

Yangyang Xu

313B Gordon Palmer Hall
Department of Mathematics, University of Alabama
Box 870350, Tuscaloosa, AL 35487
Email: yxu76@ua.edu
Office Phone: (+1)205-348-1975

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

EMPLOYMENT

- University of Alabama, Tuscaloosa**
Assistant professor Aug. 2016 –
- University of Minnesota, Twin Cities**
Postdoctoral fellow Sep. 2015 – Aug. 2016
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