

Zhengchao Wan

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Education

The Ohio State University

Ph.D. in Mathematics

Advisor: Facundo Mémoli

Columbus, OH, USA

2016-2021

Peking University

B.S. in Mathematics

Advisor: Bin Dong

Beijing, China

2012-2016

Employment

University of California San Diego

Postdoctoral Scholar

Mentors: Gal Mishne, Yusu Wang

La Jolla, CA, USA

2022-Present

Research Interests

Metric geometry, optimal transport, spectral geometry, topological data analysis

Publications

Papers in Journals and Peer-Refereed Conferences.....

Samantha Chen, Sunhyuk Lim, Facundo Mémoli, Zhengchao Wan, and Yusu Wang. Weisfeiler-Lehman meets Gromov-Wasserstein. In *International Conference on Machine Learning (ICML)*, pages 3371–3416. PMLR, 2022.

Facundo Mémoli, Zhengchao Wan, and Yusu Wang. Persistent laplacians: Properties, algorithms and implications. *SIAM Journal on Mathematics of Data Science*, 4(2):858–884, 2022.

Facundo Mémoli and Zhengchao Wan. On p -metric spaces and the p -Gromov-Hausdorff distance. *p-Adic Numbers, Ultrametric Analysis and Applications*, 14(3):173–223, 2022.

Zhengchao Wan. A novel construction of Urysohn universal ultrametric space via the Gromov-Hausdorff ultrametric. *Topology and its Applications*, 300:107759, 2021.

Facundo Mémoli, Zane Smith, and Zhengchao Wan. The Wasserstein transform. In *International Conference on Machine Learning (ICML)*, pages 4496–4504. PMLR, 2019.

Preprints.....

Sunhyuk Lim, Facundo Mémoli, Zhengchao Wan, Qingsong Wang, and Ling Zhou. Some results about the Tight Span of spheres. *arXiv preprint arXiv:2112.12646*, 2021.

Facundo Mémoli, Axel Munk, Zhengchao Wan, and Christoph Weitkamp. The ultrametric Gromov-Wasserstein distance. *arXiv preprint arXiv:2101.05756*, 2021.

Facundo Mémoli, Zane Smith, and Zhengchao Wan. The Gromov-Hausdorff distance between ultrametric spaces: its structure and computation. *arXiv preprint arXiv:2110.03136*, 2021.

Facundo Mémoli and Zhengchao Wan. Characterization of Gromov-type geodesics. *arXiv preprint arXiv:2105.05369*, 2021.

Kun Jin, Facundo Mémoli, and Zhengchao Wan. The Gaussian transform. *arXiv preprint arXiv:2006.11698*, 2020.

Computational Software / Expository Webpages

Persistent Laplacian (with F. Mémoli and Y. Wang)

<https://github.com/ndag/Persistent-Laplacian>

Gromov-Hausdorff distances between ultrametric spaces (with F. Mémoli and Z. Smith)

<https://github.com/ndag/ultrametrics>

The ultrametric Gromov-Wasserstein distances (with F. Mémoli, A. Munk and C. Weitkamp)

<https://github.com/ndag/uGW>

Talks

Topology, Geometry and Data Analysis seminar at Ohio State Oct. 2021

The Gromov-Hausdorff distance between ultrametric spaces

Geometry and Topology meet Data Analysis and Machine Learning (GTDAML 2021) July 2021

Persistent Laplacians: properties, algorithms and implications

Seminar at Centre for Topological Data Analysis, Oxford University May 2021

Persistent Laplacians: properties, algorithms and implications

Algebraic Topology: Methods, Computation, and Science (hosted by AATRN) Jan. 2021

Computing the Gromov-Hausdorff distance between ultrametric spaces

Topology, Geometry, and Applications - Graduate Students Seminar at Ohio State Oct. 2020

Urysohn universal ultrametric space

Geometry, Topology and Data Seminar, Florida State University Nov. 2019

The Wasserstein transform

Topology, Geometry, and Applications - Graduate Students Seminar at Ohio State Sep. 2019

Gromov-Hausdorff distance between ultrametric spaces

Air Force Research Lab in Dayton, Ohio July 2019

The Wasserstein transform

Talks in Mémoli's group seminars

Multiple talks on topics including differential geometry, metric geometry, etc

Poster Presentations

International Conference on Machine Learning, ICML 2019 June 2019

The Wasserstein transform

GTDAML2019, the Ohio State University May 2019

The Wasserstein transform

Geometric Data Analysis, University of Chicago May 2019

The Wasserstein transform

Honors and Awards

Special Graduate Assignments, the Ohio State University Spring 2020

Travel Award, ICML2019 June 2019

Alumina Yizheng Distinguished Scholar Award, Peking University

Oct. 2014

Jiang Zehan Scholarship, Peking University

Sep. 2013

Teaching Experiences

MATH 1172, the Ohio State University

Spring 2021

Engineering Mathematics A

MATH 1172, the Ohio State University

Autumn 2018

Engineering Mathematics A

Mini-Course, Peking University

Summer 2016

Information Geometry

Professional Services

Organization of activities.....

Midwest Student Conference GTDAML2019, the Ohio State University

June 2019

Co-organizer

Referee.....

Journals

Analysis and Geometry in Metric Spaces

Computational Geometry: Theory and Applications

Journal of Combinatorial Optimization

SIAM Journal on Applied Algebra and Geometry

Conferences

Symposium on Computational Geometry (2021, 2022)

ACM-SIAM Symposium on Discrete Algorithms (2019, 2022)

Conference on the Mathematical Theory of Deep Neural Networks (2022)