

Ling Zhou

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Research Interests

Applied algebraic topology, computational geometry, topological data analysis

Education

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|-----------------|---|
| 2017-9 - Now | Ph.D. in Mathematics, at <i>The Ohio State University, Columbus, Ohio USA</i> |
| 2015-9 - 2017-7 | M.Phil. in Mathematics, at <i>Hong Kong University of Science and Technology, Hong Kong</i> |
| 2010-9 - 2015-7 | B.S. in Mathematics and Applied Mathematics, at <i>Sichuan University, Chengdu, Sichuan China</i> |

Publications

- Contessoto, M., Mémoli, F., Stefanou, A. & **Zhou, L.** (2022). [Persistent Cup-Length](#), In X. Goaoc and M. Kerber, editors, *38th International Symposium on Computational Geometry (SoCG 2022)*, volume 224 of *Leibniz International Proceedings in Informatics (LIPIcs)*, pages 31:1–31:17, Dagstuhl, Germany, 2022. Schloss Dagstuhl – Leibniz-Zentrum für Informatik.
- Qin, T., **Zhou, L.**, & Xiu, D. (2020). [Reducing Parameter Space for Neural Network Training](#). *Theoretical and Applied Mechanics Letters*, 10(3), 170-181.
- Huang, J. S., & **Zhou, L.** (2019). [Generalized Fourier Transforms Associated with the Oscillator Representation](#). *Journal of Fourier Analysis and Applications*, 25(5), 2782-2800.

Preprints

- Mémoli, F., & **Zhou, L.** (2022). [Stability of Filtered Chain Complexes](#). *arXiv preprint arXiv:2208.11770*.
- Lim, S., Mémoli, F., Wan, Z., Wang, Q. & **Zhou, L.** (2021) [Some Results about the Tight Span of Spheres](#). *arXiv preprint arXiv:2112.12646*.
- Mémoli, F. & **Zhou, L.** (2019) [Persistent Homotopy Groups of Metric Spaces](#). *arXiv preprint arXiv:1912.12399*.

Talks

1. Persistent cup-length, at *Algebraic Topology and Topological Data Analysis: A Conference in Honor of Gunnar Carlsson* (Aug 2, 2022). [[Link](#), [Slides](#)]
2. Persistent cup-length, at *Women in Computational Topology at 2022 AWM Research Symposium* (Jun 19, 2022). [[Link](#)]
3. Persistent cup-length, at *The 38th International Symposium on Computational Geometry (SoCG 2022)* (Jun 9, 2022). [[Link](#)]
4. Persistent homotopy groups of metric spaces, at '*Homotopical aspects of TDA*' held by Center for Quantum and Topological Systems in New York University, Abu Dhabi (Jun 2, 2022).
5. Persistent cup-length, at *Computational Topology and Applications at the Spring Western AMS Sectional Meeting* (May 14-15, 2022). [[Link](#)]
6. Persistent homotopy groups of metric spaces, at *Bridging Applied and Quantitative Topology* (May 10, 2022). [[Link](#)]
7. Persistent homotopy groups of metric spaces, at *AATRN Vietoris-Rips Seminar* (Jan 21, 2022). [[Link](#), [YouTube](#)]
8. Persistent cup-length, at *University of Florida Topological Data Analysis conference* (Jan 20, 2022). [[Link](#)]
9. Other Persistence Invariants: homotopy and the cohomology ring, at *Topology Seminar at Florida State University* (Jan 18, 2022).
10. Short tutorial: the cup product operation. at *Tutorial-a-thon hosted by AATRN and WinCompTop* (Jan 3, 2022). [[Link](#), [Youtube](#)]
11. Persistent cup-length and its computation, at *OSU Topology, Geometry, and Applications - Graduate Student Seminar Group* (Dec 10, 2021). [[Link](#)]
12. Other Persistence Invariants: homotopy and the cohomology ring, at *Online workshop "Beyond TDA -- Persistent topology and its applications in data sciences"* (Aug 2021). [[Youtube](#)]
13. Persistent homotopy groups of metric spaces, at *TGDA talks co-hosted by AATRN* (Jan 2021). [[Link](#), [Youtube](#)]
14. Filtered chain complexes and verbose barcodes, at *OSU Topology, Geometry, and Applications - Graduate Student Seminar Group* (Nov 20, 2022). [[Link](#)]
15. Persistent homotopy groups of metric spaces, at *MBI Seminar Series* (Sep 2020). [[Link](#)]

I give talks regularly in the NDA group meeting, one to two talks per semester starting from 2018.

Other Research Projects/Experience

1. Steaming-Hot - Erdős Institute's Bootcamp [[GitHub](#)] | *Python: BeautifulSoup, Scikit-learn, Pandas, Matplotlib*, May 2021
Built models to classify, predict and do survival analysis of Steam games and user data
 - Scrapped monthly time series data over the past 10 years of 10k+games

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- Exploratory data analysis for 70k+ features of 57k+ games, using scatter matrix and histograms
 - Built a model to find similarity of the trends of different games, to provide advice for game developers
2. Are you Van Gogh's - Erdős Institute's Bootcamp [[GitHub](#)] | *Python: Ripser, Pandas*, May 2020
Built a model to determine if a painting is in Van Gogh's style or not.
 - Applied topological data analysis tool to study the brush strokes of the digitalization of the paintings
 3. Parameter Estimation of a Two-Parameter Ito Process, supervised by Xiao-Hu Wang, Department of Mathematics, Sichuan University, 2015
 4. Optimization of Urban Public Transport System in Chengdu, supervised by Bao-Feng Di, College of Architecture and Environment, Sichuan University, 2011

Academic Events

- 2023-3 Co-organizer of a [special session on Topological Persistence: Theory, Algorithms, and Applications at the Spring Southeastern AMS Sectional Meeting](#) at Georgia Institute of Technology, Atlanta
- 2020-1 - Organizer of the weekly group meetings of the research group [Network Data Analysis at OSU](#).
2022-8
- 2019.6 Co-organizer of the [First Midwest Graduate Student Conference: Geometry and Topology meet Data Analysis and Machine Learning](#).

Reviews

Subreviewer for SoCG 2022
Subreviewer for SoCG 2021

Teaching Experience

Teaching assistant for *Engineering Mathematics B (MATH2173)* at OSU, Fall 2022
Mentor for [Direct Reading Program at OSU](#), Spring 2022

- Guided an undergraduate to read about topological data analysis (TDA) and to code in Python to analyze football data using TDA tools

Teaching assistant for *Calculus II (MATH1172)* at OSU, Spring 2019
Teaching assistant for *Introduction to Lie Groups (MATH4151)* at HKUST, Spring 2017
Teaching assistant for *Real Analysis (MATH3033)* at HKUST, Fall 2016
Teaching assistant for *Calculus II (MATH1014)* at HKUST, Spring 2016

Selected Scholarships and Awards

Special Graduate Assignment, Spring 2020 & Spring 2023 (OSU)

Tibor Radó Graduate Fellowship, 2017-18 (OSU)
The 12th Epsilon Fund Award to Top Students, 2016-2017 (HKUST)
Din-Yu Hsieh Teaching Award, 2016-2017 (HKUST)
Scholarship of the Pilot Project for Fostering Top-Notch Students in Basic Science, 2013-2014
Outstanding Student Award 2011-12, 2012-13 (Sichuan University, top 10%)
First Class Comprehensive Scholarship 2010-11, 2011-12 (Sichuan University, top 2%)
National Endeavor Fellowship 2012-13, 2013-14 (top 5%)
National Scholarship 2010-11, 2011-12 (top 2%)