

Mengdi Wang

Assistant Professor
Department of Operations Research and Financial Engineering
Princeton University
Sherrerd Hall 226, Princeton, NJ 08544
Mobile: 617-543-7694; Email: mengdiw at princeton dot edu

<http://www.princeton.edu/~mengdiw/>

Education

Ph.D. in Electrical Engineering and Computer Science, MIT, 2013 (Advisor: Dimitri P. Bertsekas)
B.S. in Information Science and Control Theory, Tsinghua University, 2007.

Appointments

Assistant Professor, Department of Operations Research and Financial Engineering, Princeton University, since July 2014.

Senior Research Scholar, Department of Operations Research and Financial Engineering, Princeton University, September 2013 - June 2014.

Research Interests

Data-driven optimization in statistics, machine and reinforcement learning, with applications in healthcare analytics and finance modeling.

Honors and Awards

NSF CAREER “Stochastic Nested Composition Optimization: Theory and Algorithms,” \$500,000, 02/01/2017-01/31/2022.

Industrial Gift “Optimization and Machine Learning in Financial Technology,” \$900,000, 03/01/2017-03/01/2020.

Princeton Innovation Award “Machine Learning to Aid Clinical Decision-Making,” \$120,000, 02/01/2017-08/31/2018.

NSF DMS “Closing the Duality Gap: Decomposition of High-Dimensional Nonconvex Optimization,” \$200,000, 07/01/2016-06/30/2018.

Best Paper Prize for Young Researchers in Continuous Optimization (awarded once every three years) at the Fifth International Conference on Continuous Optimization of the Mathematical Optimization Society, 2016.

Journal Publications

1. Y. Chen, M. Wang. Stochastic Primal-Dual Methods and Sample Complexity of Reinforcement Learning. Submitted to JMLR on 12/07/2016.
2. X. Li*, J. Ge*, T. Zhang, M. Wang, H. Liu, and T. Zhao. The "PICASSO" package for high dimensional nonconvex sparse learning in R. Submitted.
3. J. Ge, M. Hong, M. Wang, H. Liu, and T. Zhao. Homotopy Active Set Proximal Newton Algorithm for Sparse Learning. Submitted to Mathematical Programming Series C.
4. M. Wang*, J. Liu*, X. Fang. Accelerating Stochastic Composition Optimization. A preliminary version at Neural Information Processing Systems (NIPS), 2016. Journal version submitted in August 2016.
5. Y. Chen and M. Wang. Approximation Hardness for A Class of Sparse Optimization Problems. Submitted in March 2016.

6. Y. Chen and M. Wang. Hardness of Approximation for Sparse Optimization with L0 Norm. Submitted in February 2016.
7. J. Li, M. Wang, H. Liu, T. Zhang. Near-Optimal Stochastic Approximation for Online Principal Component Estimation. Submitted in December 2015. In revision with Mathematical Programming on 10/08/2016.
8. J. Ge, Z. Wang, M. Wang, H. Liu. Minimax-Optimal Privacy-Preserving Sparse PCA in Distributed Systems. Submitted in December 2015.
9. X. Fang, H. Liu, M. Wang, Blessing of Massive Scale: Spatial Graphical Model Inference with a Total Cardinality Constraint. Submitted in November 2015.
10. M. Wang, Y. Chen, J. Liu, Y. Gu. Random Multi-Constraint Projection: Stochastic Gradient Methods for Convex Optimization with Many Constraints. Submitted in November 2015; Resubmitted to MOR on 20160912.
11. M. Wang. Vanishing Price of Anarchy in Large Nonconvex Collaborative Optimization. In minor revision with SIAM Journal on Optimization.
12. M. Wang, X. Fang, and H. Liu. Stochastic Compositional Gradient Descent: Algorithms for Minimization of Nonlinear Operators of Expected-Values. *Mathematical Programming*, 161(1), 419-449, 2016. **Best Paper Prize for Young Researchers in Continuous Optimization, ICCOPT 2016 (awarded once every three years).**
13. M. Wang and D.P. Bertsekas. Stochastic First-Order Methods with Random Constraint Projection, *SIAM Journal on Optimization*, 26(1): 681–717, 2016.
14. M. Wang and D.P. Bertsekas. Incremental Constraint Projection Methods for Variational Inequalities, *Mathematical Programming Ser. A*, 1-43, 2014.
15. X. Wang, M. Wang, Y. Gu. A Distributed Tracking Algorithm for Reconstruction of Graph Signals, *IEEE Journal of Selected Topics in Signal Processing* 9(4): 728-740, 2015.
16. M. Wang and D.P. Bertsekas. On the Convergence of Simulation-Based Iterative Methods for Singular Linear Systems, *Stochastic Systems*, 3(1) 39-96, 2013.
17. M. Wang and D.P. Bertsekas. Stabilization of Stochastic Iterative Methods for Singular and Nearly Singular Linear Systems, *Mathematics of Operations Research*, 39(1) 1-30, 2013.
18. N. Polydorides, M. Wang, and D. P. Bertsekas. A Quasi Monte Carlo Method for Large-Scale Inverse Problems, *Monte Carlo and Quasi-Monte Carlo Methods*, Springer Proc. in Mathematics and Statistics, pp. 623-637, 2010.

Conference Publications

1. Y. Chen, S. Liu, H. Liu, M. Wang. Fixed-Horizon Primal-Dual Reinforcement Learning. Working Paper, 2016.
2. X. Lian, J. Liu, M. Wang. Finite-Sum Compositional Optimization via Variance Reduced Gradient Descent. Proceedings of AISTATS, 2017.
3. M. Wang*, J. Liu*, X. Fang. Accelerating Stochastic Composition Optimization. A preliminary version at Neural Information Processing Systems (NIPS), 2016. Journal version submitted in August 2016.
4. M. Wang. A Stochastic Primal-Dual for Online Solution of Markov Decision Process. A preliminary version at Conference of Decision and Control (CDC), 2016. Journal version submitted in August 2016.
5. M. Wang and J. Liu. A Stochastic Compositional Subgradient Method Using Markov Samples. Proceedings of Winter Simulation Conference, 2016.
6. M. Wang, Y. Xu, and Y. Gu. Multi-Task Nonconvex Optimization with Joint Constraints: A Distributed Algorithm Using Monte Carlo Estimates, International Conference on Digital Signal Processing (DSP), 2014.
7. Y. Gu and M. Wang. Learning Distributed Jointly Sparse Systems by Collaborative LMS, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2014.

Invited Talks at Stanford University, Georgia Institute of Technology, Columbia University, Rutgers University, University of Wisconsin, University of South California, Microsoft Research, Tsinghua University, Peking University, Chinese Academy of Science, Princeton Neuroscience Institute, Institute for Mathematics and its Applications, Purdue University, UIUC.

Reviewer of *Mathematical Programming*, *Mathematics of Operations Research*, *SIAM Journal on Optimization*, *Journal of Machine Learning Research*, *Journal of the American Statistical Association*, *IEEE Transactions on Automatic Control*, *IEEE Transactions on Signal Processing*, *Mathematics of Computation*, *INFORMS Journal on Computing*, *Journal of Global Optimization*, *Computational Optimization and Applications*, *Annals of Operations Research*. NIPS, ICML, AISTATS, IEEE Conference on Decision and Control, Winter Simulation Conference.