

# Zhengchao Wan

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## Education

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### 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

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### University of California San Diego

*Postdoctoral Scholar*

Mentors: Gal Mishne, Yusu Wang

La Jolla, CA, USA

2022-Present

## Research Interests

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

## Publications

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### 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)*, To appear, 2022.

Facundo Mémoli, Zhengchao Wan, and Yusu Wang. Persistent Laplacians: properties, algorithms and implications. *SIAM Journal on Mathematics of Data Science*, To appear, 2022.

Facundo Mémoli and Zhengchao Wan. On  $p$ -metric spaces and the  $p$ -Gromov-Hausdorff distance.  *$p$ -Adic Numbers, Ultrametric Analysis, and Applications*, To appear, 2021.

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 Memoli, 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

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**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

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**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

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**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

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**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

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**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

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### 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

SOCG

SODA