

Curriculum Vitae

Huan Xu
Professor, Department of Management Science
Antai College of Economics and Management
Shanghai Jiao Tong University
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I. Earned Degrees

- *Bachelor of Engineering* July 1997
Shanghai Jiaotong University, Department of Automation
- *Master of Engineering* July. 2003
National University of Singapore, Department of Electrical and Computer Engineering
- *PhD* Sep. 2009
McGill University, Department of Electrical and Computer Engineering
Thesis title: Robust decision makings and its application in machine learning

II. Employment History

- *Full Professor* Jul. 2024 - present
Shanghai Jiao Tong University
- *Senior Staff Algorithm Engineer* Aug. 2018 - Apr. 2014
Alibaba Group
- *Assistant Professor* Aug. 2016 - Aug. 2019
Georgia Institute of Technology
- *Associate Professor (with tenure)* Jun. 2017 - Aug. 2019
National University of Singapore
- *Assistant Professor* Jan. 2011 - Jun. 2017
National University of Singapore
- *Post-Doctoral appointment* May. 2009 - Dec. 2010
University of Texas at Austin, Department of Electrical and Computer Engineering
- *Education Consultant* Jul. 2003 - Jul. 2004
Oracle Co. Ltd
- *Telesales Representative* Jul. 2000 - Jun. 2001
Hewlett Packard Co. Ltd
- *Electrical Engineer* Sep. 1997 - Jul. 2000
Panasonic Co. Ltd

III. Research Interest

- Optimization under Uncertainty
- Machine Learning
- Reinforcement Learning and Markov Decision Processes
- High-dimensional Statistics

IV. Publications

Citation¹ : 9142 (5777 since 2019); H-index: 48.

A. Books, Book Chapters, and Edited Volumes

- (1) S. Mannor, H. Xu, “Data Driven Methods for Markov Decision Problems with Parameter Uncertainty”, in *Operations Research and Management Science in the Age of Analytics*, INFORMS TutORials in Operations Research 2019.
- (2) C. Caramanis, S. Mannor, H. Xu, “Robust Optimization in Machine Learning”, in *Optimization for Machine Learning*, S. Sra, S. Nowozin and S. Wright eds, MIT press, 2011.

B. Published and Accepted Journal Articles

- (1) **A. Rivera**, H. Wang and H. Xu. “The Online Saddle Point Problem and Online Convex Optimization with Knapsacks”, *Mathematics of Operations Research*, forthcoming, 2024.
- (2) R. Zhang, Y. Mei and H. Xu, “Robustness and Tractability of Nonconvex M-estimators”, *Statistica Sinica*, 32(3), pp1295-1316, 2022.
- (3) **C. Nguyen**, L. Ho, H. Xu, V. Dinh and B. Nguyen, “Bayesian Active Learning with Abstention Feedbacks”, *Neurocomputing*, 471, pp242-250, 2022.
- (4) **W. Yang**, M. Sim and H. Xu, “Goal Scoring, Coherent Loss and Applications to Machine Learning”, *Mathematical Programming*, 182, pp103-140, 2020.
- (5) **L. Hien**, M. Sim and H. Xu, “Mitigating Interdiction Risk with Fortification”, *Operations Research*. 68(2), pp348-362, 2020.
- (6) **Y. Wang**, H. Xu and C. Leng, “Provable Subspace Clustering: When LRR Meets SSC”, *IEEE Transactions on Information Theory*, 65(9), pp5406-5432, 2019.
- (7) **L. Hien**, **C. Nguyen**, H. Xu, C. Lu, and **J. Feng**, “Accelerated Randomized Mirror Descent Algorithms for Composite Non-strongly Convex Optimization”, *Journal of Optimization Theory and Applications*, 181(2), pp541-566, 2019.
- (8) Z. Chen, M. Sim and H. Xu, “Distributionally Robust Optimization with Infinitely Constrained Ambiguity Sets”, *Operations Research*, 67(5), pp1328-1344, 2019.
- (9) Y. Cao, L. Xie, Y. Xie and H. Xu, “Sequential Change Point Detection via Online Convex Optimization”, *Entropy*, 20(2), pp108-, 2018.
- (10) **P. Yu**, W. Haskell and H. Xu, “Approximate Value Iteration for Risk-Aware Markov Decision Processes”, *IEEE Transactions on Automatic Control*, 63(9), pp3135-3142, 2018.
- (11) J. Shen, P. Li and H. Xu, “Online Optimization for Max-Norm Regularization”, *Machine Learning*, 106(3), pp419-457, 2017.
- (12) **S. Lim**, Y. Chen and H. Xu, “Clustering from General Pairwise Observations with Applications to Time-varying Graphs”, *Journal of Machine Learning Research*, 18, 1-49, 2017.
- (13) H. Xu, C. Caramanis and S. Mannor, “Statistical Optimization in High Dimensions”, *Operations Research*, 64(4), pp958-979, 2016.
- (14) S. Mannor, O. Mebel and H. Xu, “Robust MDPs with k -Rectangular Uncertainty”, *Mathematics of Operations Research*, 41(4), pp 1484-1509, 2016.
- (15) **S. Lim**, H. Xu and S. Mannor, “Reinforcement Learning in Robust Markov Decision Processes”, *Mathematics of Operations Research*, 41(4). pp1323-1353, 2016.

¹as of 2024/3/27 per Google Scholar

- (16) Y. Chen, H. Xu, C. Caramanis and S. Sanghavi, "Matrix Completion with Column Manipulation: Near-Optimal Sample-Robustness-Rank Tradeoffs", *IEEE Transactions on Information Theory*, 62(1), pp503-526, 2016 .
- (17) **Y. Wang** and H. Xu, "Noisy Sparse Subspace Clustering", *Journal of Machine Learning Research*, 17(12), pp1-41, 2016.
- (18) G. Liu, H. Xu, J. Tang, Q. Liu and S. Yan, "A Deterministic Analysis for LRR", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 38(3), pp417-430, 2016.
- (19) **W. Yang** and H. Xu, "Distributionally Robust Chance Constraints for Non-linear Uncertainties", *Mathematical Programming*, 155(1), pp231-265, 2016.
- (20) **P. Yu** and H. Xu, "Distributionally Robust Counterpart in Markov Decision Processes", *IEEE Transactions on Automatic Control*, 61(9), pp2538-2543, 2015.
- (21) N. Ailon, Y. Chen and H. Xu, "Iterative and Active Graph Clustering Using Trace Norm Minimization Without Cluster Size Constraints", *Journal of Machine Learning Research*, 16, pp455-490, 2015.
- (22) **J. Feng**, X. Yuan, Z. Wang, H. Xu and S. Yan, "Auto-grouped Sparse Representation for Visual Analysis", *IEEE Transactions on Image Processing*, 23(12), pp5390-5399, 2014.
- (23) Y. Chen, S. Sanghavi and H. Xu, "Improved Graph Clustering", *IEEE Transactions on Information Theory*, 60(10), pp6440-6456, 2014.
- (24) Y. Chen, A. Jalali, S. Sanghavi and H. Xu, "Clustering Partially Observed Graphs via Convex Optimization", *Journal of Machine Learning Research*, 15, pp2213-2238, 2014.
- (25) S. Abeygunawardane, P. Jirutitijaroen, and H. Xu, "Adaptive Maintenance Policies for Ageing Devices using Markov Decision Process", *IEEE Transactions on Power Systems*, 28(3), pp3194-3203, 2013.
- (26) H. Xu, C. Caramanis and S. Mannor, "Outlier-Robust PCA: The High Dimensional Case", *IEEE Transactions on Information Theory*, 59(1), pp546-572, 2013.
- (27) H. Xu, C. Caramanis and S. Mannor, "Optimization under Probabilistic Envelope Constraints", *Operations Research*, 60(3), pp682-699, 2012.
- (28) H. Xu and S. Mannor, "Distributionally Robust Markov Decision Processes", *Mathematics of Operations Research*, 37(2), pp288-300, 2012.
- (29) H. Xu, C. Caramanis and S. Mannor, "A Distributional Interpretation of Robust Optimization", *Mathematics of Operations Research*, 37(1), pp95-110, 2012.
- (30) H. Xu and S. Mannor, "Robustness and Generalization", *Machine Learning*, 86(3), pp391-423, 2012.
- (31) H. Xu C. Caramanis and S. Sanghavi, "Robust PCA via Outlier Pursuit", *IEEE Transactions on Information Theory*, 58(5), pp3047-3064, 2012.
- (32) H. Xu, C. Caramanis and S. Mannor, "Sparse Algorithms are not Stable: A No-Free-Lunch Theorem", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 34(1), pp187-193, 2012.
- (33) H. Xu, C. Caramanis and S. Mannor, "Robust Regression and Lasso", *IEEE Transactions on Information Theory*, 56(7), pp3561-3574, 2010.
- (34) H. Xu, C. Caramanis and S. Mannor, "Robustness and Regularization in Support Vector Machines", *Journal of Machine Learning Research*, 10(Jul), pp1485-1510, 2009.
- (35) H. Xu and S. Mannor, "A Kalman Filter Design Based on the Performance/Robustness Tradeoff", *IEEE Transactions on Automatic Control*, 54(5), pp1171-1175, 2009.
- (36) Y.Y. Joe, A. Tay, Z.Y. Dong, H.H. Ng and H. Xu, "Searching Oligo sets of Human Chromosome 12 using Evolutionary Strategies", *International Journal of Systems Science*, 35(13-14), pp787-800, 2004.

C. Conference Presentation with Proceedings (Refereed)

- (1) Q. Zhao, T. Li, M. Du, Y. Jiang, Q. Sun, Z. Wang, H. Liu and H. Xu, “UniMatch: A Unified User-item Matching Framework for the Multipurpose Merchant Marketing”, ICDE, 2023.
- (2) Q. Sun, J. Gu, X. Xu, R. Xu, K. Liu, B. Yang, H. Liu, and H. Xu, “Learning Interest-oriented Universal User Representation via Self-supervision”, ACM Multimedia, 2022.
- (3) Q. Wen, K. He, L. Sun, Y. Zhang, M. Ke and H. Xu, “RobustPeriod: Robust Time-Frequency Mining for Multiple Periodicity Detection”, SIGMOD Conference, 2021.
- (4) J. Hua, L. Yan, H. Xu, and C. Yang, “Markdowns in E-Commerce Fresh Retail: A Counterfactual Prediction and Multi-Period Optimization Approach”, KDD, 2021.
- (5) M. Xie, W. Yin and, H. Xu, “AutoBandit: A Meta Bandit Online Learning System”, IJCAI, 2021.
- (6) Q. Wen, L. Sun, F. Yang, X. Song, J. Gao, X. Wang and H. Xu, “Time Series Data Augmentation for Deep Learning: A Survey”, IJCAI, 2021.
- (7) K. Zhou, Y. Dong, K. Wang, W. Lee, B. Hooi, H. Xu and J. Feng, “Understanding and Resolving Performance Degradation in Deep Graph Convolutional Networks”, CIKM, 2021.
- (8) Y. Zhou, P. Hu, C. Liang, H. Xu, G. Huzhang, Y. Feng, Q. Da, X. Wang, A. Zeng, “A Primal-Dual Online Algorithm for Online Matching Problem in Dynamic Environments”, AAAI, 2021.
- (9) Y. Zhao, Y. Zhou, M. Ou, H. Xu and N. Li, “Maximizing Cumulative User Engagement in Sequential Recommendation: An Online Optimization Perspective”, KDD, 2020.
- (10) Y. Li, E. Fang, H. Xu and T. Zhao, “Implicit Bias of Gradient Descent based Adversarial Training on Separable Data”, ICLR, 2020.
- (11) Q. Wen, J. Gao, X. Song, L. Sun, H. Xu and S. Zhu, “RobustSTL: A Robust Seasonal-Trend Decomposition Algorithm for Long Time Series”, AAAI, 2019.
- (12) A. Rivera, H. Wang and H. Xu, “Large Scale Markov Decision Processes with Changing Rewards”, NeurIPS, 2019.
- (13) P. Zhou, X. Yuan, H. Xu, S. Yan and J. Feng, “Efficient Meta Learning via Minibatch Proximal Update”, NeurIPS, 2019.
- (14) C. Qu, S. Mannor, H. Xu, Y. Qi, L. Song and J. Xiong, “Value Propagation for Decentralized Networked Deep Multi-agent Reinforcement Learning”, NeurIPS, 2019.
- (15) K. Zhao, J. Hua, L. Yan, Q. Zhang, H. Xu and C. Yang, “A Unified Framework for Marketing Budget Allocation”, KDD, 2019.
- (16) C. Qu, S. Mannor and H. Xu, “Nonlinear Distributional Gradient Temporal-Difference Learning”, ICML, 2019.
- (17) A. Rivera, J. Abernethy, H. Wang and H. Xu, “Competing Against Nash Equilibria in Adversarially Changing Zero-Sum Games”, ICML, 2019.
- (18) A. Rivera and H. Xu, “Risk-Averse Stochastic Convex Bandit”, AISTATS, 2019.
- (19) T. Zahavy, B. Kang, A. Sivak, J. Feng, H. Xu, and S. Mannor, “Ensemble Robustness and Generalization of Stochastic Deep Learning Algorithms”, ICLR (Workshop), 2018.
- (20) R. Gao, L. Xie, Y. Xie and H. Xu, “Robust Hypothesis Testing Using Wasserstein Uncertainty Sets”, NeurIPS, 2018.
- (21) C. Qu, Y. Li and H. Xu, “Non-convex conditional Gradient Sliding”, ICML, 2018.
- (22) J. Yang, X. Ye, R. Trivedi, H. Xu and H. Zha, “Learning Deep Mean Field Games for Modeling Large Population Behavior”, ICLR (Oral), 2018.

- (23) Y. Cao, L. Xie, Y. Xie and H. Xu, "Nearly second-order optimality of online joint detection and estimation via one-sample update schemes.", AISTATS, 2018.
- (24) A. Roy, H. Xu and S. Pokutta, "Reinforcement Learning Under Model Mismatch", NeurIPS, 2017.
- (25) M. Farajtabar, J. Yang, X. Ye, H. Xu, R. Trivedi, E. Khalil, S. Li, L. Song, H. Zha, "Fake News Mitigation via Point Process Based Intervention", ICML, 2017
- (26) D. Vainsencher, S. Mannor, H. Xu, "Ignoring Is a Bliss: Learning with Large Noise Through Reweighting-Minimization", COLT, 2017.
- (27) L. Liao, X. He, Z. Ren, L. Nie, H. Xu, TS. Chua, "Representativeness-aware Aspect Analysis for Brand Monitoring in Social Media", IJCAI, 2017.
- (28) R. Zhao, V. Tan and H. Xu, "Online Nonnegative Matrix Factorization with General Divergences", AISTATS, 2017.
- (29) J. Wang, J. Shen, P. Li, and H. Xu, "Online Matrix Completion for Signed Link Prediction", in *Tenth ACM International Conference on Web Search and Data Mining*, Cambridge, UK, 2017.
- (30) **N. Cuong**, and H. Xu, "Adaptive Maximization of Pointwise Submodular Functions With Budget Constraint", NeurIPS, 2016.
- (31) J. Shen, P. Li, and H. Xu, "Online Low-Rank Subspace Clustering by Basis Dictionary Pursuit", ICML, 2016.
- (32) **C. Qu**, H. Xu, C. Ong: "Fast Rate Analysis of Some Stochastic Optimization Algorithms", ICML, 2016.
- (33) H. Zhang, X. Shang, **W. Yang**, H. Xu, H. Luan, T-S. Chua, "Online Collaborative Learning for Open-Vocabulary Visual Classifiers", CVPR, 2016.
- (34) **C. Qu** and H. Xu, "Subspace Clustering with Irrelevant Features via Robust Dantzig Selector", NeurIPS, 2015.
- (35) **W. Yang** and H. Xu, "A Unified Framework for Outlier-Robust PCA-like Algorithms", ICML, 2015.
- (36) **W. Yang** and H. Xu, "Streaming Sparse Principal Component Analysis", ICML, 2015.
- (37) **W. Yang** and H. Xu, "A Divide and Conquer Framework for Distributed Graph Clustering", ICML, 2015.
- (38) **S. Lim** , Y. Chen and H. Xu, " A Convex Optimization Framework for Bi-Clustering", ICML, 2015.
- (39) **J. Feng**, H. Xu, S. Mannor, and S. Yan, "Robust Logistic Regression and Classification", NeurIPS, 2014.
- (40) **S. Lim**, Y. Chen and H. Xu, "Clustering from Labels and Time-Varying Graphs", NeurIPS, 2014.
- (41) **C. Zhu**, H. Xu, C. Leng and S. Yan (2014). "Convex Optimization Procedure for Clustering: Theoretical Revisit", NeurIPS, 2014.
- (42) J. Shen, H. Xu and P. Li, "Online Optimization for Max-Norm Regularization", NeurIPS, 2014.
- (43) **J. Feng**, Z. Lin, H. Xu and S. Yan, "Robust Subspace Segmentation with Laplacian Constraint", CVPR, 2014.
- (44) A. Tamar, S Mannor and H. Xu, "Scaling Up Robust MDPs using Function Approximation", ICML, 2014.
- (45) Y. Chen, **S. Lim** and H. Xu, "Weighted Graph Clustering with Non-Uniform Uncertainties", ICML, 2014.
- (46) **W. Yang**, M. Sim and H. Xu, "Coherent Loss Function for Classification", ICML, 2014.
- (47) D. Vainsencher, S. Mannor and H. Xu, "Learning Multiple Models via Regularized Weighting", NeurIPS, 2013.
- (48) **J. Feng**, H. Xu, S. Mannor and S. Yan , "Online PCA for Contaminated Datan", NeurIPS, 2013.
- (49) **J. Feng**, H. Xu, and S. Yan, "Online Robust PCA via Stochastic Optimization", NeurIPS, 2013.
- (50) **S. Lim**, H. Xu, and S. Mannor, "Reinforcement Learning in Robust Markov Decision Processes", NeurIPS, 2013.

- (51) **Y. Wang**, H. Xu and C. Leng, "Provable Subspace Clustering: When LRR meets SSC", NeurIPS, 2013.
- (52) N. Ailon, Y. Chen and H. Xu, "Breaking the Small Cluster Barrier of Graph Clustering", ICML, 2013.
- (53) **W. Yang**, and H. Xu, "A Unified Robust Regression Model for Lasso-like Algorithms", ICML, 2013.
- (54) **Y. Wang**, and H. Xu, "Noisy Sparse Subspace Clustering", ICML, 2013.
- (55) Y. Chen, S. Sanghavi and H. Xu, "Clustering Sparse Graphs", NeurIPS, 2012.
- (56) **J. Feng**, X. Yuan, Z. Wang, H. Xu and S. Yan, "Auto-grouped Sparse Representation for Visual Analysis", ECCV, 2012.
- (57) **J. Feng**, H. Xu and S. Yan, "Robust PCA in High-dimension: A Deterministic Approach", ICML, 2012.
- (58) S. Mannor, O. Mebel and H. Xu, "Lightning Does Not Strike Twice: Robust MDPs with Coupled Uncertainty", ICML, 2012.
- (59) **Y. Wang**, and H. Xu, "Stability of Matrix Factorization for Collaborative Filtering", ICML, 2012.
- (60) H. Xu, C. Caramanis and S. Mannor, "Statistical Optimization in High Dimensions", AISTATS, 2012.
- (61) H. Xu, and C. Leng, "Robust Mutli-task Regression with Grossly Corrupted Observations", AISTATS, 2012.
- (62) G. Liu, H. Xu and S. Yan, "Exact Subspace Segmentation and Outlier Detection by Low-Rank Representation", AISTATS, 2012.
- (63) H. Xu and S. Mannor, "Probabilistic Goal Markov Decision Processes", IJCAI, 2011.
- (64) Y. Chen, H. Xu, C. Caramanis and S. Sanghavi, "Robust Matrix Completion with Corrupted Columns", ICML, 2011.
- (65) A. Jalali, Y. Chen, S. Sanghavi and H. Xu, "Clustering Partially Observed Graphs via Convex Optimization", ICML, 2011.
- (66) H. Xu and S. Mannor, "Distributionally Robust Markov Decision Processes", NeurIPS, 2010.
- (67) H. Xu C. Caramanis and S. Sanghavi, "Robust PCA via Outlier Pursuit", NeurIPS, 2010.
- (68) H. Xu and S. Mannor, "Robustness and Generalization", COLT, 2010.
- (69) H. Xu, C. Caramanis and S. Mannor, "Principal Component Analysis with Contaminated Data: The High Dimensional Case", COLT, 2010.
- (70) H. Xu and S. Mannor, "Parametric Regret in Uncertain Markov Decision Processes", in *Forty-Eighth IEEE Conference on Decision and Control (CDC)*, 2009.
- (71) H. Xu, C. Caramanis, S. Mannor and S. Yun, "Risk Sensitive Robust Support Vector Machines", in *Forty-Eighth IEEE Conference on Decision and Control (CDC)*, 2009.
- (72) H. Xu, C. Caramanis and S. Mannor, "Robust Regression and Lasso", NeurIPS, 2008.
- (73) H. Xu and S. Mannor, "The Robustness-Performance Tradeoff in Markov Decision Processes", NeurIPS, 2006.
- (74) Y.Y. Joe, H. Xu, Z.Y. Dong, H.H. Ng and A. Tay, "Searching Oligo Sets of Human Chromosome 12 using Evolutionary Strategies", in *the 2003 Congress on Evolutionary Computation*, 2003.

V. Grant and Contracts

- 04/2013 – 03/2016, *Machine Learning Algorithms for Limited Samples in High Dimension Spaces*, Ministry of Education of Singapore, Total Project Value S\$441,073. My share: 100%.
- 02/2015 – 01/2018, *Practicable Robust Markov Decision Processes*, Ministry of Education of Singapore, Total Project Value S\$495,367. My Share: 100%
- 04/2015 – 03/2018, *ABCD: Analysis of Big Corrupted Data*, A*STAR Singapore, Total Project Value S\$482,400. My Share: 100%
- 03/2016-12/2018, *Machine Learning, Robust Optimisation, and Verification: Creating Synergistic Capabilities in Cyber-security Research*, PI, NRF – Joint Singapore-UK Research in Cyber Security Grant, Total Project Value S\$379,080. My Share: 100%

VI. Invited Seminar Presentation

- Concordia University, Canada, April, 2017.
- University of Wisconsin Madison, USA, Mar, 2016.
- Georgia Institute of Technology, USA, Mar, 2016.
- University of Minnesota Twin Cities, USA, Feb, 2016.
- University of Toronto, Canada, Jan, 2016.
- Cornell University, USA, Nov, 2015.
- New York University, USA, Nov, 2015.
- Columbia University, USA, Nov, 2015.
- The University of Texas at Austin, USA, Oct, 2015.
- Carnegie Mellon University, USA, July, 2015.
- Singapore University of Technology and Design, Singapore, Oct, 2014.
- Imperial College, UK, Jul, 2012
- Fudan University, China, Dec 2010
- University of Science and Technology of China, Dec 2010
- Nanjing University, China, Dec 2010
- National University of Singapore, Sep 2010
- Nanjing University, China, Dec 2009
- Technion – Israel Institute of Technology, Israel, Jan 2009
- Massachusetts Institute of Technology, USA, Nov 2008
- The University of Texas at Austin, USA, May 2008.

Professional Service

A. Editorial Memberships

- Associate Editor, Mathematics of Operations Research
- Associate Editor, IEEE Transactions on Pattern Analysis and Machine Intelligence.
- Editorial Board Member, Computational Management Science.
- Area Chair, ICML.
- Area Chair, NeurIPS.

B. Technical Journal or Conference Referee Activities

- Management Science
- Operations Research
- Mathematics of Operations Research
- Mathematical Programming
- Annals of Statistics
- Journal of Machine Learning Research
- Machine Learning
- Artificial Intelligence
- IEEE Transactions on Information Theory
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Automatic Control
- IEEE Transactions on Signal processing
- IEEE Transactions on Knowledge and Data Engineering
- Queueing Systems
- Information Processing Letters
- Signal Processing.
- ICML
- NeurIPS
- COLT

C. Proposal Panels and Reviews

- Israel Science Foundation
- Swiss National Science Foundation