

Yangyang Xu

207 Church St SE, Lind Hall 4035
Minneapolis, MN 55455, USA

Homepage: www.ima.umn.edu/~yangyang/
Email: yangyang@ima.umn.edu

EDUCATION

Rice University, Houston, TX, USA.

Ph.D. in Computational and Applied Mathematics 2014

Thesis: "Block coordinate update method in tensor optimization"

Advisor: Professor Wotao Yin

Chinese Academy of Sciences, Beijing, China.

M.S. in Operations Research 2010

Thesis: "On complexity of multi-task n -vehicle exploration problem."

Advisor: Professor Jinchuan Cui

Nanjing University, Nanjing, China.

B.S. in Computational Mathematics 2007

WORKING EXPERIENCE

University of Minnesota, Twin Cities

Postdoctoral fellow Sep. 2015 – present

Mentor: Professor Shuzhong Zhang

University of Waterloo

Postdoctoral fellow Aug. 2014 – Aug. 2015

Advisors: Professors Stephen Vavasis and Henry Wolkowicz

Siemens Corporate Research

Intern. Mentors: Drs. Ioannis Akrotirianakis and Amit Chakraborty Summer 2012

Developed fast algorithms for binary and multi-class Support Vector Machines with applications to microarray and texture classifications.

RESEARCH INTERESTS

Methodology: large-scale optimization, sparse optimization, stochastic computing, tensor optimization

Applications: compressed sensing, image processing, machine learning, data mining

PUBLICATION LIST

Published or accepted

14. Z. Peng, T. Wu, **Y. Xu**, M. Yan and W. Yin. Coordinate Friendly Structures, Algorithms and applications. *Annals of Mathematical Sciences and Applications*, 1(1), 57–119, 2016.
13. N. Zhou, **Y. Xu**, H. Cheng, J. Fang and W. Pedrycz. Global and local structure preserving sparse subspace learning: an iterative approach to unsupervised feature selection. *Pattern Recognition*, 53, pp. 87–101, 2016.
12. **Y. Xu** and W. Yin. A fast patch-dictionary method for whole image recovery, *Inverse problems and imaging*, 10(2), 2016.

11. **Y. Xu** and W. Yin. Block stochastic gradient iteration for convex and nonconvex optimization, *SIAM Journal on Optimization*, 25(3), 1686–1716, 2015. [pdf]
10. **Y. Xu**, R. Hao, W. Yin and Z. Su. Parallel matrix factorization for low-rank tensor completion, *Inverse problems and imaging*, 9(2), 601–624, 2015. [pdf]
9. **Y. Xu**. Alternating proximal gradient method for sparse nonnegative Tucker decomposition. *Mathematical Programming Computation*, 7(1), 39–70, 2015. [pdf]
8. **Y. Xu**, I. Akrotirianakis and A. Chakraborty. Proximal gradient method for Huberized support vector machine, *Pattern Analysis and Applications*, 2015. [pdf]
7. **Y. Xu**, I. Akrotirianakis and A. Chakraborty. Alternating direction method of multiplier for regularized multiclass support vector machines. *Lecture Note in Computer Science*, 2015.
6. **Y. Xu**, W. Yin and S. Osher. Learning circulant sensing kernels. *Inverse Problems and Imaging*, 8(3), 901–923, 2014. [pdf]
5. **Y. Xu** and W. Yin. A block coordinate descent method for multi-convex optimization with applications to nonnegative tensor factorization and completion. *SIAM Journal on Imaging Sciences*, 6(3), 1758–1789, 2013. [pdf]
4. M. Lai, **Y. Xu** and W. Yin. Improved iteratively reweighted least squares for unconstrained smoothed ℓ_q minimization. *SIAM Journal on Numerical Analysis*, 51(2), pp. 927–957, 2013. [pdf]
3. (Conference) Q. Ling, **Y. Xu**, W. Yin and Z. Wen. Decentralized low-rank matrix completion, *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 2925–2928, 2012. [pdf]
2. **Y. Xu** and J. Cui. Multi-task n -vehicle exploration problem: complexity and algorithms. *Journal of Systems Science and Complexity*, pp. 1080–1092, 2012.
1. **Y. Xu**, W. Yin, Z. Wen and Y. Zhang. An alternating direction algorithm for matrix completion with nonnegative factors. *Journal of Frontiers of Mathematics in China, Special Issues on Computational Mathematics (Springer)*, 2011, pp. 365–384. [pdf]

Under review

1. D. Oliveira, H. Wolkowicz and **Y. Xu**. ADMM for the SDP relaxation of the QAP. Submitted.
2. Z. Peng, **Y. Xu**, M. Yan and W. Yin. ARock: an algorithmic framework for asynchronous parallel coordinate updates. Submitted. [pdf]
3. **Y. Xu**. On the convergence of higher-order orthogonality iteration. Submitted. [pdf]
4. **Y. Xu**. On higher-order singular value decomposition from incomplete data. Submitted.
5. **Y. Xu** and W. Yin. A globally convergent algorithm for nonconvex optimization based on block coordinate update. Submitted. [pdf]
6. J. Shi, **Y. Xu** and R. Baraniuk. Sparse bilinear logistic regression. Submitted.

COMPUTER SKILLS

MATLAB, C/C++, MPI, distributed/parallel computing, R, UNIX/Linux

Software packages

Tensor completion by parallel matrix factorization

Block-coordinate update for matrix and tensor factorization

Learning circulant kernels

INVITED TALKS

Block stochastic gradient update method. INFORMS Annual Meeting. Philadelphia, PA, Nov. 1–4, 2015.

On the convergence of higher-order orthogonality iteration and its extension. SIAM Conference on Applied Linear Algebra, Atlanta, GA, Oct. 26–30, 2015.

Compressed higher-order singular value decomposition. AMMCS-CAIMS Congress. Wilfrid Laurier University, Waterloo, Canada, June 7–12, 2015

Low-rank tensor recovery via matrix factorization. SIAM Conference on CSE. Salt Lake City, March 14–18, 2015.

Parallel matrix factorization for low-rank tensor completion. SIAM Conference on Optimization. San Diego, CA, May 19–22, 2014.

Block coordinate descent in tensor optimization. Seminar of Department of Mathematics, National University of Singapore, Feb. 10, 2014.

Block coordinate descent for multi-convex optimization. 14th International Conference on Approximation Theory. San Antonio, TX, April 7–10, 2013.

Decentralized low-rank matrix completion, CAAM Colloquium, Rice University, Nov. 2, 2011.

Matrix completion with nonnegative factors, Math Colloquium, Shanghai Jiaotong University, Aug. 17, 2011.

PROFESSIONAL ACTIVITIES

Session Organizer

SIAM Conference on Optimization, San Diego, CA, May 19–22, 2014

INFORMS Optimization Society Conference, Houston, TX, March 6–8, 2014

Journal Referee

SIAM Journal on Imaging Sciences

SIAM Journal on Optimization

SIAM Journal on Scientific Computing

Mathematical Programming

Applied Mathematics and Computation

Computational Optimization and Applications

Journal of Machine Learning Research

Journal of Computational Mathematics

Journal of Global Optimization

Journal of Mathematical Imaging and Vision

Journal of Operations Research Society of China

Journal of Optimization Theory and Application

Journal of Scientific Computing

IEEE Signal Processing

IEEE Neural Network and Learning System

HONORS AND AWARDS

Alan Weiser Memorial Travel Award, Rice University	2014
Graduate fellowship, Rice University	2010 – 2011
Championship of the Enterprise Simulation Contest of Chinese Academy of Sciences	2008
First Prize, Scholarship of Nanjing University	2006
First Prize, National Scholarship of China	2005
Samsung Scholarship	2004