

Theodore Weisman

tjwei@umich.edu

<https://public.websites.umich.edu/tjwei/>

Department of Mathematics
University of Michigan

CURRENT POSITION

Assistant professor (non-tenure) and research fellow, University of Michigan
Ann Arbor, Michigan

2022 – present (on leave 2023 – 2024)

PAST POSITIONS

Postdoctoral researcher, Max Planck Institute for Mathematics in the Sciences
Leipzig, Germany

2023 – 2024

EDUCATION

University of Texas at Austin, Austin, Texas

Ph.D. in Mathematics

August 2022

Advisor: Jeffrey Danciger

Thesis: Higher-rank generalizations of convex cocompact and geometrically finite dynamics

Yale University, New Haven, Connecticut

B.S. in Mathematics (intensive), magna cum laude

May 2016

AWARDS AND HONORS

NSF Postdoctoral Research Fellowship

2022 – present

Frank Gerth III Outstanding Dissertation Award

2022

University of Texas at Austin

Provost's Graduate Excellence Fellowship

University of Texas at Austin

2016 – 2021

Honorable mention, *Visualizing Science* competition

University of Texas at Austin

2022

PUBLISHED AND ACCEPTED ARTICLES

1. *An extended definition of Anosov representation for relatively hyperbolic groups*. Accepted for publication in *Journal of Topology*.
2. *Singular value gap estimates for free products of semigroups* (with K. Tsouvalas), 2024. Accepted for publication in *Groups, Geometry, and Dynamics*.
3. *Limits of limit sets in rank-one symmetric spaces* (with A. Guilloux), 2024. Accepted for publication in *Geometriae Dedicata*.
4. *Topological stability of relatively hyperbolic groups acting on their boundaries* (with K. Mann and J. F. Manning). *Math. Z.* 312, 5 (2026).
5. *Morse properties in convex projective geometry* (with M. Islam) *Adv. Math.* 479 (2025), p. 110430.
6. *Cubulated hyperbolic groups admit Anosov representations* (with S. Douba, B. Fléchettes, and F. Zhu). *Geom. Topol.* 29 (2025) 4695–4766.
7. *Combination theorems for geometrically finite convergence groups* (with A. Traaseth), 2023. Accepted for publication in *Algebraic and Geometric Topology*.

8. *Stability of hyperbolic groups acting on their boundaries* (with K. Mann and J.F. Manning), 2022. Accepted for publication in *Groups, Geometry, and Dynamics*.
9. *Dynamical properties of convex cocompact actions in projective space*. *J. Topol.*, 16.3 (2023), pp 990-1047A.
10. *Realization of Groups with Pairing as Jacobians of Finite Graphs* (with L. Gaudet, D. Jensen, D. Ranganathan, and N. Wawrykow). *Annals of Combinatorics*, 22.4 (2018), pp 781-801.

PREPRINTS

1. *Dehn filling in semisimple Lie groups*. arXiv:2502.17592, 2025. (submitted, 53 pages).
2. *Examples of extended geometrically finite representations*. arXiv:2311.18653, 2023 (35 pages).

TEACHING EXPERIENCE

Instructor, University of Michigan
 MATH 590 (Introduction to Topology) *Winter 2025*
 MATH 285 (Honors multivariable & vector calculus) *Fall 2024, Fall 2025*

Teaching Assistant, University of Texas at Austin
 M427L (Advanced calculus for applications II) *Spring 2022*
 M408C (Differential and integral calculus) *Fall 2018, Spring 2020*
 M408S (Integral calculus for science) *Spring 2019*

SI (Supplemental Instruction) Teaching Assistant, University of Texas at Austin
 M408C (Differential and integral calculus) *Fall 2019*

In addition to taking on normal TA duties, SI teaching assistants met weekly to develop better teaching strategies and discuss ways to improve classroom environment.

Peer Tutor, Yale University
 MATH 244 (Discrete mathematics) *Fall 2014, Fall 2015*
 MATH 222 (Linear algebra with applications) *Spring 2016*

MENTORSHIP

Faculty mentor, University of Michigan math REU
University of Michigan *Summer 2023*

Advised an undergraduate student on a research project relating to hyperbolic groups and finite-state automata.

Faculty mentor, Lab of Geometry at Michigan
University of Michigan *Winter 2023, Winter 2025*

Designed and led several undergraduate projects focused on computer visualization in hyperbolic and real projective geometry.

Mentor, Texas Geometry Lab
University of Texas at Austin *Spring 2021, Fall 2021, Spring 2022*

Mentored a group of undergraduates on a computer visualization project. Met with students twice a week, provided guidance and suggestions for their programming project, and helped build the website for the lab.

Mentor, UT Directed Reading Program
University of Texas at Austin *2017–2021*

Mentored several undergraduate students through the process of reading a mathematical text. Mentoring involved meeting the student weekly to discuss the text and coaching them through a 15-minute talk at the end of the semester.

OUTREACH

Volunteer, Michigan Math Circle
University of Michigan *2024*

Ran an interactive session with Ann Arbor middle school students interested in mathematics.

Volunteer, Sunday Morning Math Group
University of Texas at Austin

2019–2020

Worked with Austin middle school and high school students biweekly on math problems, and gave a talk at one session on geometry of map projections.

Volunteer teacher, Splash at Yale
Yale University

Summer/Fall 2014, Spring 2015

Taught one-hour long minicourses to high school students. Each class met 1-4 times and had 20-30 students. Titles included *Abstract algebra*, *What is a number?*, and *The game of hex*.

MathCounts Coach, Columbus Family Academy
New Haven, CT

2013

Led weekly problem sessions for 7-10 students on the Columbus Family Academy middle school MathCounts team.

INVITED TALKS

1. “Dehn filling in semisimple Lie groups”
Lie theory, Spectra, and Dynamics,
Paderborn University September 2025
2. “Anosov representations of cubulated hyperbolic groups”
Low-dimensional phenomena: geometry & dynamics,
Institut Henri Poincaré June 2025
3. “Dehn filling in semisimple Lie groups”
University of Texas at Austin Groups and Dynamics seminar April 2025
4. “Anosov representations of cubulated hyperbolic groups”
Binghamton University Geometry and Topology seminar April 2025
5. “Dehn filling in semisimple Lie groups”
Spring Topology and Dynamical Systems Conference,
special session on geometric topology March 2025
6. “Anosov representations of cubulated hyperbolic groups”
Spring Topology and Dynamical Systems Conference,
special session on geometric group theory March 2025
7. “Anosov representations of cubulated hyperbolic groups”
Georgia Tech Geometry/Topology seminar February 2025
8. “Dehn filling in semisimple Lie groups”
University of Wisconsin dynamics seminar February 2025
9. “Dehn filling in semisimple Lie groups”
University of Michigan RTG seminar January 2025
10. “Dehn filling in semisimple Lie groups”
AMS fall southwestern sectional meeting,
special session on geometry and dynamics of character varieties October 2024
11. “Anosov representations of cubulated hyperbolic groups”
UC Riverside geometry seminar June 2024
12. “Anosov representations of cubulated hyperbolic groups”
IMJ-PRG Séminaire Géométrie et Topologie February 2024
13. “Anosov representations of cubulated hyperbolic groups”
University of Texas Groups & Dynamics seminar September 2023
14. “Combination theorems for geometrically finite convergence groups”
Nearly Carbon Neutral Geometric Topology June 2023
15. “Topological stability for (relatively) hyperbolic boundary actions”
Geometric Topology in New York,
Columbia University June 2023

16. "Topological stability for hyperbolic group actions on their boundaries"
CUNY hyperbolic geometry seminar October 2022
17. "Ping-pong, automata, and hyperbolic stability"
University of Michigan geometry seminar September 2022
18. "Extended geometrically finite representations"
*AMS-SMF-EMS Joint International Meeting,
special session on deformation spaces of geometric structures* July 2022
19. "Extended geometrically finite representations"
*Spring Topology and Dynamical Systems Conference,
special session on geometric topology* March 2022
20. "Relative Anosov representations and convex projective structures"
University of Virginia geometry seminar February 2022
21. "Extended convergence dynamics and relative Anosov representations"
NUS Topology and Geometry seminar February 2022
22. "Extended convergence dynamics and relative Anosov representations"
Heidelberg University differential geometry seminar December 2021
23. "Relative Anosov representations and convex projective structures."
University of Wisconsin dynamics seminar October 2021
24. "Relative Anosov representations and convex projective structures."
Rice University topology seminar September 2021
25. "Relative Anosov representations and convex projective structures."
Florida State University geometry and topology seminar September 2021
26. "Extended convergence dynamics, relative Anosov representations, and stability"
IHES September 2021
27. "Anosov representations: the relatively hyperbolic case." (Expository talk)
Workshop on Anosov representations in Aussois September 2021
28. "Group actions on boundaries of convex divisible domains."
*AMS fall southeastern sectional meeting,
special session on geometric structures on manifolds* November 2019

CONTRIBUTED TALKS

- "Expansion/contraction dynamics for non-strictly convex projective manifolds."
GTA Philadelphia, Temple University May 2021
- "Jacobians of finite graphs," with L. Gaudet and N. Wawrykow.
MAA Mathfest Undergraduate Paper Sessions August 2014

OUTREACH TALKS

1. "Unsolvable problems." *UMich math circle* Fall 2024
2. "The word problem and the isoperimetric problem." *UMich undergraduate math club* Winter 2023
3. "Basics of the probabilistic method." *UT undergraduate math club* Spring 2022
4. "Geometry in Minkowski space." *UT undergraduate math club* Spring 2021
5. "Solving the word problem with geometry." *UT undergraduate math club* Fall 2020
6. "Map projections." *UT Sunday morning math group* Fall 2019

SERVICE

- Organizer**, Log cabin workshop on *Kleinian behavior and beyond in group theory and geometry* January 2026
- Organizer**, *20 Years of Anosov Representations* conference
Max Planck Institute for Mathematics in the Sciences October 2024

Minicourse leader

“Boundaries of Groups and Spaces”

June 2020

“Hyperbolic Groups”

August 2019

Led weeklong courses for graduate students as part of a University of Texas summer minicourse program

Thesis committee for PhD student: Max Lahn

University of Michigan

Spring 2025

Referee for various journals, including: *Advances in Mathematics*, *Compositio Mathematica*, *Journal für die reine und angewandte Mathematik (Crelle's journal)*, *Geometriae Dedicata*, *Journal of Differential Geometry*, *International Mathematics Research Notices***Organizer**, Topology seminar

University of Michigan

Fall 2022 - Winter 2023

Co-organizer, Learning seminar on geometric group theory

University of Texas at Austin

Fall 2021, Spring 2022

Organizer, Learning seminar on relative Anosov representations

University of Texas at Austin

Summer 2020

Organizer, Junior Topology Seminar

University of Texas at Austin

Fall 2019

Co-organizer, Geometric topology seminar

University of Texas at Austin

2018 - 2021

Co-founder, SUMS

Yale University

2014 – 2016

Co-organized weekly meetings for math talks given by a small group of undergraduates

OTHER

Author and maintainer, `geometry_tools` Python packagehttps://public.websites.umich.edu/~tjwei/geometry_tools/geometry_tools.html

Developed package for performing numerical computations and producing visualizations in hyperbolic and projective geometry.