

Wenqiang PU

Signal Processing, Optimization

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Basic Information

Gender: Male

Date of Birth: Jan. 26, 1991

Position: Research Scientist, Shenzhen Research Institute of Big Data

Research Interests

Signal Processing

Array Signal Processing, Distributed SP, Multi-sensor Data fusion

Optimization

Convex Relaxation, First-order Optimization, Primal-Dual Method

Machine Learning

Neural Network, Reinforcement Learning for SP Application

Education

Information and Signal Processing

P.h.D., Xi'an, China

EE, Xidian University

Sep. 2013– Dec. 2018

The Chinese University of Hong Kong (Shenzhen)

Visiting P.hD Student, Shenzhen, China

Jan. 2015–Jun. 2018

Electronic Engineering

B.Sc, Xi'an, China

EE, Xidian University

Sep. 2009–Jun. 2013

Work Experience

Information System Lab

Research Scientist, Shenzhen, China

Shenzhen Research Institute of Big Data

Oct. 2020– Present

School of Science and Engineering

Postdoc, Shenzhen, China

The Chinese University of Hong Kong (Shenzhen)

Jan. 2019–Sep. 2020

Academic Activities

Talks.....

Invited Talk

ICIAM 2023, Tokyo, Japan

Stochastic Mirror Descent for Low-Rank Tensor Decomposition

Aug. 2023

Cooperative Sensing via Matrix Factorization of Sample Covariance Matrix

Invited Talk

Aug. 2023

China Electromagnetic Spectrum Annual Conference 2023, Chengdu, China

Iteration Complexity of Proximal ALM for Nonconvex Optimization

Invited Talk

April 2023

DINO 2023, Beijing, China

Low-Rank Tensor Decomposition Under Non-Euclidean Losses

Invited Talk

Oct. 2022

Sichuan University, Chengdu, China

Optimization Technique in Array Signal Processing

Invited Talk

June 2022

Zhejiang University, Hangzhou, China

Low-Rank Tensor Decomposition Under Non-Euclidean Losses

Invited Talk

Nov. 2021

CECNet 2021, Online

Notes on Optimization in Signal Processing

Invited Talk

Sep. 2020

Xidian University, Xian, China

Overcome DoF Limitation in Robust Beamforming

Invited Talk

Oct. 2019

ICCAIS 2019, Chengdu, China

Conference/Workshop Organization.....

International Conference on Control, Automation and Information Sciences

Session Chair, Xian, China

Oct. 2021

2020 International Workshop on Mathematical Issues in Information Science

Session Chair, Shenzhen, China

Dec. 2020

Reviewers.....

Conference: IEEE ICASSP, IEEE SAM, IEEE MLSP

Journal: IEEE Transactions on Signal Processing, IEEE Transactions on Aerospace and Electronic Systems, IEEE Information Forensics and Security, IEEE Signal Processing Letter, Journal of Global Optimization, Remote Sensing, Signal Processing

Publications

Journal Papers.....

- [1] K. Li, H. Liu, B. Jiu, **W. Pu**, X. Peng, and J. Yan, "Knowledge aided model-based reinforcement learning for anti-jamming strategy learning", *IEEE Transactions on Aerospace and Electronic Systems*, 2024.
- [2] J. Yan, R. Zhai, T. Yan, **W. Pu**, J. Luo, and H. Liu, "System error estimation for sensor network with integrated sensing and communication application", *Signal Processing*, vol. 213, p. 109200, 2023.
- [3] **W. Pu**, Y.-F. Liu, and Z.-Q. Luo, "Efficient estimation of sensor biases for the 3-dimensional asynchronous multi-sensor system", *IEEE Transactions on Signal Processing*, 2023.
- [4] J. Yan, T. He, L. Ma, **W. Pu**, H. Liu, and M. S. Greco, "Maneuvering resource allocation for coordinated target tracking in airborne radar network", *IEEE Transactions on Signal Processing*, 2023.
- [5] **W. Pu**, J. Xiao, T. Zhang, and Z.-Q. Luo, "A penalized inequality-constrained approach for robust beamforming with dof limitation", *Signal Processing*, vol. 202, p. 108746, 2023.

- [6] J. Dai, **W. Pu***, J. Yan*, Q. Shi, and H. Liu, "Multi-uav collaborative trajectory optimization for asynchronous 3-d passive multitarget tracking", *IEEE Transactions on Geoscience and Remote Sensing*, vol. 61, pp. 1–16, 2023.
- [7] J. Dai, J. Yan, **W. Pu**, H. Liu, and M. S. Greco, "Adaptive channel assignment for maneuvering target tracking in multistatic passive radar", *IEEE Transactions on Aerospace and Electronic Systems*, 2022.
- [8] **W. Pu**, S. Ibrahim, X. Fu, and M. Hong, "Stochastic mirror descent for low-rank tensor decomposition under non-euclidean losses", *IEEE Transactions on Signal Processing*, vol. 70, pp. 1803–1818, 2022.
- [9] H. Sun, **W. Pu**, X. Fu, T.-H. Chang, and M. Hong, "Learning to continuously optimize wireless resource in a dynamic environment: A bilevel optimization perspective", *IEEE Transactions on Signal Processing*, vol. 70, pp. 1900–1917, 2022.
- [10] J. Dai, J. Yan, J. Lv, *et al.*, "Composed resource optimization for multitarget tracking in active and passive radar network", *IEEE Transactions on Geoscience and Remote Sensing*, vol. 60, pp. 1–15, 2022.
- [11] K. Li, B. Jiu, **W. Pu**, H. Liu, and X. Peng, "Neural fictitious self-play for radar antijamming dynamic game with imperfect information", *IEEE Transactions on Aerospace and Electronic Systems*, vol. 58, no. 6, pp. 5533–5547, 2022.
- [12] J. Yan, H. Jiao, **W. Pu***, C. Shi, J. Dai, and H. Liu, "Radar sensor network resource allocation for fused target tracking: A brief review", *Information Fusion*, 2022.
- [13] K. Li, B. Jiu, H. Liu, and **W. Pu**, "Robust antijamming strategy design for frequency-agile radar against main lobe jamming", *Remote Sensing*, vol. 13, no. 15, p. 3043, 2021.
- [14] J. Yan, J. Dai, **W. Pu**, H. Liu, and M. Greco, "Target capacity based resource optimization for multiple target tracking in radar network", *IEEE Transactions on Signal Processing*, vol. 69, pp. 2410–2421, 2021.
- [15] J. Yan, **W. Pu**, S. Zhou, H. Liu, and M. S. Greco, "Optimal resource allocation for asynchronous multiple targets tracking in heterogeneous radar networks", *IEEE Transactions on Signal Processing*, vol. 68, pp. 4055–4068, 2020.
- [16] J. Yan, J. Dai, **W. Pu**, S. Zhou, H. Liu, and Z. Bao, "Quality of service constrained-resource allocation scheme for multiple target tracking in radar sensor network", *IEEE Systems Journal*, vol. 15, no. 1, pp. 771–779, 2020.
- [17] J. Yan, **W. Pu**, S. Zhou, H. Liu, and Z. Bao, "Collaborative detection and power allocation framework for target tracking in multiple radar system", *Information Fusion*, vol. 55, pp. 173–183, 2020.
- [18] Z. Lin, **W. Pu**, and Z.-Q. Luo, "Minimax design of constant modulus mimo waveforms for active sensing", *IEEE Signal Processing Letters*, vol. 26, no. 10, pp. 1531–1535, 2019.
- [19] J. Yan, **W. Pu***, J. Dai, H. Liu, and Z. Bao, "Resource allocation for search and track application in phased array radar based on pareto bi-objective optimization", *IEEE Transactions on Vehicular Technology*, vol. 68, no. 4, pp. 3487–3499, 2019.
- [20] **W. Pu**, Y.-F. Liu, J. Yan, H. Liu, and Z.-Q. Luo, "Optimal estimation of sensor biases for asynchronous multi-sensor data fusion", *Mathematical Programming*, vol. 170, pp. 357–386, 2018.
- [21] J. Yan, **W. Pu***, H. Liu, B. Jiu, and Z. Bao, "Robust chance constrained power allocation scheme for multiple target localization in colocated mimo radar system", *IEEE Transactions on Signal Processing*, vol. 66, no. 15, pp. 3946–3957, 2018 (Corresponding Author).
- [22] J. Yan, H. Liu, **W. Pu**, H. Liu, Z. Liu, and Z. Bao, "Joint threshold adjustment and power allocation for cognitive target tracking in asynchronous radar network", *IEEE Transactions on Signal Processing*, vol. 65, no. 12, pp. 3094–3106, 2017.
- [23] J. Yan, H. Liu, **W. Pu**, and Z. Bao, "Exact fisher information matrix with state-dependent probability of detection", *IEEE Transactions on Aerospace and Electronic Systems*, vol. 53, no. 3, pp. 1555–1561, 2017.
- [24] J. Yan, **W. Pu**, H. Liu, S. Zhou, and Z. Bao, "Cooperative target assignment and dwell allocation for multiple target tracking in phased array radar network", *Signal Processing*, vol. 141, pp. 74–83, 2017.
- [25] J. Yan, H. Liu, **W. Pu**, B. Jiu, Z. Liu, and Z. Bao, "Benefit analysis of data fusion for target tracking in multiple radar system", *IEEE Sensors Journal*, vol. 16, no. 16, pp. 6359–6366, 2016.
- [26] J. Yan, H. Liu, **W. Pu**, S. Zhou, Z. Liu, and Z. Bao, "Joint beam selection and power allocation for multiple target tracking in netted colocated mimo radar system", *IEEE Transactions on Signal Processing*, vol. 64, no. 24, pp. 6417–6427, 2016.

- [27] J. Yan, H. Liu, **W. Pu**, and Z. Bao, "Decentralized 3-d target tracking in asynchronous 2-d radar network: Algorithm and performance evaluation", *IEEE Sensors Journal*, vol. 17, no. 3, pp. 823–833, 2016.

Conference Papers.....

- [28] Y. Fan, B. Jiu, **W. Pu**, K. Li, Y. Zhang, and H. Liu, "An inverse reinforcement learning method to infer reward function of intelligent jammer", in *2023 IEEE International Radar Conference (RADAR)*, IEEE, 2023, pp. 1–4.
- [29] C. Wang, B. Jiu, **W. Pu**, K. Li, Y. Zhao, and H. Liu, "Anti-jamming equilibrium strategy learning of frequency agile radar based on monte carlo tree search", in *2023 IEEE International Radar Conference (RADAR)*, IEEE, 2023, pp. 1–6.
- [30] K. Li, **W. Pu**, and Z.-Q. Luo, "An exploration-estimation beamforming scheme for 5gnr fdd massive mimo communications", in *2023 IEEE 24th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, IEEE, 2023, pp. 146–150.
- [31] J. Liu, H. Liu, **W. Pu**, R. Zhou, M.-Y. You, and Q. Shi, "Weak signal detection based on beta divergence", in *2023 IEEE 24th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, IEEE, 2023, pp. 461–465.
- [32] L. Zhou, **W. Pu**, M.-Y. You, R. Zhang, and Q. Shi, "Joint optimization of uav deployment and directional antenna orientation for multi-uav cooperative sensing", in *2023 IEEE Wireless Communications and Networking Conference (WCNC)*, IEEE, 2023, pp. 1–5.
- [33] H. Li, Z. Han, **W. Pu***, L. Liu, K. Li, and B. Jiu, "Counterfactual regret minimization for anti-jamming game of frequency agile radar", in *2022 IEEE 12th Sensor Array and Multichannel Signal Processing Workshop (SAM)*, IEEE, 2022, pp. 111–115.
- [34] J. Dai, X. Mo, **W. Pu**, J. Yan, P. Wang, and H. Liu, "Resource allocation for multiple target tracking in active and passive radar network", in *2021 CIE International Conference on Radar (Radar)*, IEEE, 2021, pp. 2564–2568.
- [35] Y. Fan, B. Jiu, **W. Pu**, K. Li, H. Li, and H. Liu, "A probabilistic jamming strategy model for frequency agility radar anti-jamming problem", in *2021 CIE International Conference on Radar (Radar)*, IEEE, 2021, pp. 1131–1135.
- [36] **W. Pu**, S. Ibrahim, X. Fu, and M. Hong, "Fiber-sampled stochastic mirror descent for tensor decomposition with β -divergence", in *ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2021, pp. 2925–2929.
- [37] B. Song, H. Sun, **W. Pu**, S. Liu, and M. Hong, "To supervise or not to supervise: How to effectively learn wireless interference management models?", in *2021 IEEE 22nd International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, IEEE, 2021, pp. 211–215.
- [38] H. Sun, **W. Pu**, M. Zhu, X. Fu, T.-H. Chang, and M. Hong, "Learning to continuously optimize wireless resource in episodically dynamic environment", in *ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2021, pp. 4945–4949.
- [39] T. Cao, **W. Pu**, P. Zhang, and Z.-Q. Luo, "Beam pattern synthesis for conformal array with sidelobe and polarization control: A penalized inequality approach", in *2020 IEEE 11th Sensor Array and Multichannel Signal Processing Workshop (SAM)*, IEEE, 2020, pp. 1–5.
- [40] **W. Pu**, P. Zan, J. Xiao, T. Zhang, and Z.-Q. Luo, "Evaluation of joint auditory attention decoding and adaptive binaural beamforming approach for hearing devices with attention switching", in *ICASSP 2020-2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2020, pp. 8728–8732.
- [41] **W. Pu**, J. Xiao, T. Zhang, and Z.-Q. Luo, "A joint auditory attention decoding and adaptive binaural beamforming algorithm for hearing devices", in *ICASSP 2019-2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2019, pp. 311–315.
- [42] Z. Lin, **W. Pu**, and Z.-Q. Luo, "Minimax design of constant modulus mimo waveforms", in *2018 52nd Asilomar Conference on Signals, Systems, and Computers*, IEEE, 2018, pp. 1889–1893.
- [43] S. Jiang, **W. Pu**, and Z.-Q. Luo, "Optimal asynchronous multi-sensor registration in 3 dimensions", in *2018 IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, IEEE, 2018, pp. 81–85.
- [44] **W. Pu**, Y. Yu, S. Yu, and Z.-Q. Luo, "An alternating minimization approach to optimizing subarray configuration for a large phased array", in *2018 IEEE 10th Sensor Array and Multichannel Signal Processing Workshop (SAM)*, IEEE, 2018, pp. 361–365.

- [45] J. Xiao, **W. Pu**, Z.-Q. Luo, and T. Zhang, "Evaluation of the penalized inequality constrained minimum variance beamformer for hearing aids", in *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2018, pp. 3344–3348.
- [46] E. Hadad, D. Marquardt, **W. Pu**, *et al.*, "Comparison of two binaural beamforming approaches for hearing aids", in *2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2017, pp. 236–240.
- [47] **W. Pu**, J. Xiao, T. Zhang, and Z.-Q. Luo, "A penalized inequality-constrained minimum variance beamformer with applications in hearing aids", in *2017 IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, IEEE, 2017, pp. 175–179.
- [48] J. Yan, **W. Pu**, H. Liu, and Z. Bao, "Joint power and bandwidth allocation for centralized target tracking in multiple radar system", in *2016 CIE International Conference on Radar (RADAR)*, IEEE, 2016, pp. 1–5.

Patents.....

- [49] **W. Pu**, J. Xiao, T. Zhang, and Z. Luo, *Beam former, beam forming method and hearing aid system*, US Patent 11,019,433, May 2021.
- [50] **W. Pu**, J. Xiao, and T. Zhang, *EEG-assisted beamformer, beamforming method and ear-worn hearing system*, US Patent 11,617,043, Mar. 2023.