JINMING XU

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Education	**Nanyang Technological University**, Singapore	2011-2016

Doctor of Philosophy (Ph.D.), Electrical and Electronic Engineering
- Thesis: *Augmented Distributed Optimization for Networked Systems*
- Advisor: Prof. Yeng Chai Soh and Prof. Lihua Xie (IEEE Fellow, IFAC Fellow)

Shandong University, Jinan, China · 2005-2009

Bachelor of Science (B.Sc.), Mechanical Engineering
- Ranking: *top 5%* among 204
- Excellent Undergraduate Thesis Award (*top 5%*), 2009

Research Interests
- Distributed Optimization and Control
- Distributed Machine Learning, Large-Scale Signal Processing
- Security and Privacy of Distributed Algorithms
- Network Science

Academic Positions

Zhejiang University, Hangzhou, China · 9/2019-Present
Tenure-Track Professor, College of Control Science and Engineering

Purdue University, West Lafayette, USA · 9/2018-8/2019
Postdoctoral Scholar, School of Industrial Engineering; **Host**: Prof Gesualdo Scutari

Arizona State University, Phoenix, USA · 10/2017-8/2018
Postdoctoral Scholar, Department of Electrical and Computer Engineering; **Host**: Prof Angelia Nedich and Prof Anna Scaglione

Nanyang Technological University, Singapore · 8/2016-9/2017
Research Fellow, School of Electrical and Electronic Engineering

Honors & Awards
- "Outstanding Overseas Talent Young Scholars", Zhejiang Province, 2020
- "One-Hundred Talent Young Scholars", Zhejiang University, 2019
- Excellent Undergraduate Thesis Award (*top 5%*), 2009
- Outstanding Student Scholarship (*top 5%*), 2006-2008

Research Experience

Distributed Optimization over Networks [J3, 5, 6-7, 9-10; C2, 5, 7, 8] 5/2013-Present
- Developed *several novel distributed algorithms* for multi-agent optimization and resource allocation problems over general and adversarial networks,
- Provided a unified algorithmic framework for these proposed distributed algorithms and achieved *fast (even optimal) rates* under this framework,
- Investigated the fundamental communication-computation trade-off,
- Applied to sensor fusion problems and economic dispatch of power systems.

Coordinated Control for Networked Dynamical Systems [J2; C1] 8/2011-8/2015
- Designed a *new distributed derivative-free scheme* for networked dynamic optimization,
- Proposed a *primal-dual* extremum seeking approach for *unknown constraints*,
- Applied the proposed scheme to wind farms for energy maximization.

Occupancy Modeling for Optimal HVAC Control [J1] 9/2012-5/2013
- Proposed *new stochastic models* for occupancy modeling and prediction,

- Designed *distributed model predictive control schemes* for large-scale HVAC systems.

Project Experience

- **Jinming Xu (PI)**, "*Distributed Optimization Algorithms: Unified Framework and Fundamental Complexity Analysis*", National Natural Science Foundation, China, 240,000RMB, 2021-2023,
- **Jinming Xu (PI)**, "*Development of communication-efficient distributed machine learning algorithms*", Huawei Technologies, China, 897,000RMB, 2020-2021
- **Jinming Xu (PI)**, "*Fundamental Theory and Methods for Distributed Optimization over Networks*", Zhejiang University, China, 2000,000RMB, 2020-2025
- **Jinming Xu (Main Participant)**, "*Distributed Fog Computing for Non-Convex Big-Data Analytics*", NSF-CIF, USA, 270,000USD, 2017-2021.
- **Jinming Xu (Main Participant)**, "*Identification and Isolation of Malicious Behavior in Multi-Agent Optimization Algorithms*", NSF-CCF, USA, 180,000USD, 2017-2020.

Publications   Journal Articles

J10 **Jinming Xu**, Ye Tian, Ying Sun and Gesualdo Scutari, *"Distributed Algorithms for Composite Optimization: Unified Framework and Convergence Analysis,"* **IEEE Transactions on Signal Processing**, Early Access, 2021:10.1109/TSP.2021.3086579. [pdf]

J9 Tie Ding, Shanying Zhu, Cailian Chen, **Jinming Xu** and Xinping Guan, *Differentially Private Distributed Resource Allocation via Deviation Tracking,* **IEEE Transactions on Signal and Information Processing over Networks**, vol. 7: 222-235, 2021.

J8 Yongyang Xiong, **Jinming Xu**, Keyou You, Jianxing Liu, and Ligang Wu, *Privacy Preserving Distributed Online Optimization over Unbalanced Digraphs via Subgradient Rescaling,* **IEEE Transactions on Control of Network Systems**, vol. 7, no. 3, pp. 1366-1378, 2020. [pdf]

J7 Shi Pu, Wei Shi, **Jinming Xu**, Angelia Nedich,*Push-Pull Gradient Methods for Distributed Optimization in Networks,* **IEEE Transactions on Automatic Control (Regular)**, vol. 66, no. 1, pp. 1-16, 2020; online available. [pdf]

J6 **Jinming Xu**, Shanying Zhu, Yeng Chai Soh and Lihua Xie, *A Dual Splitting Approach for Distributed Resource Allocation with Regularization,* **IEEE Transactions on Control of Network Systems**, vol. 6, no. 1: 403-414, 2019. [pdf]

J5 **Jinming Xu**, Shanying Zhu, Yeng Chai Soh and Lihua Xie, *A Bregman Splitting Scheme for Distributed Optimization over Networks,* **IEEE Transactions on Automatic Control (Regular)**, vol. 63, no. 11, pp. 3809-3824, 2018. [pdf]

J4 Shanying Zhu, Cailian Chen, **Jinming Xu**, Lihua Xie and Johansson Karl Henrik, *Mitigating Quantization Effects on Distributed Sensor Fusion: A Least Squares Approach,* **IEEE Transactions on Signal Processing**, vol. 66, no. 13, pp. 3459-3474, 2018. [pdf]

J3 **Jinming Xu**, Shanying Zhu, Yeng Chai Soh and Lihua Xie, *Convergence of Asynchronous Distributed Gradient Methods over Stochastic Networks,* **IEEE Transactions on Automatic Control (Regular)**, vol. 63, no. 2, pp. 434-448, 2018. [pdf]

J2 **Jinming Xu** and Yeng Chai Soh, *A Distributed Simultaneous Perturbation Approach for Large-scale Dynamic Optimization Problems,* **Automatica (Regular)** 72 (2016):194-204.

J1 Zhenghua Chen, **Jinming Xu**, Yeng Chai Soh, *Modeling Regular Occupancy in Commercial Buildings Using Stochastic Models,* **Energy and Buildings** 103 (2015): 216-223.

Conference Proceedings

J12 **Jinming Xu**, Ye Tian, Gesualdo Scutari and Ying Sun,*Optimal Primal-Dual Algorithms for Distributed Optimization over Networks,* In Proceedings of the **23rd International Conference on Artificial Intelligence and Statistics (AISTATS)**, Italy, pp. 2381-2391, 2020. [pdf]

C11 **Jinming Xu**, Ye Tian, Ying Sun and Gesualdo Scutari, "A unified algorithmic framework for distributed composite optimization," In Proceedings of 59th IEEE Conference on Decision and Control (CDC), Jeju, Korea, pp. 2309-2316, 2020.

C10 Zhibin Wang, **Jinming Xu**, Shanying Zhu, and Cailian Chen, "A dual splitting method for distributed economic dispatch in multi-energy systems,"In Proceedings of 21st IFAC World Congress, Berlin (Virtual), Germany, pp. 12566-12571, 2020.

C9 **Jinming Xu**, Ying Sun and Gesualdo Scutari,"A Unified Contraction Analysis of a Class of Distributed Algorithms for Composite Optimization,", *CAMSAP 2019*, To apear.

C8 Shi Pu, Wei Shi, **Jinming Xu**, Angelia Nedich,"A Push-Pull Gradient Method for Distributed Optimization in Networks,", In *Proceedings of 57th IEEE Conference on Decision and Control (CDC)*, 2018.

C7 **Jinming Xu**, Shanying Zhu, Yeng Chai Soh and Lihua Xie, "A Dual Splitting Algorithm for Distributed Resource Allocation Problems,", In *Proceedings of 56th IEEE Conference on Decision and Control (CDC)*, 2017.

C6 Shanying Zhu, **Jinming Xu**, Cailian Chen, Xinping Guan and Binqiang Xue, "DINS: A Scheme for Distributed Sensor Fusion over Fading Channels," *IFAC-PapersOnLine* 50(1), 2017: 14284-14289.

C5 **Jinming Xu**, Shanying Zhu, Yeng Chai Soh and Lihua Xie, "A Forward-Backward Bregman Splitting Scheme for Regularized Distributed Optimization Problems," In *Proceedings of 55th IEEE Conference on Decision and Control (CDC)*, 2016.

C4 Shanying Zhu, **Jinming Xu**, Cailian Chen and Xinping Guan, "A Least Square Approach for Distributed Sensor Fusion in Bandwidth-constrained Sensor Networks," In *Proceedings of 41st IEEE Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2016.

C3 Shanying Zhu, Shuai Liu, **Jinming Xu**, Yeng Chai Soh, and Lihua Xie, "Averaging based distributed estimation algorithm for rate-constrained sensor networks with additive quantization model," In *Proceedings of 54th IEEE Conference on Decision and Control (CDC)*, 2015.

C2 **Jinming Xu**, Shanying Zhu, Yeng Chai Soh and Lihua Xie, "Augmented Distributed Gradient Methods for Multi-agent Optimization under Uncoordinated Constant Stepsizes," In *Proceedings of 54th IEEE Conference on Decision and Control (CDC)*, 2015.

C1 **Jinming Xu** and Yeng Chai Soh, "Distributed Extremum Seeking Control of Networked Large-scale Systems under Constraints," In *Proceedings of 52nd IEEE Conference on Decision and Control (CDC)*, 2013.

Presentations Invited Talks

- School of Automation, Tsinghua University, "Distributed Optimization over Networks: Efficient Algorithms and Fundamental Limits", Beijing, China,   06/2020

- Institute of High Performance Computing, A*Star, "*When do distributed optimization algorithms meet centralized counterparts and beyond*", Singapore   05/2020

- School of Mathematical Sciences, Shanghai Jiaotong University, "*Distributed Optimization over Networks: From Algorithms to Complexity Bounds*", Shanghai, China 11/2019

- School of Control Science and Engineering, Zhejiang University, "*Distributed Optimization over Networks: From Algorithms to Applications*", Hangzhou, China   4/2019

- CSL lab, University of Illinois at Urbana–Champaign, "*Augmented Distributed Optimization: From Algorithms to Applications*", Champaign, IL USA   10/2018

- INFORMS Optimization, "*Robust Distributed Optimization for Networks with Unreliable Nodes*", Denver, USA   3/2018

- School of Electrical Engineering, Shanghai Jiaotong University (SJTU), "*Augmented Distributed Optimization: A General Primal-Dual Perspective*", Shanghai, China   1/2017

Conference Talks

- 59th IEEE CDC, "*A unified algorithmic framework for distributed composite optimization*", Jeju (virtual), Korea, USA, 12/2020.
- 8th IEEE CAMSAP, "*A Unified Contraction Analysis of a Class of Distributed Algorithms for Composite Optimization*", Guadeloupe, France, 12/2019.
- 33rd AISTATS, "*Accelerated Primal-Dual Algorithms for Distributed Optimization over Networks*", Italy (virtual), 06/2020
- 56th IEEE CDC, "*A dual splitting algorithm for distributed resource allocation problems*", Melbourne, Australia, 12/2017.
- 54th IEEE CDC, "*A Forward-Backward Bregman Splitting Scheme for Regularized Distributed Optimization Problems*", Las Vegas, USA   12/2016
- 52nd IEEE CDC, "*Distributed Extremum Seeking Control of Networked Large-scale Systems under Constraints*", Florence, Italy   12/2013

Professional Activities

Services

- Guest Editor for Journal of Control Theory and Applications
- Associated Editor for ICCA 2019, 2020
- Session (co)-Chair for CCC 2021, SIAM OPT 2021, ICCA 2020 and CDC 2020
- Program Chair for Global Automation ECR Workshop 2019; TPC members for ICPADS 2020, CACRE 2020

Reviews

- Automatica
- IEEE Transactions on Automatic Control
- IEEE Transactions on Control of Network Systems
- SIAM Journal on Optimization
- IEEE Transactions on Cybernetics
- IEEE Transactions on Systems, Man and Cybernetics: Systems
- IEEE Transactions on Signal and Information Processing over Networks
- IEEE Transactions on Signal Processing
- IEEE Transactions on Network Science and Engineering
- IEEE Conference on Decision and Control
- International Conference on Networked Systems
- International Federation of Automatic Control

Memberships

- IEEE Member (since 2011) ● IEEE Control Systems Society (since 2013).