

Zhiyang Wang

Homepage: zhiyangwang.net | Email: zhiyangw@seas.upenn.edu
Philadelphia, PA, 19104, USA

EDUCATION

- **University of Pennsylvania** *Philadelphia, USA*
Ph.D. in Electrical and Systems Engineering 2019 - Present
 - Advisor: Prof. Alejandro Ribeiro
 - Thesis: Manifold Filters and Neural Networks: Geometric Graph Signal Processing in the Limit
 - Committee: Prof. George Pappas (Chair), Prof. René Vidal, Prof. Mikhail Belkin, Prof. Tara Javidi
- **University of Science and Technology of China** *Hefei, China*
Master in Electrical Engineering 2016 - 2019
 - Advisor: Prof. Cong Shen
 - Thesis: Small Cell Resource Allocation with Multi-Armed Bandit Theory
- **University of Science and Technology of China** *Hefei, China*
Bachelor in Electrical Engineering 2012 - 2016
 - Advisor: Prof. Cong Shen

RESEARCH INTEREST

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

HONORS AND AWARDS

- **Rising Stars in Data Science** *November 2024*
2024 Rising Stars in Data Science Workshop at University of California San Diego
- **Finalist for Asilomar 2024 Best Student Paper Award** *October 2024*
10 out of 150 were selected for the Best Student Paper Competition at Asilomar
- **EECS Rising Stars** *November 2023*
2023 Rising Stars in EECS Workshop at Georgia Institute of Technology
- **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

Preprints:

- [P.2] **Z. Wang**, J. Cerviño, and A. Ribeiro, "Generalization of Graph Neural Networks is Robust to Model Mismatch," *arXiv*, arxiv:2408.13878, 2024.
- [P.1] **Z. Wang**[†], J. Cerviño[†], and A. Ribeiro, "A Manifold Perspective on the Statistical Generalization of Graph Neural Networks," *arXiv*, arXiv:2406.05225, 2024. [[arXiv](#)]

Journals:

- [J.9] **Z. Wang**, J. Cerviño, and A. Ribeiro, "Generalization of Geometric Graph Neural Networks," submitted to *IEEE Transactions on Signal Processing*, 2024.
- [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. [[pdf](#)]
- [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. [[pdf](#)]
- [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. [[pdf](#)]
- [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 Conference Proceedings:

- [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 Conference Proceedings:

- [C.16] C. F. Deberaldini Netto, **Z. Wang**, and L. Ruiz, "Improved Image Classification with Manifold Neural Networks," submitted to *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2025.
- [C.15] **Z. Wang**, J. Cerviño, and A. Ribeiro, "Generalization of Geometric Graph Neural Networks," *Asilomar Conference on Signals, Systems, and Computers*, 2024. **Finalist for Best Student Paper Award.**
- [C.14] **Z. Wang**, Jianlin Guo, Kieran Parsons, Yukimasa Nagai, Takenori Sumi, and Philip Orlik, "Learning Based Routing Link Scheduling in Heterogeneous Wireless IoT Networks," *IEEE International Conference on Communications Workshops*, 2024.
- [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.** [[pdf](#)]
- [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.

PRESENTATIONS

Talks:

- **Manifold Filters and Neural Networks: Geometric Graph Signal Processing in the Limit** *November 2024*
Rising Stars in Data Science
- **Generalization of Geometric Graph Neural Networks** *October 2024*
Asilomar Conference on Signals, Systems, and Computers
- **Manifold Filters and Neural Networks: Geometric Graph Signal Processing in the Limit** *October 2024*
2024 INFORMS Annual Meeting
- **Manifold Filters and Neural Networks: Geometric Graph Signal Processing in the Limit** *September 2024*
Johns Hopkins University Jr. MINDS Seminar
- **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** November 2024
Rising Stars in Data Science
- **Generalization of Geometric Graph Neural Networks** October 2024
Asilomar Conference on Signals, Systems, and Computers
- **Manifold Filters and Neural Networks: Geometric Graph Signal Processing in the Limit** October 2024
IPAM workshop II: Theory and Practice of Deep Learning
- **Manifold Filters and Neural Networks: Geometric Graph Signal Processing in the Limit** September 2024
Simons Collaboration on Mathematical and Scientific Foundations of Deep Learning Annual Meeting
- **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 AND MENTORING EXPERIENCE

- **Mentor for Graduate Student Javier Porras Valenzuela** September 2024 - Present
University of Pennsylvania
- **Mentor for Graduate Student Romina Garcia** May 2024 - Present
University of Pennsylvania
- **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
- **Mentor for Undergraduate Student Martin Alijaj** June 2020 - August 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

GRANT WRITING EXPERIENCE

- **NSF-SNSF: Generative Graph Models at Scale: Discrete Diffusion, Transferability and Requirements** 2024
Responsible for the section on graph representation learning and learning by transference Status: Granted
Intended award amount: \$450,000.00

WORK EXPERIENCE

- **Mitsubishi Electric Research Laboratories** Boston, USA
Research Intern June 2023 - August 2023
 - Host: Dr. Jianlin Guo
 - Project: Worked on IoT network route scheduling using heterogeneous GNNs
- **Pennsylvania State University** University Park, USA
Visiting Scholar July 2018 - December 2018
 - Host: Prof. Jing Yang
 - Project: Worked on algorithms for constraint bandit models and analyzed their performance

PROFESSIONAL SERVICE

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 Wireless Communications Letters 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 - 2025

PROFESSIONAL SKILLS

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

PROFESSIONAL MEMBERSHIPS

- Institute for Operations Research and the Management Sciences (INFORMS) 2024 - Present
- IEEE Signal Processing Society 2019 - Present
- Institute of Electrical and Electronics Engineers (IEEE) 2017 - Present

REFERENCES

Available upon request.