Alekh Agarwal

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Interests

I am broadly interested in several theoretical aspects of machine learning with particular emphasis in the areas of learning theory, convex optimization and statistics. I like to understand new theoretical problems and challenges arising out of large-scale learning, and have recently focused in the areas of distributed machine learning and designing learning algorithms that work under a computational budget.

Education

- **UC Berkeley** - PhD Candidate with graduate fellowship in EECS department starting Fall 2007
- **UC Berkeley** - Received MA in Statistics in Dec. 2009.
- **Indian Institute of Technology**, Bombay. (2003 - 2007)
  Bachelor of Technology Pro gramme at Department of Computer Science and Engineering
  - Overall CGPA: **9.55/10**

Major Academic Achievements

- **Google PhD Fellowship** - Was awarded the Google Fellowship for years 2011-13.
- **MSR PhD Fellowship** - Was awarded the MSR Fellowship for years 2009-11.
- **Upton Graduate Fellowship** - Was offered the Upton Fellowship by the Princeton CS Deptt for Fall 2007 term.
- **International Physics Olympiad** - Represented India at the IPhO 2003 and won an **Honorable Mention**.
- **IIT JEE 2003** - Ranked $13^{\mathbf{th}}$ all over India, out of around 2,000,000 students.
- **NTSE 2001** - Awarded the prestigious **National Talent Search** Scholarship.

Submitted Preprints

- **Stochastic convex optimization with bandit feedback** - *Alekh Agarwal, Dean Foster, Daniel Hsu, Sham Kakade and Alexander Rakhlin*
- **The Generalization Ability of Online Algorithms for Dependent Data** - *Alekh Agarwal and John Duchi*
- **Ergodic Subgradient Descent** - *John Duchi, Alekh Agarwal, Mikael Johansson and Mike Jordan*
- **Distributed Delayed Stochastic Optimization** - *Alekh Agarwal and John Duchi*
- **Fast global convergence of gradient methods for high-dimensional statistical recovery** - *Alekh Agarwal, Sahand Negahban and Martin Wainwright*
- **Noisy matrix decomposition via convex relaxation: Optimal rates in high dimensions** - *Alekh Agarwal, Sahand Negahban and Martin Wainwright*
- **Information-theoretic lower bounds for the oracle complexity of convex optimization** - *Alekh Agarwal, Peter Bartlett Pradeep Ravikumar and Martin Wainwright*
- **A Stochastic View of Optimal Regret through Minimax Duality** - *Jacob Abernethy, Alekh Agarwal, Peter Bartlett and Alexander Rakhlin*
- **Matrix Regularization techniques for online multitask learning** - *Alekh Agarwal, Peter Bartlett and Alexander Rakhlin*

Journal Publications

- **Dual Averaging for Distributed Optimization: Convergence Analysis and Network Scaling** - *John Duchi, Alekh Agarwal and Martin Wainwright* - to appear in IEEE Transactions on Automatic Control, January 2012.

- **Message passing in graph structured linear programs: Convergence, proximal projections and rounding schemes** - *Pradeep Ravikumar, Alekh Agarwal and Martin Wainwright* - in Journal of Machine Learning Research, Vol. 11, 2010.

CONFERENCE PUBLICATIONS

- **Stochastic convex optimization with bandit feedback** - *Alekh Agarwal, Dean Foster, Daniel Hsu, Sham Kakade and Alexander Rakhlin* - NIPS 2011, Granada.
- **Distributed Delayed Stochastic Optimization** - *Alekh Agarwal and John Duchi* - NIPS 2011, Granada.
- **Ergodic Subgradient Descent** - *John Duchi, Alekh Agarwal, Mikael Johansson and Mike Jordan* - Allerton 2011, Allerton.
- **Learning with Missing Features** - *Afshin Rostamizadeh, Alekh Agarwal and Peter Bartlett.*
- **Oracle inequalities for computationally budgeted model selection** - *Alekh Agarwal, John Duchi, Peter Bartlett and Clement Levrard* - COLT 2011, Budapest.
- **Noisy matrix decomposition via convex relaxation: Optimal rates in high dimensions** - *Alekh Agarwal, Sahand Negahban and Martin Wainwright.*
- **Information-theoretic lower bounds on the oracle complexity of sparse convex optimization** - *Alekh Agarwal, Peter Bartlett, Pradeep Ravikumar and Martin Wainwright* - NIPS 2010 OPT Workshop, Whistler.
- **Distributed Dual Averaging in Networks** - *John Duchi, Alekh Agarwal and Martin Wainwright* - NIPS 2010, Vancouver.
- **Fast convergence rates of gradient methods for high-dimensional statistical recovery** - *Alekh Agarwal, Sahand Negahban and Martin Wainwright* - NIPS 2010, Vancouver.
- **Optimal Algorithms for Online Convex Optimization with Multi-Point Bandit Feedback** - *Alekh Agarwal, Ofer Dekel and Lin Xiao* - COLT 2010, Haifa.
- **Optimal Allocation Strategies for the Dark Pool Problem** - *Alekh Agarwal, Peter Bartlett and Max Dama* - AISTATS 2010, Sardinia.
- **Information-theoretic lower bounds for the oracle complexity of convex optimization** - *Alekh Agarwal, Peter Bartlett Pradeep Ravikumar and Martin Wainwright* - NIPS 2009, Vancouver.
- **A Stochastic View of Optimal Regret through Minimax Duality** - *Jacob Abernethy, Alekh Agarwal, Peter Bartlett and Alexander Rakhlin* - COLT 2009, Montreal.
- **Message passing in graph structured linear programs: Convergence, proximal projections and rounding schemes** - *Pradeep Ravikumar, Alekh Agarwal and Martin Wainwright* - ICML 2008, Helsinki.
- **An analysis of inference with Universum** - *Fabian Sinz, Olivier Chapelle, Alekh Agarwal and Bernhard Schölkopf* - NIPS 2007, Vancouver.
- **Learning Random Walks to Rank Nodes in Graphs** - *Alekh Agarwal and Soumen Chakrabarti* - ICML 2007, Corvallis, Oregon.
- **Learning Parameters in Entity-Relationship Graphs from Ranking Preferences** - *Soumen Chakrabarti and Alekh Agarwal* - ECML-PKDD 2006, Berlin.
- **Learning to Rank Networked Entities** - *Alekh Agarwal, Soumen Chakrabarti and Sunny Aggarwal* - ACM SIGKDD 2006, Philadelphia.
- **Sentiment Analysis: A New Approach for Effective Use of Linguistic Knowledge and Exploiting Similarities in a Set of Documents to be Classified** - *Alekh Agarwal and Pushpak Bhattacharyya* - International Conference on Natural Language Processing(ICON), IIT Kanpur, India, December 2005
- **Augmenting WordNet with Polarity Information on Adjectives** - *Alekh Agarwal and Pushpak Bhattacharyya* - 3rd International Wordnet Conference(GWC 06), Jeju Island, Korea, South Jeju (Seogwipo).

INVITED TALKS

- DISCML 2009 workshop - Rounding schemes for early termination in graph structured linear programs.

- MMDS 2010 workshop - Information-theoretic lower bounds on the oracle complexity of convex optimization (also given at IBM Research, Almaden).
- MSR Theory Seminar - Dual Averaging for Distributed Optimization: Convergence Analysis and Network Scaling.
- CMU Statistical Learning Colloquium - Noisy matrix decomposition via convex relaxation.
- Banff workshop on Sparse and Low Rank Approximation - Noisy matrix decomposition via convex relaxation.

Professional Activities

- COST workshop - Co-organizing workshop on Computational Trade-offs in Statistical Learning at NIPS 2011.
- LCCC workshop - Co-organized workshop on Learning in Cores, Clusters and Clouds at NIPS 2010.
- Journal Refereeing - JMLR, MLJ, IEEE Info Theory, Annals of Statistics, IEEE TNN, IEEE TAC.
- Conference PC - NIPS, COLT ICML, AISTATS.

Work Experience

- **Yahoo! Research** Worked with John Langford, Miroslav Dudik and Olivier Chapelle on distributed optimization for large scale machine learning.
- **Microsoft Research** Worked with Lin Xiao and Ofer Dekel in Summer 2009 on online convex optimization under partial feedback.
- **Yahoo! Research** Worked with Olivier Chapelle in Summer 2008 on displaying ads on the Yahoo! search page based on the query context using techniques from bandit optimization.
- **Max Planck Institute** Worked with Bernhard Schölkopf and Bob Williamson in Summer 2006 on taxonomy and reductions between learning problems and developed new reductions such as from one-class to binary classification and from binary classification to ranking.