

XINYI (ELENA) WANG

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EDUCATION

Michigan State University

Ph.D. in Computational Mathematics, Science, and Engineering

Thesis: *Topological Data Analysis on Graphs*

East Lansing, MI

Expected May 2025

Advisor: Dr. Elizabeth Munch

College of the Holy Cross

B.A. in Mathematics and Music with High Honors, Cum Laude

Thesis: *Invariant Theory in Characteristic p*

Worcester, MA

May 2020

Advisor: Dr. John Little

RESEARCH EXPERIENCE

Research Interest: Topological Data Analysis, Computational Geometry, Machine Learning

Michigan State University

Graduate Research Assistant

East Lansing, MI

September 2020 – Present

ICERM at Brown University, Program on Math + Neuroscience

Long Term Visitor

Providence, RI

Fall 2023

Lawrence Berkeley National Laboratory

Ph.D. Intern; Mentor: Dr. Dmitriy Morozov

Berkeley, CA

March – August 2023

College of the Holy Cross

Undergraduate Researcher - Mathematics Honors Senior Thesis

Weiss Summer Research Student in the Science and Mathematics

Weiss Summer Research Student in the Humanities, Social Sciences, and Arts

Worcester, MA

September 2019 – May 2020

Summer 2017, 2018

Summer 2019

PUBLICATION

* indicates first authorship, † indicates undergraduate collaborators

- A. Hwang, **X. Wang**, “Clairaut Surfaces in Euclidean Three-Space,” In: *Tōhoku Math. J.*, **74** no. 2, 215–227, 2022.
- R. Liu, S. Canturk, F. Wenkel, S. McGuire, **X. Wang**, A. Little, L. O’Bray, M. Perlmuter, B. Rieck, M. Hirn, G. Wolf, L. Rampašek. “Taxonomy of Benchmarks in Graph Representation Learning,” In: *Proceedings of the First Learning on Graphs Conference*, volume 198 of *Proceedings of Machine Learning Research*, pages 6:1-6:25. PMLR, 09-12 Dec 2022.
- L. Baily, H. S. Blake, G. Cochran, N. Fox, M. Levet, R. Mahmoud, E. Matson, I. Singgih, G. Stadnyk, **X. Wang**, A. Wiedemann. “Complexity and Enumeration in Models of Genome Rearrangement,” In: *Computing and Combinatorics*, volume 14422, 3-14, 2024.
- E. W. Chambers, E. Munch, S. Percival, **X. Wang***. “A Distance for Geometric Graphs via the Labeled Merge Tree Interleaving Distance,” submitted, available on arXiv.
- N. Wiley†, **X. Wang**, E. Munch. “An Optimization of Euler Characteristic Transform Computation on Embedded Graphs,” *in preparation*.

CONFERENCES AND PRESENTATIONS

AATRN (<i>invited</i>) Computing the Bottleneck Distance from All Directions	Virtual <i>October 2024</i>
AMS 2024 Fall Eastern Sectional Meeting (<i>invited</i>) Computing the Bottleneck Distance from All Directions	Albany, NY <i>October 2024</i>
Spires Topology Conference (<i>poster</i>) Persistence-Informed Convolutional Neural Networks	Oxford, UK <i>August 2024</i>
Claremont Topology Seminar (<i>invited</i>) Topological Data Analysis on Embedded Graphs	Claremont, CA <i>April 2024</i>
Albion College Mathematics and Computer Science Colloquium (<i>invited</i>) Unraveling Hidden Patterns with Topological Data Analysis (TDA)	Albion, MI <i>March 2024</i>
National Museum of Mathematics (<i>invited</i>) Breaking limits and influencing the future: a panel discussion	Virtual <i>February 2024</i>
Joint Mathematics Meetings (<i>invited</i>) The Labeled Merge Tree Interleaving Distance and its Application	San Francisco, CA <i>January 2024</i>
Northeastern University Graduate Student Seminar (<i>invited</i>) The Labeled Merge Tree Interleaving Distance and its Application	Boston, MA <i>October 2023</i>
ICERM Topology and Geometry in Neuroscience Workshop Directed Labeled Merge Tree Distance for Geometric Graphs	Providence, RI <i>October 2023</i>
ICERM at Brown University Graduate Student Seminar Directed Labeled Merge Tree Distance for Geometric Graphs	Providence, RI <i>September 2023</i>
Computational Persistence The Labeled Merge Tree Interleaving Distance and its Application	West Lafayette, IN <i>September 2023</i>
TDA Week Directed Labeled Merge Tree Distance for Geometric Graphs	Kyoto, Japan <i>August 2023</i>
International Symposium on Computational Geometry Directed Labeled Merge Tree Distance on Classification of <i>Passiflora</i> Leaves	Dallas, TX <i>June 2023</i>
Randomness in Topology and its Applications A Distance for Geometric Graphs via the Labeled Merge Tree Interleaving Distance	Chicago, IL <i>March 2023</i>
8th Mexican Workshop on Applied Geometry and Topology A Distance for Geometric Graphs via the Labeled Merge Tree Interleaving Distance	Virtual <i>November 2022</i>
SIAM Conference on Mathematics of Data Science A Distance for Geometric Graphs via the Labeled Merge Tree Interleaving Distance	San Diego, CA <i>September 2022</i>
Algebraic Topology and TDA Hosted by the Institute for Mathematics and its Applications	Minneapolis, MN <i>August 2022</i>
Algebraic Topology: Methods, Computation, and Science Hosted by the Mathematical Institute, University of Oxford	Oxford, UK <i>June 2022</i>
Mathematics Research Communities Single-Cut and Join in Genome Rearrangement	Java Center, NY <i>June 2022</i>
Joint Mathematics Meetings Invariant Theory in Characteristic p	Denver, CO <i>January 2020</i>

MENTORING AND TEACHING EXPERIENCE

Undergraduate Research Mentor

Michigan State University

- Denis Selyuzhitsky
- Ray Hasan
- Nathan Willey (now PhD student at the Ohio State University)

East Lansing, MI

September 2022 – Present

September 2023 - Present

September 2023 - Present

September 2022 - May 2023

Teaching Assistant, Department of CMSE

Michigan State University

- CMSE201: Computational Modeling and Data Analysis

East Lansing, MI

Spring 2024

REU Graduate Research Mentor

Michigan State University

- SURIUM REU program (3 students)
- ACRES REU program (10 students)

East Lansing, MI

Summer 2022, 2024

Summer 2024

Summer 2022

Teaching Assistant, Department of Mathematics and CS

College of the Holy Cross

- MATH241 Multivariable Calculus
- MATH243 Mathematical Structures
- MATH244 Linear Algebra
- MATH361 Real Analysis

Worcester, MA

Fall 2017 - March 2020

Fall 2017, 2018

Fall 2019

Spring 2018, 2019

Spring 2020

Teaching Assistant, Department of Music

College of the Holy Cross

- MUSC201 Music Theory 1
- MUSC202 Music Theory 2
- MONT110G Jazz, Civil Rights, Hip Hop
- MONT110G Music, Politics and Culture

Worcester, MA

Fall 2017 - Spring 2019

Fall 2017, 2018, 2019

Spring 2018, 2019

Fall 2019

Spring 2020

PROFESSIONAL DEVELOPMENT

Certification in College Teaching

Awarded by the Graduate School at MSU

Michigan State University

May 2024

Undergraduate Mentorship Training

Two-day training program offered by the College of Engineering

Michigan State University

June 2024

GRANTS, AWARDS, AND HONORS

Engineering Leadership Fellow

Outreach fellowship awarded to student leaders

Michigan State University

Fall 2023 – Present

Distinguished Engineering Scholar

Awarded to outstanding students to graduate study in engineering

Michigan State University

Fall 2020 – Spring 2021

Raymond P. and Marie M. Ginther Graduate Fellowship

Research fellowship awarded to selected first-year graduate students

Michigan State University

Fall 2020

Museum of Mathematics MOST Fellow

Outreach fellowship awarded to 10 early-career female mathematicians

MoMath

August 2023

Travel Grants for TDA Week 2023

Travel support for attending TDA Week

Kyoto University

August 2023

Travel Grants for CG Week 2023

Travel support for attending CG Week

UT Dallas*July 2023***Travel Funding for AMS MRC**

Travel support for attending Mathematics Research Community

Java Center, NY*June 2022***Pi Mu Epsilon**

Mathematical Honors Society

College of the Holy Cross*Inducted 2020***MAA Poster Session Outstanding Poster Award**

Awarded to recognize best posters in MAA Undergraduate Poster Session

Joint Mathematics Meeting*January 2019***The Beethoven Prize**

Awarded to an outstanding music major

College of the Holy Cross*May 2020***SERVICE AND OUTREACH**

Fellow, Mathematics Outreach Seminar and Training Program*National Museum of Mathematics***New York, NY***July, 2023***Engineering K-12 Outreach Fellow, College of the Engineering***Michigan State University***East Lansing, MI***August, 2023 - present***Vice President of Graduate Student Organization***Michigan State University***East Lansing, MI***September 2022 - August 2023***Graduate Student Liaison, Department of CMSE***Michigan State University***East Lansing, MI***September 2021 - August 2022***Student Representative, CMSE Hiring Committee***Michigan State University***East Lansing, MI***October 2021 - March 2022***Co-Chair, Department of Music Student Advisory Committee***College of the Holy Cross***Worcester, MA***April 2018 - April 2020***Program Coordinator, International Student Orientation***College of the Holy Cross***Worcester, MA***Fall 2017, 2018, 2019***Workshop Leader, The Arts in Practice***Burncoat High School***Worcester, MA***October 2019***REVIEW AND REFEREE**

- International Symposium of Computational Geometry (SoCG) (Subreviewer) *2023*
- Conference and Workshop on Neural Information Processing Systems (NeurIPS) *2022-2024*
- Journal of Applied and Computational Topology *2023*

CONFERENCE AND WORKSHOP ORGANIZATION

MSU TDA Seminar

Organize weekly seminars at MSU

East Lansing, MI*August 2024 - present***Workshop on Directional Transform**

International Symposium of Computational Geometry (SoCG)

Athens, Greece*June 2024*

PROFESSIONAL EXPERIENCE

Research Analyst Intern

Shanghai, China

Caitong Fund Management Company

May - September 2020

- Developed data-driven insights on the future direction of 15 companies across 4 industries
- Presented 3 investment ideas to Caitong's investment community and helped investors harness data science to enhance their process

SKILLS AND INTERESTS

Programming: Python, L^AT_EX, SQL, MATLAB, OpenMP/MPI, Magma, Maple, Fortran

Interests: Piano and Flute Performance, Cooking and Gastronomy

Languages: Fluent Mandarin and English, Conversational French and Korean