Naman Agarwal

CONTACT INFORMATION

Graduate Student
Department of Computer Science
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RESEARCH INTERESTS

Convex/Non-Convex Optimization for Machine Learning, Deep Learning, Privacy for Machine Learning and Data Analysis, Online Learning, Theoretical Computer Science.

EDUCATION

Princeton University, Princeton, NJ, USA
Pursuing PhD in Computer Science
- GPA : *3.95/4.00*
- Advisor: Dr. Elad Hazan

University of Illinois Urbana-Champaign, Urbana, IL, USA
Master of Science in Computer Science, May 2014
- GPA : *3.96/4.00*
- Advisor: Dr. Alexandra Kolla
- Masters Thesis: Unique Games Conjecture : the Boolean Hypercube and connections to graph lifts

IIT Bombay, Mumbai, India
Bachelor of Technology in Computer Science and Engineering, August 2012
- GPA : *9.48/10.00*
- Advisor: Dr. Abhiram G. Ranade
- Bachelor Thesis: Convergence Analysis of Newton's Method in Draw-CAD

PUBLICATIONS / MANUSCRIPTS

- **Communication Efficient Differentially Private Mechanisms for Distributed Mean Estimation**
  Naman Agarwal, Ananda Theertha Suresh, Felix Yu, Sanjiv Kumar
  Under preparation
- **Leverage Score Sampling for Faster Accelerated Regression and ERM**
  Naman Agarwal, Sham Kakade, Rahul Kidambi, Praneeth Nethrapalli, Aaron Sidford, Yin Tat Lee
  Under Submission to Conference on Learning Theory (COLT 2018)
  Arxiv Link: https://arxiv.org/abs/1711.08426
- **Lower Bounds for Higher-Order Convex Optimization**
  Naman Agarwal, Elad Hazan
  Under Submission to Symposium on Theory of Computing (STOC) 2018
  Arxiv Link: https://arxiv.org/pdf/1710.10329.pdf
- **The Price of Differential Privacy For Online Learning**
  Naman Agarwal, Karan Singh
  International Conference on Machine Learning (ICML) 2017
  Arxiv Link: https://arxiv.org/abs/1701.07953
- **Finding Approximate Local Minima for Nonconvex Optimization Faster Than Gradient Descent**
  Naman Agarwal, Zeyuan Allen-Zhu, Brian Bullins, Elad Hazan, Tengyu Ma
  Symposium on Theory of Computing (STOC) 2017
  Arxiv link : https://arxiv.org/abs/1611.01146
- **Second Order Stochastic Optimization in Linear Time**
  Naman Agarwal, Brian Bullins, Elad Hazan

Journal of Machine Learning Research (JMLR)
Link: http://www.jmlr.org/papers/volume18/16-491/16-491.pdf
Preliminary results presented at the Optimization Methods for the Next Generation of Machine Learning workshop - ICML 2016

- **On the Expansion of Group-Based Lifts**
  Naman Agarwal, Karthekeyan Chandrasekaran, Alexandra Kolla, Vivek Madan
  21^{st} International Workshop on Randomization and Computation (RANDOM) 2017
  An earlier version of the paper appears at the Arxiv link : http://arxiv.org/abs/1311.3268
- **Multisection in the Stochastic Block Model using Semidefinite Programming**
  Naman Agarwal, Afonso Bandeira, Konstantinos Koiliaris, Alexandra Kolla
  To appear in Compressed Sensing and Its Applications: Second International MATHEON Conference, 2015
  Arxiv link : http://arxiv.org/abs/1507.02323
- **Unique Games on the Hypercube**
  Naman Agarwal, Guy Kindler, Alexandra Kolla, Luca Trevisan
  Chicago Journal of Theoretical Computer Science
  Link : http://cjtcs.cs.uchicago.edu/articles/2015/1/contents.html

WORK/RESEARCH EXPERIENCE

Research Internship, *BigML Team, Google Research NYC*
Privacy and Communication in Large Scale Distributed Machine Learning Summer 2017

Research Assistantship, *supervised by Dr. Elad Hazan*
Second Order Methods for Optimization in Machine Learning 2015- ongoing

Research Internship, *supervised by Dr. Nikhil Srivastava, Microsoft Research, Bangalore*
Optimization Approaches for Faster Graph Sparsification Summer 2014

Research Assistantship, *supervised by Dr. Alexandra Kolla, University of Illinois Urbana-Champaign*
Spectral Graph Theory and Stochastic Networks 2012-2014

Research Internship, *supervised by Dr. Ranjita Bhagwan, Microsoft Research, Bangalore*
Algorithms for Automated Data Center Design Summer 2011

Research Internship, *supervised by Dr. Stefan Schwoon, LSV, ENS-Cachan* Summer 2010

SELECTED TALKS

- Faster than Gradient Descent: Second-Order methods for Machine Learning - *Microsoft Research, New England*
- The Price of Differential Privacy For Online Learning - *Google Research NYC*
- Finding Approximate Local Minima for Nonconvex Optimization Faster Than Gradient Descent - *STOC 2017*
- Finding Approximate Local Minima for Nonconvex Optimization Faster Than Gradient Descent - *Princeton Theory Lunch*
- Second Order Stochastic Optimization in Linear Time - *Princeton Alg-ML Seminar*

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

TEACHING EXPERIENCE	• Teaching Assistant, CS 423 : Theory of Algorithms − Spring 2016, Princeton University • Teaching Assistant, CS 402 : Artificial Intelligence − Fall 2015, Princeton University • Teaching Assistant, CS 461 : Computer Security − Fall 2012, UIUC • Teaching Assistant, CS 420 : Graph Theory − Spring 2012, IIT Bombay
PROGRAMMING SKILLS	• Deep Learning in TensorFlow, Python, C++, MATLAB
PROFESSIONAL SERVICE	• Reviewer for ICML 2018, NIPS 2017, COLT 2017, COLT 2016, Journal of Machine Learning Research, Mathematical Programming, Theory of Computing.