

XUAN WANG

Electrical and Computer Engineering \diamond George Mason University
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ACADEMIC DEGREES

Purdue University *Aug. 2016 - Aug. 2020*
Ph.D. in Autonomy and Control, School of Aeronautics and Astronautics Engineering

- Dissertation: Distributed Control and Optimization in Multi-robot Systems
- Ph.D. Advisor: Professor Shaoshuai Mou

ACADEMIC POSITIONS

Assistant Professor *Starting Aug. 2021*
Electrical and Computer Engineering,
George Mason University, Fairfax, VA

Postdoctoral Scholar *Oct. 2020 - Jul. 2021*
Mechanical and Aerospace Engineering
University of California, San Diego
Hosted by Professor Jorge Cortés.

TEACHING

Instructor, George Mason University *Starting Aug. 2021*

- ECE 421: Classical Systems and Control Theory (2021-F, 2022-F, 2023-F)
- ECE 429: Modern Control Systems Lab (2023-F)
- ECE 623: Distributed Control and Optimization (2022-S, 2024-S)

Instructor, Purdue University *Jan. 2018 - May. 2018*

- AAE 364L: Control Systems Analysis and Lab (2018-S)

Teaching Assistant, Purdue University *Aug. 2016 - Dec. 2017*

- AAE 203: Aeromechanics (2016-F, 2017-F)

PUBLICATIONS

Journal

- [1] **X. Wang**, and J. Cortes “Efficient Reconstruction of Neural Mass Dynamics Modeled by Linear-Threshold Networks,” *under review by IEEE Transactions on Automatic Control*, arXiv: 2308.14231.
- [2] **X. Wang**, S. Mou, and S. Sundaram “Resilience for Distributed Consensus with Constraints,” *under review by IEEE Transactions on Automatic Control*, arXiv: 2206.05662.
- [3] D. Duong-Tran, R. Kaufmann, J. Chen, **X. Wang**, S. Garai, F. Xu, J. Bao, E. Amico, A. Kaplan, G. Petri, J. Goni, Y. Zhao and L. Shen, “Homological landscape of human brain functional sub-circuits,” *under review by Mathematics Special Issue ”Computer Graphics, Visualization and Medical Imaging: Theory and Applications”*, Dec, 2023.

- [4] **X. Wang**, S. Mou, and B. D. O. Anderson “Constrained Consensus-based Distributed Optimization with Integral Feedback,” *IEEE Transactions on Automatic Control*, vol. 68, no. 3, pp. 1894–1901, 2022.
- [5] **X. Wang**, S. Mou, and B. D. O. Anderson “Scalable, Distributed Algorithms for Solving Linear Equations via Double-Layered Networks,” *IEEE Transactions on Automatic Control*, vol. 65, no. 3, pp. 1132–1143, 2020.
- [6] **X. Wang**, J. Zhou, S. Mou, and M. Corless “A Distributed Algorithm for Least Squares Solutions,” *IEEE Transactions on Automatic Control*, vol. 64, no. 10, pp. 4217–4222, 2019.
- [7] **X. Wang**, S. Mou, and S. Sundaram. “A Resilient Convex Combination for Consensus-based Distributed Algorithms.” *Numerical Algebra, Control & Optimization*, vol. 9, no. 3, pp.269-281, 2019.
- [8] J. Zhou, **X. Wang**, S. Mou, and B. D. O. Anderson “Finite-Time Distributed Linear Equation Solver for Solutions with Minimum l_1 Norm,” *IEEE Transactions on Automatic Control*, vol. 65, no. 4, pp. 1691-1696, 2020.
- [9] **X. Wang**, S. Mou, and D. Sun “Improvement of a Distributed Algorithm for Solving Linear Equations,” *IEEE Transactions on Industrial Electronics*, vol. 64, no. 4, pp. 3113–3117, 2017.
- [10] **X. Wang**, H. Gao, O. Kaynak, and W. Sun “Online Deflection Estimation of X-axis Beam on Positioning Machine,” *IEEE/ASME Transactions on Mechatronics*, vol. 21, no. 1, pp. 339–350, 2016.

Conference

- [1] A. Mahmud, D. Nguyen, F. Veiga, X. Xiao, **X. Wang** “Enhancing Human-Robot Collaborative Transportation with Human-Uncertainty-Aware MPC and Pose Optimization,” *under review*, Dec, 2023.
- [2] Z. Hu, M. Limbu, D. Shishika, X. Xiao, **X. Wang** “Learning Team Coordination to Traverse Adversarial Environments,” *under review*, Sep, 2023.
- [3] Y. Zhou, W. Jin, **X. Wang** “Distributed Differentiable Dynamic Game for Multi-robot Coordination,” *under review*, Sep, 2023.
- [4] Y. Zhou, C. Nowzari, **X. Wang** “Distributed Multi-robot Flocking based on Acoustic Doppler Effect,” *62nd IEEE Conference on Decision and Control (CDC)*, Dec, 2023.
- [5] Z. Hu*, M. Limbu*, S. Oughourli*, **X. Wang**, X. Xiao, D. Shishika “Team coordination on graphs with state-dependent edge cost,” *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems*, Oct, 2023. **Best paper finalist** on cognitive robots. [* : co-first authors.]
- [6] M. Umair, L. Shen, D. Duong-Tran, **X. Wang** “Subject and Task Fingerprint using Dynamics Reconstruction from fMRI Time-series Data,” *Annual Meeting of the Organization for Human Brain Mapping (OHBM)*, July, 2023.
- [7] **X. Wang**, and J. Cortés “Data-Driven Control of Linear-Threshold Network Dynamics,” *2022 American Control Conference (ACC)*, pp. 114-119.
- [8] **X. Wang**, and J. Cortés “Data-Driven Reconstruction of Firing Rate Dynamics in Brain Networks,” *60th IEEE Conference on Decision and Control (CDC)*, pp. 6463-6468.

- [9] **X. Wang**, J. Hudack and S. Mou “Distribute Algorithm with Resilience for Multi-Agent Task Allocation,” *2021 IEEE International Conference on Industrial Cyber-Physical Systems (ICPS)*, pp. 112-117. **Best paper award**
- [10] **X. Wang**, and S. Mou “More Consensus is *Not Always* Beneficial,” *2020 American Control Conference (ACC)*, Jul. 2020. 3273–3278.
- [11] **X. Wang**, S. Mou, and B. D. O. Anderson “A Discrete-time Distributed Algorithm for Minimum l_1 -Norm Solution of an Under-determined Linear Equation Set,” *IFAC 2020*, Jul. 2020. pp. 3340–3347.
- [12] **X. Wang**, S. Mou, and S. Sundaram. “Resilience for Consensus-based Distributed Algorithms in Hostile Environment.” *57th Annual Allerton Conference on Communication, Control, and Computing*, Sep. 2019. pp. 7.
- [13] **X. Wang**, and S. Mou “A Distributed algorithm for Least Squares Solutions in Double-layered Multi-agent Networks,” *2019 American Control Conference (ACC)*, Jul. 2019. pp. 90–95.
- [14] **X. Wang**, S. Mou, and B. D. O. Anderson “A Distributed Algorithm with Scalar States for Solving Linear Equations,” *57th IEEE Conference on Decision and Control (CDC)*, Dec 2018, pp. 2861–2865.
- [15] **X. Wang** and S. Mou “A Distributed Algorithm for Achieving the Conservation Principle,” *2018 American Control Conference (ACC)*, June 2018, pp. 5863–5867.
- [16] J. Zhou, **X. Wang**, S. Mou, and B. D. O. Anderson “Distributed Algorithm for Achieving Minimum l_1 Norm Solutions of Linear Equation ,” *2018 American Control Conference (ACC)*, June 2018, pp. 5857–5862.
- [17] **X. Wang**, J. Zhou, S. Mou, and M. Corless “A Distributed Linear Equation Solver for Least Square Solutions,” *56th IEEE Conference on Decision and Control (CDC)*, Dec 2017, pp. 5955–5960.
- [18] **X. Wang**, S. Mou, and D. Sun “Further Discussions on a Distributed Algorithm for Solving Linear Algebra Equations,” in *2017 American Control Conference (ACC)*, May 2017, pp. 4274–4278.

Academic Presentation

- [1] Invited presentation, “Automated Resilience for Distributed Coordination in Large-scale Networks,” at *NASA ULI Annual Review at Georgia Tech*, June. 2023.
- [2] Invited presentation, “Distributed Coordination for Multi-robot Systems,” at *Army Research Lab*, March. 2022.
- [3] Technical presentation, “Distributed Control and Optimization in Autonomous Multi-robot Systems,” at *UC San Diego*, June. 2021.
- [4] Invited talk, “Distributed Control and Optimization in Autonomous Multi-robot Systems,” at *George Mason University*, Apr. 2021.
- [5] Invited talk, “Distributed Control and Optimization in Autonomous Multi-robot Systems,” at *The University of Oklahoma*, Apr. 2021.
- [6] Invited talk, “Distributed Control and Optimization in Multi-agent Systems,” at *Tongji University*, Oct. 2020.

- [7] Invited talk, “Distributed Control and Optimization in Autonomous Multi-robot Systems,” at *North Carolina A&T State University*, May. 2020.
- [8] Invited talk, “Distributed Control and Optimization in Autonomous Multi-robot Systems,” at *Missouri University of Science & Technology*, Mar. 2020.
- [9] Technical talks in *2017-2022 American Control Conferences*.
- [10] Technical talk in *57th-60th IEEE Conference on Decision and Control*.
- [11] Technical poster in *8th Midwest Workshop on Control and Game Theory*, St. Louis.
- [12] Technical poster in *2018 OIGP Spring Reception Poster Session*, Purdue University.
- [13] Technical poster in *CERIAS 2017, 2018 Symposium Poster Session*, Purdue University.

RESEARCH GRANTS

Funded Projects.

- [F1] PI in NSF, ‘Learning Coordination for Multi-Autonomous Multi-Human (MAMH) Agent Systems with Guaranteed Safety’, Duration: 1/1/2024-12/31/2026, Amount: \$344,628, *Recommended for funding, to start in SP 2024. Awaiting administrative processing.*
- [F2] Co-PI in ARO-TBAM, ‘Tactical Team Behavior with Hierarchical Decision Making using Game Theory and Learning’, Duration: 8/1/2022-7/31/2023, Amount: \$481,115, Share: \$160,356
- [F3] PI in Southeastern Center for Electrical Engineering Education, ‘A Distributed Learning Framework for Multi-robot Cooperative Control’, Duration: 8/1/2022-7/31/2023, Amount: \$27,780
- [F4] PI in 4-VA, ‘Data-driven Prediction and Regulation of Firing Rate Dynamics in Brain’, Duration: 8/1/2022-7/31/2023, Amount: \$19,991

PROFESSIONAL SERVICE

- Technical Committee Member** for Manufacturing Automation and Robotic Control (MARC), *IEEE Control Systems Society* *Since Jun. 2023*
- Proposal Review Panelist** for USDA-NIFA-AFRI–Engineering for Agricultural Production and Processing. *Jan. 2024*
- Technical Track co-Chair** for 2024 *IEEE International Conference on Industrial Cyber-Physical Systems (ICPS)*. *Dec. 2023*
- Proposal Review Panelist** for NSF-Cyber physical systems. *Dec. 2022*
- Challenge Organizer**, UAV Data-driven Control Challenge, 2022 International Conference on Machine Learning and Applications (ICMLA). *Sep. 2022*
- Technical Program Committee**, 2022 International Conference on Artificial Intelligence and Computer Science (AICS). *Jul. 2022*
- Session Chair**, 2021 Annual Conference of the *IEEE Industrial Electronics Society (IECON)*. *Oct. 2021*

AWARDS

Awards by Students

Zechen Hu, **Best Paper Finalist on Cognitive Robots** at 023 IEEE/RSJ International Conference on Intelligent Robots and Systems 2023

Makaela Vidal, Kabir Basnet, Huy Luu, Namita Palahalli, Lizzie Krebs, Richard Kang, **Outstanding ECE Senior Design Project Award** 2023

Muhammad Umair, **CEC Innovation Week Best Poster Award**, George Mason University 2023

Yizhi Zhou, **GMU Presidential Scholarship**, George Mason University 2022

Own Awards

Best Paper Award, ICPS 2021, IEEE Industrial Electronics Society. 2021

Outstanding Research Award, College of Engineering, Purdue University. 2020

Bilsland Fellowship, College of Engineering, Purdue University. 2019 - 2020

Travel Grant, 8th Midwest Workshop on Control and Game Theory 2019

2018 AAE Teaching Assistant Award, AAE, Purdue University 2018

Koerner Scholarship, Purdue University 2017

OTHER SERVICE

Ph.D. Program Committee Member for Department of Electric and Computer Engineering, George Mason University *Since Aug. 2021*

Reviewer for

- *IEEE Transactions on*

- *Automatic Control*
- *Signal Processing*
- *Cybernetics*
- *Intelligent Transportation Systems*
- *Control of Network Systems*
- *Automation Science and Engineering*
- *Industrial Electronics*
- *Network Science and Engineering*

- *Automatica*

- *Journal of Systems and Control Engineering*

- *Journal of Robust and Nonlinear Control*

- *57, 58th IEEE Conf. on Decision and Control*

- *2018 and 2019 American Control Conference*

- *IEEE Control Systems Letters*

- *Journal of the Franklin Institute*

- *IEEE Access*

- *2019 AIAA SciTech*

- *2019 Dynamic Systems and Control Conference*