Naman Agarwal

CONTACT
INFORMATION

Research Scientist
Google Research, Princeton
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RESEARCH
INTERESTS

Optimization for Machine Learning, Decision Making and Control, Privacy for Machine Learning and Data Analysis.

EDUCATION

Princeton University, Princeton, NJ, USA
Doctor of Philosphy(PhD) in Computer Science
- GPA: *3.95/4.00*
- Advisor: Dr. Elad Hazan
- Thesis: Second-Order Optimization Methods for Machine Learning

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

WORK/RESEARCH
EXPERIENCE

Research Scientist, *Google Research, Princeton*   2018-ongoing

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

PREPRINTS

- **Boosting for Dynamical Systems**
  Naman Agarwal, Nataly Brukhim, Elad Hazan, Zhou Lu
  Arxiv Link: https://arxiv.org/abs/1906.08720

- **Extreme Tensoring for Low-Memory Preconditioning**
  Xinyi Chen, Naman Agarwal, Elad Hazan, Cyril Zhang, Yi Zhang
  Arxiv Link: https://arxiv.org/abs/1902.04620

- **Effective Dimension of Exp-Concave Optimization**
  Naman Agarwal, Alon Gonen
  Under Submission
  Arxiv Link: https://arxiv.org/abs/1805.08268

- **Leverage Score Sampling for Faster Accelerated Regression and ERM**
  Naman Agarwal, Sham Kakade, Rahul Kidambi, Praneeth Nethrapalli, Aaron Sidford, Yin Tat-Lee
  Under Submission
  Arxiv Link: https://arxiv.org/abs/1711.08426

- **Adaptive regularization with cubics on manifolds**
  Naman Agarwal, Nicolas Boumal, Brian Bullins, Coralia Cartis
  Under Submission
  Arxiv Link: https://arxiv.org/abs/1806.00065

PUBLICATIONS

- **Logarithmic Regret for Online Control**
  Naman Agarwal, Elad Hazan, Karan Singh
  Oral Presentation Conference on Neural Information Processing Systems(NeurIPS), 2019
  Arxiv Link: https://arxiv.org/abs/1902.08721

- **Learning in Non-convex Games with an Optimization Oracle**
  Naman Agarwal, Alon Gonen, Elad Hazan
  Conference on Learning Theory(COLT), 2019
  Arxiv Link: https://arxiv.org/abs/1810.07362

- **Online Control with Adversarial Disturbances**
  Naman Agarwal, Brian Bullins, Elad Hazan, Sham Kakade, Karan Singh
  International Conference on Machine Learning(ICML), 2019
  Arxiv Link: https://arxiv.org/abs/1902.08721

- **The Case for Full-Matrix Adaptive Regularization**
  Naman Agarwal, Brian Bullins, Xinyi Chen, Elad Hazan, Karan Singh, Cyril Zhang, Yi Zhang
  International Conference on Machine Learning(ICML), 2019
  Arxiv Link: https://arxiv.org/pdf/1806.02958.pdf

- **cpSGD: Communication-efficient and differentially-private distributed SGD**
  Naman Agarwal, Ananda Theertha Suresh, Felix Yu, Sanjiv Kumar, Brendan Mcmahan
  Spotlight, Neural Information Processing Systems, 2018
  Arxiv Link: https://arxiv.org/abs/1805.10559

- **Lower Bounds for Higher-Order Convex Optimization**
  Naman Agarwal, Elad Hazan
  Conference on Learning Theory(COLT), 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 in Linear Time**
  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)
  Arxiv link : https://arxiv.org/abs/1602.03943
  Preliminary results presented at the Optimization Methods for the Next Generation of Machine Learning workshop - ICML 2016
  Awarded Honorable Mention for the 2018 Student Paper Prize Competition of the INFORMS Optimization Society

- **On the Expansion of Group-Based Lifts**
  Naman Agarwal, Karthekeyan Chandrasekaran, Alexandra Kolla, Vivek Madan
  21st 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

ACADEMIC
ACHIEVEMENTS
- Awarded the 2018 Student Paper Prize Competition of the INFORMS Optimization Society, Honorable Mention.
- 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
- Java, C++, MATLAB

PROFESSIONAL
SERVICE
- Program Committee Member - ALT 2019.
- Reviewer for ICLR 2019, NIPS 2018, ICML 2018, NIPS 2017, COLT 2017, COLT 2016, Journal of Machine Learning Research, Mathematical Programming, Theory of Computing.