

## Naman Agarwal

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CONTACT INFORMATION	Graduate Student Department of Computer Science Princeton University Princeton, NJ 08540 USA	<i>Mobile:</i> +1-217-418-9266 <i>E-mail:</i> namana@princeton.edu <a href="http://www.cs.princeton.edu/~namana">http://www.cs.princeton.edu/~namana</a>
RESEARCH INTERESTS	Convex/Non-Convex Optimization for Machine Learning, Deep Learning, Online Learning, Theoretical Computer Science.	
EDUCATION	<b>Princeton University</b> , Princeton, NJ, USA Pursuing PhD in Computer Science <ul style="list-style-type: none"><li>• GPA : 3.95/4.00</li><li>• Advisor: Dr. Elad Hazan</li></ul> <b>University of Illinois Urbana-Champaign</b> , Urbana, IL, USA Master of Science in Computer Science, May 2014 <ul style="list-style-type: none"><li>• GPA : 3.96/4.00</li><li>• Advisor: Dr. Alexandra Kolla</li><li>• Masters Thesis: Unique Games Conjecture : the Boolean Hypercube and connections to graph lifts</li></ul> <b>IIT Bombay</b> , Mumbai, India Bachelor of Technology in Computer Science and Engineering, August 2012 <ul style="list-style-type: none"><li>• GPA : 9.48/10.00</li><li>• Advisor: Dr. Abhiram G. Ranade</li><li>• Bachelor Thesis: Convergence Analysis of Newton's Method in Draw-CAD</li></ul>	
PUBLICATIONS / MANUSCRIPTS	<ul style="list-style-type: none"><li>• <b>Finding Approximate Local Minima for Nonconvex Optimization in Linear Time</b> <i>Naman Agarwal, Zeyuan Allen-Zhu, Brian Bullins, Elad Hazan, Tengyu Ma</i> To appear in the Symposium on Theory of Computing (STOC) 2017 Arxiv link : <a href="https://arxiv.org/abs/1611.01146">https://arxiv.org/abs/1611.01146</a></li><li>• <b>Second Order Stochastic Optimization in Linear Time</b> <i>Naman Agarwal, Brian Bullins, Elad Hazan</i> Accepted for publication in the Journal of Machine Learning Research (JMLR) Arxiv link : <a href="https://arxiv.org/abs/1602.03943">https://arxiv.org/abs/1602.03943</a></li><li>• <b>Multisection in the Stochastic Block Model using Semidefinite Programming</b> <i>Naman Agarwal, Afonso Bandeira, Konstantinos Koiliaris, Alexandra Kolla</i> Under Submission Arxiv link : <a href="http://arxiv.org/abs/1507.02323">http://arxiv.org/abs/1507.02323</a></li><li>• <b>On the Expansion of Group-Based Lifts</b> <i>Naman Agarwal, Karthekeyan Chandrasekaran, Alexandra Kolla, Vivek Madan</i> Under Submission An earlier version of the paper appears at the Arxiv link : <a href="http://arxiv.org/abs/1311.3268">http://arxiv.org/abs/1311.3268</a></li><li>• <b>Unique Games on the Hypercube</b> <i>Naman Agarwal, Guy Kindler, Alexandra Kolla, Luca Trevisan</i> Chicago Journal of Theoretical Computer Science Link : <a href="http://cjtc.cs.uchicago.edu/articles/2015/1/contents.html">http://cjtc.cs.uchicago.edu/articles/2015/1/contents.html</a></li></ul>	
EMPLOYMENT	<ul style="list-style-type: none"><li>• Research Assistant, supervised by Dr. Elad Hazan – 2016-</li><li>• Teaching Assistant, CS 423 : Theory of Algorithms – Spring 2016, Princeton University</li><li>• Teaching Assistant, CS 402 : Artificial Intelligence – Fall 2015, Princeton University</li></ul>	

- Research Internship at Microsoft Research India, with Dr. Nikhil Srivastava – 2014
- Research Assistant, supervised by Dr. Alexandra Kolla – 2013-2014
- Teaching Assistant, CS 461 : Computer Security – Fall 2012, UIUC
- Teaching Assistant, CS 420 : Graph Theory – Spring 2012, IIT Bombay
- Research Internship at Microsoft Research India, under Dr. Ranjita Bhagwan – 2011
- Research Internship at Laboratoire Spécification et Vérification (ENS Cachan), with Dr. Stefan Schwoon – Summer 2010

ACADEMIC  
ACHIEVEMENTS

- Selected to receive the Chirag Foundation Graduate Fellowship in Computer Science awarded by the Computer Science Department at University of Illinois Urbana-Champaign.
- Awarded the Student Travel Award to attend the conferences STOC-2013 and CCC-2013.
- Secured an All India Rank 64 in IITJEE 2008 among 300,000 students.
- Secured an All India Rank of 148 in AIEEE 2008 among 8,00,000 students
- Awarded the CBSE Merit Scholarship on the basis of my performance in AIEEE

RESEARCH  
EXPERIENCE

**Second Order Methods for Optimization in Machine Learning** **2016**  
*Princeton University*

Developed linear time second order stochastic optimization algorithms, **LiSSA** and **FastCubic** for convex/non-convex optimization in Machine Learning. FastCubic provably achieves a second order local minima for deep networks in linear time as well as provably improves over the state of the art running time for convergence to first order optima. LiSSA, a linear time second order method for convex functions improves over running times of the state of the art first order methods both in theory and in practice.

**Multisection in the Stochastic Block Model** **2016**  
*Princeton University*

Established a sharp phase transition for exact recovery in stochastic block models with more than 2 clusters. Efficient exact recovery above the information theoretic threshold was achieved by exhibiting integrality of the natural semi-definite relaxation.

**Unique Games for the Boolean Hypercube** **2013-14**  
*Simons Institute for Theory of Computing*

Proved the existence of a non-uniform integrality gap instance for SDP relaxation of Unique Games where the constraint graph is a Hypercube. Conjectured that adding triangle inequalities to the relaxation is sufficient to solve the problem.

**Spectrum of Random Lifts of Graphs** **2013**  
*University of Illinois Urbana Champaign*

Generalized the notion of graph lifts to general group based lifts and characterized their spectrum leading to a quasi polynomial time algorithm for constructing Ramanujan graphs.

PROGRAMMING  
SKILLS

- Deep Learning in TensorFlow, Python
- Java, C++, MATLAB

PROFESSIONAL  
SERVICE

- Sub-reviewer for COLT 2016, JMLR.