

Xudong Li

Curriculum Vitae

School of Data Science
Fudan University
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Education

- 2010–2015 **Ph.D. in Mathematics** (major in Optimization), *National University of Singapore*, Singapore.
Dissertation: *A two-phase augmented Lagrangian method for convex composite quadratic programming*
Advisors: Defeng Sun, Kim-Chuan Toh
- 2006–2010 **B.S. in Mathematics**, *University of Science and Technology of China*, Hefei, China.

Research Interests

Efficient algorithms for large scale optimization problems in data science
Optimization and decision making under uncertainty
Matrix Optimization Problems, in particular, large scale convex quadratic semidefinite programming

Positions

- Sep 2018 – Associate Professor, School of Data Science, Fudan University
- Aug 2017 – Postdoctoral Research Associate, Department of Operations Research and Financial Engineering,
Aug 2018 Princeton University
- Sep 2015 – Research Fellow, Department of Mathematics, National University of Singapore, Singapore
Jul 2017
- Feb – Aug 2015 Research Assistant, Department of Mathematics, National University of Singapore, Singapore

Honors and Awards

- Aug 2019 Best Paper Prize for Young Researchers in Continuous Optimization, by the Mathematical Optimization Society, 2019 (**Awarded once every three years**)
- Oct 2013 Part-Time Teaching Assistant Award for AY 2012/2013, National University of Singapore

Professional Service

- ✉ Associate Editor, *Mathematical Programming Computation*
- ✉ Section Chair, the Sixth International Conference on Continuous Optimization (ICCOPT 2019)
- ✉ Section Chair, 2019 INFORMS Annual Meeting
- ✉ Section Chair, 2018 INFORMS Annual Meeting
- ✉ Secretary, SIAM NUS Student Chapter, 2013-2014
- ✉ Reviewer for AMS Mathematical Reviews
- ✉ Referee for *Mathematical Programming*, *SIAM Journal on Optimization*, *Operations Research*, *Mathematics of Operations Research*, *Mathematical Programming Computation*, *SIAM Journal on Numerical Analysis*, *IEEE Transactions on Signal Processing*, *ICML*, *NIPS*, *Numerical Algorithms*, *Optimization and Engineering*, *Asia-Pacific Journal of Operational Research*, *Applied Mathematics and Mechanics (English Edition)*

Preprints

- ⌘ Yuetian Luo, Xudong Li, and Anru Zhang, Nonconvex factorization and manifold formulations are almost equivalent in low-rank matrix optimization, arXiv: 2108.01772, 2021
- ⌘ Ling Liang, Xudong Li, Defeng Sun, and Kim-Chuan Toh, QPPAL: A two-phase proximal augmented Lagrangian method for high dimensional convex quadratic programming problems, arXiv:2103.13108, 2021
- ⌘ Yuetian Luo, Wen Huang, Xudong Li, and Anru Zhang, Recursive importance sketching for rank constrained least squares, arXiv:2011.08630, 2020
- ⌘ Zhensheng Yu, Xuyu Chen, and Xudong Li, A dynamic programming approach for generalized nearly isotonic optimization, arXiv:2011.03305, 2020
- ⌘ Wenying Liao, Xudong Li, Mengdi Wang, Lars O. Hedin, and Simon A. Levin, Coordinated market approach for nitrogen pollution reduction and food security, 2020
- ⌘ Rujun Jiang and Xudong Li, Hölderian error bounds and Kurdyka-Łojasiewicz inequality for the trust region subproblem, arXiv:1911.11955, 2019

Publications

- ⌘ Qinzhen Li and Xudong Li, Fast projection onto the ordered weighted ℓ_1 norm ball, arXiv:2002.05004, *SCIENCE CHINA Mathematics*, 2021, <https://doi.org/10.1007/s11425-020-1743-9>
- ⌘ Jiali Wang, He Chen, Rujun Jiang, Xudong Li, and Zihao Li, Fast Algorithms for Stackelberg Prediction Game with Least Squares Loss, accepted, *International Conference on Machine Learning (ICML)*, arXiv:2105.05531, 2021
- ⌘ Ying Cui, Chao Ding, Xudong Li, and Xinyuan Zhao, Augmented Lagrangian methods for convex matrix optimization problems, *Journal of the Operations Research Society of China*, in print, 2021
- ⌘ Liang Chen, Xudong Li, Defeng Sun, and Kim-Chuan Toh, On the equivalence of inexact proximal ALM and ADMM for a class of convex composite programming, *Mathematical Programming*, 185 (2021), pp. 111–161, arXiv:1803.10803
- ⌘ Ziwei Zhu, Xudong Li, Mengdi Wang, and Anru Zhang, Learning Markov models via low-rank optimization, *Operations Research*, in print, arXiv:1907.00113, 2020
- ⌘ Xudong Li, Defeng Sun, and Kim-Chuan Toh, An asymptotically superlinearly convergent semismooth Newton augmented Lagrangian method for Linear Programming, *SIAM Journal on Optimization*, 30 (2020), pp. 2410–2440
- ⌘ Xudong Li, Efficient proximal point algorithm for convex composite optimization, *Mathematica Numerica Sinica*, 42 (2020), pp. 385–404 (in Chinese)
- ⌘ Xudong Li and Ethan Xingyuan Fang, Invited discussion on the article “A Bayesian conjugate gradient method”, *Bayesian Analysis*, 14 (2019), 977–979
- ⌘ Xudong Li, Defeng Sun and Kim-Chuan Toh, On the efficient computation of a generalized Jacobian of the projector over the Birkhoff polytope, *Mathematical Programming*, 179 (2020), pp. 419–446
- ⌘ Xudong Li, Defeng Sun and Kim-Chuan Toh, A block symmetric Gauss-Seidel decomposition theorem for convex composite quadratic programming and its applications, *Mathematical Programming*, 175 (2019), 396–418
- ⌘ Xudong Li, Mengdi Wang and Anru Zhang, Estimation of Markov chain via rank-constrained likelihood, arXiv:1804.00795, *Proceedings of the 35-th International Conference on Machine Learning (ICML)*, Stockholm, Sweden, PMLR 80, 2018
- ⌘ Xudong Li, Defeng Sun and Kim-Chuan Toh, QSDPNAL: A two-phase augmented Lagrangian method for convex quadratic semidefinite programming, *Mathematical Programming Computation*, 10 (2018), 703–743

- ✉ Xudong Li, Defeng Sun and Kim-Chuan Toh, On efficiently solving the subproblems of a level-set method for fused lasso problems, *SIAM Journal on Optimization*, 28 (2018), 1842–1866
- ✉ Xudong Li, Defeng Sun and Kim-Chuan Toh, A highly efficient semismooth Newton augmented Lagrangian method for solving Lasso problems, *SIAM Journal on Optimization*, 28 (2018), 443–458
Best Paper Prize for Young Researchers in Continuous Optimization, ICCOPT 2019 (1 in 3 years)
- ✉ Ying Cui, Xudong Li, Defeng Sun and Kim-Chuan Toh, On the convergence of a majorized ADMM for the linearly constrained convex optimization problems of coupled objective functions, *Journal of Optimization Theory and Applications*, 169 (2016), 1013–1041
- ✉ Xudong Li, Defeng Sun and Kim-Chuan Toh, A Schur complement based proximal ADMM for convex quadratic conic programming and extensions, *Mathematical Programming*, 155 (2016), 333–373

Softwares

- ✉ SuiteLasso: a MATLAB suite for regression problems with generalized Lasso regularizers
- ✉ QSDPNAL: a MATLAB software for convex quadratic semidefinite programming problems
- ✉ DP4GNIO: C/C++ implementations of the dynamic programming algorithm for solving ℓ_1 -GNIO and ℓ_2 -GNIO problems

Other Experiences

- Sep 2019 Visiting Senior Research Fellow, Institute of Operations Research and Analytics, National University of Singapore
- Aug 2018 Visiting Senior Research Fellow, Institute of Operations Research and Analytics, National University of Singapore
- Aug 2017 Visiting Scholar, Department of Statistics, University of Wisconsin-Madison, 16 Aug–31 Aug 2017
- Mar 2017 Visiting Scholar, Operations Research and Financial Engineering, Princeton University, 5 Mar–18 Mar 2017
- Feb 2017 Visiting Scholar, Faculty of Science and Engineering, Curtin University, 7 Feb–18 Feb 2017
- Apr 2015 Visiting Academic, Mathematical Sciences, University of Southampton, 6 Apr–19 Apr 2015

Teaching Experience

- 2021 Spring Optimization: Reinforcement Learning, Fudan University, Lecturer
- 2021 Spring Operations Research, Fudan University, Lecturer
- 2020 Spring Theory and Algorithms for Large-scale Optimization, Fudan University, Lecturer
- 2019 Spring Operations Research, Fudan University, Lecturer
- 2018 Fall Algorithms for Big Data, Fudan University, Lecturer
- 2014 Fall Matrix Computation (MA4230), National University of Singapore, Teaching Assistant
- 2014 Spring Discrete Optimization (MA4254), National University of Singapore, Teaching Assistant
- 2013 Fall Nonlinear Programming (MA3236), National University of Singapore, Teaching Assistant
- 2013 Spring Discrete Optimization (MA4254), National University of Singapore, Teaching Assistant
- 2012 Spring and Fall Mathematics I & II (MA1505 & MA1506), National University of Singapore, Teaching Assistant