journal of Analytic Combinatorics 11 (OJAC) 2016
- REFEREED
CONFERENCE /
WORKSHOP
PUBLICATIONS *Sparsified Cholesky and Multigrid Solvers for Connection Laplacians*
R. Kyng, Y. T. Lee, R. Peng, S. Sachdeva, and D. A. Spielman
To appear at 48th ACM Symposium on Theory of Computing (STOC) 2016
- Fast, Provable Algorithms for Isotonic Regression in all ℓ_p -norms*
R. Kyng, A. Rao, S. Sachdeva
In 29th Advances in Neural Information Processing Systems (NIPS) 2015
- Algorithms for Lipschitz Learning on Graphs*
R. Kyng, A. Rao, S. Sachdeva, D. A. Spielman
In 28th Conference on Learning Theory (COLT) 2015
- Simultaneous Approximation of Constraint Satisfaction Problems*
A. Bhangale, S. Kopparty, S. Sachdeva
In 42nd International Colloquium on Automata, Languages, and Programming (ICALP) 2015
- Optimal Inapproximability for Scheduling Problems via Structural Hardness for Hypergraph Vertex Cover*
S. Sachdeva, R. Saket
In 28th IEEE Conference on Computational Complexity (CCC) 2013
- Approximating the Exponential, the Lanczos Method and an $\tilde{O}(m)$ -Time Spectral Algorithm for Balanced Separator*
L. Orecchia, S. Sachdeva, N. K. Vishnoi
In 44th ACM Symposium on Theory of Computing (STOC) 2012
- Provable ICA with Unknown Gaussian Noise, and Implications for Gaussian Mixtures and Autoencoders*
S. Arora, R. Ge, A. Moitra, S. Sachdeva
In 26th Advances in Neural Information Processing Systems (NIPS) 2012
- Finding Overlapping Communities in Social Networks: Towards a Rigorous Approach*
S. Arora, R. Ge, S. Sachdeva, G. Schoenebeck
In 13th ACM Conference on Electronic Commerce (EC) 2012
- Testing Permanent Oracles - Revisited*
S. Arora, A. Bhattacharyya, R. Manokaran, S. Sachdeva
In 16th International Workshop on Randomization and Computation (RANDOM) 2012
- Nearly Optimal NP-Hardness of Vertex Cover on k -Uniform k -Partite Hypergraphs*
S. Sachdeva, R. Saket
In 14th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX) 2011

SELECT MANUSCRIPTS	<i>A Simple Analysis of the Dikin Walk</i> S. Sachdeva, N. Vishnoi
	<i>Cuts in Cartesian Products of Graphs</i> S. Sachdeva, M. Tulsiani
THESES	<i>New Results in the Theory of Approximation: Fast Graph Algorithms and Inapproximability</i> Ph.D. Thesis, Princeton University, 2013. Advised by Sanjeev Arora
	<i>On the Hardness of Approximating Vertex Cover</i> B.Tech. Thesis, IIT Bombay, 2008. Advised by Sundar Vishwanathan
OTHER PUBLICATIONS	<i>Greedy Geometric Algorithms for Collection of Balls, with Applications to Geometric Approximation and Molecular Coarse-Graining</i> F. Cazals, T. Dreyfus, S. Sachdeva, N. Shah In Computer Graphics Forum 33-6, 2014
	<i>On the Characterization and Selection of Diverse Conformational Ensembles with Applications to Flexible Docking</i> S. Loriot, S. Sachdeva, K. Bastard, C. Prevost, F. Cazals In Computational Biology and Bioinformatics, IEEE/ACM Transactions on 8.2 (TCBB) 2011, pp. 487-498
TALKS	<i>Regression on Graphs - Lipschitz and Isotonic</i> University of Chicago, Scientific and statistical computing seminar, Nov 2015
	<i>Lipschitz Learning on Graphs</i> IIT Bombay, CS department seminar, Jul 2015
	EPFL (École Polytechnique Fédérale de Lausanne) INF department seminar, Jul 2015
	Conference on Learning Theory (COLT), Paris, Jul 2015
	UC San Diego, CS department theory seminar, May 2015
	Yale University, Statistics department seminar, Apr 2015
	<i>Triangle Removal in Groups</i> Simons Institute, UC Berkeley, Real analysis seminar, Nov 2013
	Institute for Advanced Study (IAS) Computer science/discrete mathematics seminar, Apr 2013
	<i>Generalizations of KKL Theorem and Friedgut's Junta Theorem</i> Simons Institute, UC Berkeley, Real analysis workshop, Aug 2013
	<i>Hardness for Scheduling Problems</i> Conference on Computational Complexity (CCC), Palo Alto, Jun 2013
	<i>Near-linear Time Algorithms for Balanced Separator</i> Rutgers University, DIMACS/CS theoretical computer science seminar, Mar 2013
	University of Washington, ETP theory connections, Aug 2012
	Symposium on Theory of Computing (STOC), New York, May 2012
PROFESSIONAL SERVICE	Institute for Advanced Study (IAS) Computer science/discrete mathematics seminar, Apr 2012
	<i>Testing Permanent Oracles</i> International Workshop on Randomization and Computation (RANDOM), Boston, Aug 2012
	<i>Reviewer:</i> SODA 2016, STOC 2015, SODA 2015, SIDMA, QIC, Random 2014, FOCS 2014, STOC 2014, FSTTCS 2013, SODA 2014, Approx 2013, TOC, Algorithmica, ITCS 2013, SODA 2013, ICALP 2012, LATIN 2012, SODA 2012, FSTTCS 2011

TEACHING EXPERIENCE	Lecturer, Yale University	
	<i>Lecturer for CPSC 665 : An Algorithmist's toolkit</i>	<i>Spring 2015</i>
	Designed and taught a full course on advanced algorithms (2 lectures a week)	
	55% of students rated the course excellent (highest rating)	
	Teaching Assistant, Princeton University	
PROFESSIONAL EXPERIENCE	<i>Assistant in Instruction for COS 433: Cryptography</i>	<i>Spring 2010</i>
	Taught weekly precepts, organized weekly question hours, graded assignments and exams	
	<i>Assistant in Instruction for COS 340: Reasoning About Computation</i>	<i>Fall 2009</i>
	Taught weekly precepts, organized weekly question hours, graded assignments and exams	
	Taught one 1.5-hr lecture	
	Toyota Technological Institute	Chicago, IL
	<i>Research Intern, Summer 2012</i>	
	Supervisor: Yury Makarychev	
	Lower bounds for Vertex Sparsifiers.	
	Microsoft Research India	Bangalore, India
REFERENCES	<i>Research Intern, Summer 2011</i>	
	Supervisor: Nisheeth K. Vishnoi	
	Fast algorithms for Balanced Separator.	
	INRIA	Sophia-Antipolis, France
	<i>Research Intern, Summer 2007</i>	
	Supervisor: Frederic Cazals (Research Director, Geometrica group).	
	Selecting a representative set of protein conformers.	
	ETH	Zurich, Switzerland
	<i>Research Intern, Summer 2006</i>	
	Supervisor: Riko Jacob (Algorithms, Data Structures, and Applications group).	
VISA STATUS	Cache efficiency of shortest path algorithms with preprocessing.	
	Prof. Daniel Spielman (spielman@cs.yale.edu)	
	Henry Ford II Professor of Computer Science, Mathematics, and Applied Mathematics	
	Yale University	
	Prof. Sanjeev Arora (arora@cs.princeton.edu)	
	Charles C. Fitzmorris Professor of Computer Science	
	Princeton University	
	(Please contact admin. assistant Mitra Kelly at mkelly@cs.princeton.edu)	
	Prof. Nisheeth K. Vishnoi (nisheeth.vishnoi@epfl.ch)	
	Associate Professor of Computer Science	
CITIZENSHIP	EPFL (École Polytechnique Fédérale de Lausanne)	
	Prof. John Lafferty (lafferty@galton.uchicago.edu)	
	Louis Block Professor at Departments of Statistics, Computer Science, and the College	
	University of Chicago	
	Prof. Jonathan Kelner (kelner@mit.edu)	
	Mark Hyman, Jr. Career Development Associate Professor of Applied Mathematics	
	MIT (Massachusetts Institute of Technology)	
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	Indian	