

# Zhiyang Wang

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Philadelphia, PA, 19104, USA

## RESEARCH INTEREST

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Machine Learning, Graph Neural Networks, Graph Signal Processing, Geometric Deep Learning, Manifold Neural Networks, Wireless Communication Networks.

## EDUCATION

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- **University of Pennsylvania** 2019 - Present  
*Ph.D. in Electrical and Systems Engineering*  
◦ Advisor: Prof. Alejandro Ribeiro Philadelphia, USA
- **University of Science and Technology of China** 2016 - 2019  
*Master in Electrical Engineering*  
◦ Advisor: Prof. Cong Shen Hefei, China
- **University of Science and Technology of China** 2012 - 2016  
*Bachelor in Electrical Engineering*  
◦ Advisor: Prof. Cong Shen Hefei, China

## PUBLICATIONS

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### Preprints:

- [P.1] Z. Wang<sup>†</sup>, J. Cerviño<sup>†</sup>, and A. Ribeiro, "A Manifold Perspective on the Statistical Generalization of Graph Neural Networks," *arXiv*, arXiv:2406.05225, 2024.

### Journals:

- [J.9] Z. Wang, J. Cerviño, and A. Ribeiro, "Generalization of Geometric Graph Neural Networks," submitted to *IEEE Transactions on Signal Processing*.
- [J.8] Z. Wang, L. Ruiz, and A. Ribeiro, "Geometric Graph Filters and Neural Networks: Limit Properties and Discriminability Trade-offs," *IEEE Transactions on Signal Processing*, vol. 72, pp. 2244-2259, 2024.
- [J.7] C. Battiloro, Z. Wang, H. Riess, P. Di Lorenzo, and A. Ribeiro, "Tangent Bundle Convolutional Learning: from Manifolds to Cellular Sheaves and Back," *IEEE Transactions on Signal Processing*, vol. 72, pp. 1892-1909, 2024.
- [J.6] Z. Wang, L. Ruiz, and A. Ribeiro, "Stability to Deformations of Manifold Filters and Manifold Neural Networks," *IEEE Transactions on Signal Processing*, vol. 72, pp. 2130-2146, 2024.
- [J.5] A. Parada-Mayorga, Z. Wang, F. Gama, and A. Ribeiro, "Stability of Aggregation Graph Neural Networks," *IEEE Transactions on Signal and Information Processing over Networks*, vol. 9, pp. 850-864, 2023.
- [J.4] A. Parada-Mayorga, Z. Wang, and A. Ribeiro, "Graphon Pooling for Reducing Dimensionality of Signals and Convolutional Operators on Graphs," *IEEE Transactions on Signal Processing*, vol. 71, pp. 3577-3591, 2023.
- [J.3] Z. Wang, M. Eisen, and A. Ribeiro, "Learning Decentralized Wireless Resource Allocations with Graph Neural Networks," *IEEE Transactions on Signal Processing*, vol. 70, pp. 1850-1863, 2022.
- [J.2] Z. Wang, R. Zhou, and C. Shen, "Regional Multi-Armed Bandits with Partial Informativeness," *IEEE Transactions on Signal Processing*, vol. 66, pp. 5705-5717, 2018.
- [J.1] Z. Wang and C. Shen, "Small Cell Transmit Power Assignment Based on Correlated Bandit Learning," *IEEE Journal on Selected Areas in Communications*, vol. 35, pp. 1030-1045, 2017.

### Machine Learning Conferences:

- [MC.3] **Z. Wang**, L. Ruiz, and A. Ribeiro, "Convolutional neural networks on manifolds: From graphs and back," *Conference on Neural Information Processing Systems (NeurIPS)*, Workshop: New Frontiers in Graph Learning, 2022.
- [MC.2] C. Shen, **Z. Wang**, S. S Villar, and M. van der Schaar, "Learning for Dose Allocation in Adaptive Clinical Trials with Safety Constraints," *International Conference on Machine Learning (ICML)*, 2020.
- [MC.1] **Z. Wang**, R. Zhou, and C. Shen, "Regional Multi-Armed Bandits," *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2018.

### Signal Processing and Communications Conferences:

- [C.13] **Z. Wang**, L. Ruiz, and A. Ribeiro, "Convergence of Graph Neural Networks on Relatively Sparse Graphs," *Asilomar Conference on Signals, Systems, and Computers*, 2023.
- [C.12] 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," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2023.
- [C.11] **Z. Wang**, L. Ruiz, and A. Ribeiro, "Convolutional Filtering on Sampled Manifolds," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2023.
- [C.10] **Z. Wang**, L. Ruiz, and A. Ribeiro, "Convolutional Neural Networks on Manifolds: From Graphs and Back," *Asilomar Conference on Signals, Systems, and Computers*, 2022.
- [C.9] **Z. Wang**, L. Ruiz, and A. Ribeiro, "Stability of Neural Networks on Manifolds to Relative Perturbations," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2022.
- [C.8] **Z. Wang**, L. Ruiz, M. Eisen, and A. Ribeiro, "Stable and Transferable Wireless Resource Allocation Policies via Manifold Neural Networks," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2022.
- [C.7] **Z. Wang**, L. Ruiz, and A. Ribeiro, "Stability of Neural Networks on Riemannian Manifolds," *European Signal Processing Conference (EUSIPCO)*, 2021. **Best Student Paper Award.**
- [C.6] **Z. Wang**, M. Eisen, and A. Ribeiro, "Unsupervised Learning for Asynchronous Resource Allocation in Ad-hoc Wireless Networks," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2021.
- [C.5] L. Ruiz, **Z. Wang**, and A. Ribeiro, "Graph and Graphon Neural Network Stability," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2021.
- [C.4] **Z. Wang**, M. Eisen, and A. Ribeiro, "Decentralized Wireless Resource Allocation with Graph Neural Networks," *Asilomar Conference on Signals, Systems, and Computers*, 2020.
- [C.3] **Z. Wang**, Z. Ying, and C. Shen, "Opportunistic Spectrum Access via Good Arm Identification," *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, 2018.
- [C.2] **Z. Wang** and C. Shen, "Small Cell Power Assignment with Unimodal Continuum-armed Bandits," *IEEE International Conference on Communications (ICC)*, Workshop: 5G-UDN, 2018.
- [C.1] **Z. Wang**, C. Shen, X. Luo, and 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

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- **Mitsubishi Electric Research Laboratories** June 2023 - August 2023  
*Research Intern* Onsite  
 ◦ Host: Dr. Jianlin Guo
  - **Pennsylvania State University** July 2018 - December 2018  
*Visiting Scholar* Onsite  
 ◦ Host: Prof. Jing Yang

## HONORS AND AWARDS

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- **EECS Rising Stars** November 2023  
*2023 Rising Stars in EECS Workshop at Georgia Tech*
- **Rising Star Program in Signal Processing** June 2023  
*Awarded by International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*
- **EUSIPCO Best Student Paper Award** September 2021  
*Awarded by European Association For Signal Processing to 3 student finalists at the paper competition Q&A*
- **Bruce Ford Memorial Fellowship** August 2019  
*Awarded by the University of Pennsylvania in recognition of impressive achievements*
- **The Dean's Fellowship** August 2019  
*Award by the University of Pennsylvania ESE Department in recognition of exceptional performance*
- **National Award for Graduates** September 2017  
*Granted by Ministry of Education of China to graduate students with excellent academic performance*
- **IEEE ICC Student Travel Grant** 2017  
*Awarded by IEEE International Conference on Communications (ICC)*
- **First Prize in Graduate Academic Scholarship** 2016 - 2019  
*Awarded by the University of Science and Technology of China*
- **Excellent Award in the Undergraduate Research Program** October 2015  
*Awarded by the University of Science and Technology of China*
- **First Prize in Contemporary Undergraduate Mathematical Contest in Modeling, Anhui Division** September 2015  
*Awarded by China Society for Industrial and Applied Mathematics*
- **Outstanding Student Scholarship** 2013 - 2015  
*Awarded by the University of Science and Technology of China*
- **Outstanding Volunteer of the China Young Volunteers Association** 2013  
*Awarded by China Young Volunteers Association*

## PRESENTATIONS

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### Talks:

- **Manifold Filters and Neural Networks: Geometric Graph Signal Processing in the Limit** April 2024  
*University of Pennsylvania ESE PhD Colloquium*
- **Convergence of Graph Neural Networks on Relatively Sparse Graphs** October 2023  
*Asilomar Conference on Signals, Systems, and Computers*
- **THEORINET Critique Retreat** September 2022  
*Flatiron Institute*
- **Learning Decentralized Wireless Resource Allocations with Graph Neural Networks** May 2022  
*University of Pennsylvania ESE PhD Colloquium*
- **Decentralized Wireless Resource Allocation with Graph Neural Networks** May 2020  
*Intel WAS ISTC Review Meeting*
- **Opportunistic Spectrum Access via Good Arm Identification** November 2018  
*IEEE Global Conference on Signal and Information Processing*
- **Learn to Adapt: Self-Optimizing Small Cell Transmit Power with Correlated Bandit Learning** May 2017  
*IEEE International Conference on Communications*

### Posters:

- **Manifold Filters and Neural Networks: Geometric Graph Signal Processing in the Limit** June 2023  
*Rising Stars in Signal Processing Program at ICASSP*
- **Convolutional Filtering on Sampled Manifolds** June 2023  
*International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*
- **Convolutional neural networks on manifolds: From graphs and back** December 2022  
*NeurIPS Workshop: New Frontiers in Graph Learning*
- **Convolutional Neural Networks on Manifolds: From Graphs and Back** October 2022  
*Asilomar Conference on Signals, Systems, and Computers*

## TEACHING EXPERIENCE

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- **Teaching Assistant for ESE 514 Graph Neural Networks** Fall 2021  
*University of Pennsylvania*
- **Teaching Assistant for ESE 224 Signal and Information Processing** Spring 2021  
*University of Pennsylvania*
- **Teaching Assistant for ESE 680 Graph Neural Networks** Fall 2020  
*University of Pennsylvania*
- **Teaching Assistant for MIMO Wireless Communications** Fall 2017  
*University of Science and Technology of China*
- **Teaching Assistant for C Programming** Spring 2015  
*University of Science and Technology of China*
- **Mentor** May 2024 - Present  
*Graduate: Romina Garcia*
- **Mentor** June 2020 - August 2020  
*Undergraduate: Martin Alijaj*

## PROFESSIONAL SERVICE

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### Reviewer:

- **IEEE Journal on Selected Areas in Communications** 2024
- **IEEE Internet of Things Journal** 2024
- **IEEE Access** 2024
- **SIAM Journal on Mathematics of Data Science** 2024
- **IEEE Transactions on Signal Processing** 2023 - 2024
- **IEEE Transactions on Vehicular Technology** 2021, 2024
- **IEEE Transactions on Wireless Communications** 2023
- **IEEE Sensors Journal** 2023
- **International Journal of Electrical and Computer Engineering Systems** 2023
- **IEEE International Symposium on Information Theory** 2024
- **IEEE International Workshop on Machine Learning for Signal Processing (MLSP)** 2023 - 2024
- **Asilomar Conference on Signals, Systems, and Computers** 2022 - 2024
- **IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)** 2021 - 2024

## PROFESSIONAL SKILLS

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- **Programming Languages:** Python, C++, C, MATLAB
- **Machine Learning Libraries:** scikit-learn, PyTorch, TensorFlow
- **Natural Languages:** English, Mandarin

## PROFESSIONAL MEMBERSHIPS

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- **INFORMS Membership** 2024 - Present
- **IEEE Signal Processing Society Student Membership** 2019 - Present
- **IEEE Student Membership** 2017 - Present

## REFERENCES

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Available upon request.