ZHIYANG WANG

CONTACT

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RESEARCH INTERESTS

My research is focused on the analysis of geometric graph signal processing in the limit with manifold filters and neural networks. This helps understand the properties of large graph learning architectures. I explore the applications on wireless networks, robotics as well as point cloud analysis.

EDUCATION

University of Pennsylvania *2019-Present*
Ph.D. candidate in Electrical and Systems Engineering Advisor: Prof. Alejandro Ribeiro
The Dean's Fellowship recipient
The Bruce Ford Memorial Fellowship recipent

Pennsylvania State University *Jul. 2018 - Dec. 2018*
Visiting Scholar in Electrical Engineering Advisor: Prof. Jing Yang

University of Science and Technology of China *2012-2019*
Master in Electrical Engineering Advisor: Prof. Cong Shen
Bachelor in Electrical Engineering Advisor: Prof. Cong Shen

PULICATIONS

Journal:

Z. Wang, J. Cerviño and A. Ribeiro, "Generalization of Geometric Graph Neural Networks," submitted to IEEE Transactions on Signal Processing.

Z. Wang, L. Ruiz and A. Ribeiro, "Geometric Graph Filters and Neural Networks: Limit Properties and Discriminability Trade-offs," in IEEE Transactions on Signal Processing, vol. 72, pp. 2244-2259, 2024.

C. Battiloro, **Z. Wang**, H. Riess, P. Di Lorenzo and A. Ribeiro, "Tangent Bundle Convolutional Learning: from Manifolds to Cellular Sheaves and Back", in IEEE Transactions on Signal Processing, vol. 72, pp. 1892-1909, 2024.

Z. Wang, L. Ruiz and A. Ribeiro, "Stability to Deformations of Manifold Filters and Manifold Neural Networks ", in IEEE Transactions on Signal Processing, vol. 72, pp. 2130-2146, 2024.

A. Parada-Mayorga, **Z. Wang**, F. Gama and A. Ribeiro, "Stability of Aggregation Graph Neural Networks", in IEEE Transactions on Signal and Information Processing over Networks, vol. 9, pp. 850-864, 2023.

A. Parada-Mayorga, **Z. Wang** and A. Ribeiro, "Graphon Pooling for Reducing Dimensionality of Signals and Convolutional Operators on Graphs", in IEEE Transactions on Signal Processing, vol. 71, pp. 3577-3591, 2023.

Z. Wang, M. Eisen and A. Ribeiro, "Learning Decentralized Wireless Resource Allocations with Graph Neural Networks", IEEE Transactions on Signal Processing 70 (2022): 1850-1863.

Z. Wang, R. Zhou, and C. Shen, "Regional Multi-Armed Bandits with Partial Informativeness", IEEE

Transactions on Signal Processing, Volume: 66, Issue: 21, Page(s): 5705-5717, Nov. 2018

Z. Wang and C. Shen, "Small Cell Transmit Power Assignment Based on Correlated Bandit Learning", IEEE Journal on Selected Areas in Communications, Vol. 35, No. 5, Page(s): 1030-1045, May 2017.

Conference:

Z. Wang, L. Ruiz and A. Ribeiro, "Convergence of Graph Neural Networks on Relatively Sparse Graphs", In 2023 57th Asilomar Conference on Signals, Systems, and Computers (pp. 566-572). IEEE.

C. Battiloro, **Z. Wang**, H. Riess, P. Di Lorenzo and A. Ribeiro, "Tangent Bundle Filters and Neural Networks: from Manifolds to Cellular Sheaves and Back", In ICASSP 2023-2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (pp. 1-5). IEEE.

Z. Wang, L. Ruiz and A. Ribeiro, "Convolutional Filtering on Sampled Manifolds", In ICASSP 2023-2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (pp. 1-5).

Z. Wang, L. Ruiz and A. Ribeiro, "Convolutional Neural Networks on Manifolds: From Graphs and Back", in 2022 56th Asilomar Conference on Signals, Systems, and Computers. IEEE, 2022, pp.356–360.

Z. Wang, L. Ruiz and A. Ribeiro,"Convolutional neural networks on manifolds: From graphs and back," in NeurIPS 2022 Workshop: New Frontiers in Graph Learning.

Z. Wang, L. Ruiz and A. Ribeiro, "Stability of Neural Networks on Manifolds to Relative Perturbations", In ICASSP 2022-2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (pp. 5473-5477). IEEE.

Z. Wang, L. Ruiz, M. Eisen and A. Ribeiro, "Stable and Transferable Wireless Resource Allocation Policies via Manifold Neural Networks", In ICASSP 2022-2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (pp. 8912-8916). IEEE.

Z. Wang, L. Ruiz and A. Ribeiro, "Stability of Neural Networks on Riemannian Manifolds", , In 2021 29th European Signal Processing Conference (EUSIPCO) (pp. 1845-1849). IEEE. **Best Student Paper Award**

Z. Wang, M. Eisen and A. Ribeiro, "Unsupervised Learning for Asynchronous Resource Allocation in Ad-hoc Wireless Networks", In ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 8143-8147. IEEE, 2021.

L. Ruiz, **Z. Wang** and A. Ribeiro, "Graph and Graphon Neural Network Stability", In ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), IEEE, 2021.

Z. Wang, M. Eisen and A. Ribeiro, "Decentralized Wireless Resource Allocation with Graph Neural Networks", In 2020 54th Asilomar Conference on Signals, Systems, and Computers, pp. 299-303. IEEE, 2020.

C. Shen, **Z. Wang**, S. S Villar and M. van der Schaar, "Learning for Dose Allocation in Adaptive Clinical Trials with Safety Constraints", In International Conference on Machine Learning, pp. 8730-8740. PMLR, 2020.

Z. Wang, Z. Ying, and C. Shen, "Opportunistic Spectrum Access via Good Arm Identification", IEEE GlobalSIP 2018, Anaheim, California, USA, Nov. 2018.

Z. Wang and C. Shen,"Small Cell Power Assignment with Unimodal Continuum-armed Bandits", 2018 IEEE International Conference on Communications Workshops on 5G-UDN.

Z. Wang, R. Zhou, and C. Shen, "Regional Multi-Armed Bandits", Proceedings of the Twenty-First International Conference on Artificial Intelligence and Statistics (AISTATS), PMLR 84:510-518, Playa Blanca, Lanzarote, Canary Islands, April 9-11, 2018.

Z. Wang, C. Shen, X. Luo, M. van der Schaar, "Learn to Adapt: Self-Optimizing Small Cell Transmit Power with Correlated Bandit Learning", IEEE International Conference on Communications (ICC), 2017.

WORK EXPERIENCE

Mitsubishi Electric Research Laboratories *Jun 2023 - Aug 2023*
Research Intern

TEACHING EXPERIENCE

University of Pennsylvania
Teaching Assistant
ESE 514, Graph Neural Networks *Fall 2021*
ESE 680-003, Graph Neural Networks *Fall 2020*
ESE 224, Signal and Information Processing *Spring 2021*

University of Science and Technology of China
Teaching Assistant
C programming *Spring 2015*
MIMO wireless communications course *Fall 2017*

AWARDS AND RECOGNITIONS

EECS Rising Stars Nov. 2023
2023 Rising Stars in EECS Workshop at Georgia Tech

Rising Star Program in Signal Processing at ICASSP 2023 Jun. 2023
Awarded by ICASSP 2023

EUSIPCO Best Student Paper Award Sep. 2021
Awarded by EURASIP to 3 student finalists at the paper competition Q&A

The Bruce Ford Memorial Fellowship 2019
Excellence fellowship granted by the University of Pennsylvania in addition to The Dean's Fellowship

National Award for Graduates Sep. 2017
Granted by China's Ministry of Education to graduate students with excellent academic performance.

IEEE ICC student Travel Grant 2017
Awarded by IEEE to cover for travel expenses.

The First Prize in Graduate Academic Scholarship: USTC 2016-2019

Excellent Award: The Undergraduate Research Program in USTC Oct.2015

First prize of Contemporary Undergraduate Mathematical Contest in Modeling, Anhui Division Sep. 2015

Outstanding Student Scholarship: USTC 2013-2015

Outstanding Volunteer of the Chinese Young Volunteers Association 2013

SKILLS

Programming: Python, Pytorch, C, JAVA, MATLAB, Origin
Documentation: MS Office, LaTex

PROFESSIONAL MEMBERSHIPS

IEEE student membership 2017- Present
Graduate member

IEEE Signal Processing Society Membership 2019- Present
Student member

REVIEWER EXPERIENCE

Journal:
IEEE Transactions on Vehicular Technology
IEEE Transactions on Signal Processing
IEEE Journal on Selected Areas in Communications
IEEE Transactions on Wireless Communications
IEEE Sensors Journal
IEEE Internet of Things Journal
IEEE Access
SIAM Journal on Mathematics of Data Science
International Journal of Electrical and Computer Engineering Systems

Conference:
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2021-2024
Asilomar Conference on Signals, Systems, and Computers 2022,2023
IEEE International Workshop on Machine Learning for Signal Processing (MLSP) 2023
IEEE International Symposium on Information Theory 2024