

Karen Butt

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RESEARCH INTERESTS Geometry and dynamics: spaces of nonpositive curvature, geodesic flows, hyperbolic dynamical systems, rigidity, locally symmetric spaces

EMPLOYMENT **Vanderbilt University**, Nashville, Tennessee
Assistant Professor, August 2026 –

University of Chicago, Chicago, Illinois
L. E. Dickson Instructor, September 2023 – August 2026
NSF Postdoctoral Fellow July 2024 – August 2026
Mentor: Amie Wilkinson

EDUCATION **University of Michigan**, Ann Arbor, Michigan
Ph.D. in Mathematics, April 2023
Thesis: *Closed geodesics and stability of negatively curved metrics*
Advisor: Ralf Spatzier

University of Michigan, Ann Arbor, Michigan
M.S. in Mathematics, May 2019

University of Chicago, Chicago, Illinois
B.A. with Honors in Mathematics, June 2017

- PAPERS**
7. *Monotonicity of topological entropy along the Ricci flow near a hyperbolic metric*, joint with A. Erchenko and T. Humbert
arXiv:2511.06137.
 6. *Marked Poincaré rigidity near hyperbolic metrics and injectivity of the Lichnerowicz Laplacian in dimension 3*, joint with A. Erchenko, T. Humbert, T. Lefeuvre, A. Wilkinson. arXiv:2510.11399.
 5. *Quantitative marked length spectrum rigidity for surfaces*,
arXiv:2509.16829.
 4. *Monotonicity of the Liouville entropy along the Ricci flow on surfaces*,
joint with A. Erchenko, T. Humbert, D. Mitsutani arXiv:2504.07290.
 3. *Approximate rigidity of the marked length spectrum*,
Mathematics Research Reports, Volume 4 (2023), pp. 63-82.
 2. *Approximate control of the marked length spectrum by short geodesics*,
Ergodic Theory and Dynamical Systems. Published online 2025:1-24.
doi:10.1017/etds.2025.10212. arXiv:2210.15101
 1. *Quantitative marked length spectrum rigidity*, Geometry & Topology **29:8**
(2025), pp. 3995-4054. arXiv:2203.12128

TEACHING

University of Chicago:

Spring 2026	Math 274	Differentiable Manifolds	Primary Instructor
Fall 2025	Math 204	Analysis in $\mathbb{R}^n$ -2	Primary Instructor
Spring 2024	Math 205	Analysis in $\mathbb{R}^n$ -3	Primary Instructor
Winter 2024	Math 204	Analysis in $\mathbb{R}^n$ -2	Primary Instructor
Fall 2023	Math 203	Analysis in $\mathbb{R}^n$ -1	Primary Instructor (2 sections)

University of Michigan:

Winter 2023	Math 215	Calculus III	Lab Instructor (MATLAB)
Fall 2022	Math 116	Calculus II	Primary Instructor
Fall 2021	Math 116	Calculus II	Primary Instructor
Fall 2020	Math 116	Calculus II	Primary Instructor
Fall 2019	Math 215	Calculus III	Lab Instructor (MATLAB)
Winter 2019	Math 116	Calculus II	Primary Instructor
Fall 2018	Math 116	Calculus II	Primary Instructor
Winter 2018	Math 115	Calculus I	Primary Instructor
Fall 2017	Math 105	Data, Functions, and Graphs	Primary Instructor

AWARDS

- NSF postdoctoral research fellowship 2024-2026
- AIM SQuaRE “Flexibility and rigidity for geodesic flows” 2024- with Alena Erchenko, Tristan Humbert, Daniel Mitsutani
- AIM SQuaRE “Sectional curvature of solvmanifolds” 2024- with Romina Arroyo, Karla Garcia, Ruth Gornet, Meera Mainkar, Tracy Payne
- Travel Grant (\$1000), Association for Women in Mathematics, (2023)
- Allen Shields Memorial Fellowship, University of Michigan Mathematics Department (2021)
- Juha Heinonen Memorial Fellowship, University of Michigan Mathematics Department (2019)
- FRQNT (Quebec Scientific Research Foundation) Master’s Scholarship (2017-2019)
- Paul R. Cohen Prize, University of Chicago, for highest record in undergraduate mathematics (2017)
- Phi Beta Kappa Honor Society, University of Chicago (2017)

SERVICE

- Mentor, UChicago REU (Summer 2025)
- Co-organizer, Dynamics Seminar, University of Chicago (2023–)
- Mentor for “Flexibility of entropies for negatively curved surfaces” graduate reading group, Big Ideas in Dynamics, AIM Research Community (Fall 2023)
- Speaker, Graduate Recruitment Weekend, University of Michigan, March 2023
- Differential Topology Qualifying Exam Study Group Leader, University of Michigan (Summer 2021, Summer 2022)
- Co-founder and co-organizer, UM Directed Reading Program (2018-2022)
- Co-organizer, Student Dynamics, Geometry, and Topology Seminar, University of Michigan (2019-2020)
- DRP Mentor (Fall 2018, Winter 2019, Winter 2020)

- Secretary, Association of Women in Mathematics - UM student chapter (2018-2020)
- Second Year Representative, Student Advisory Board, University of Michigan (2018-2019)

INVITED TALKS

- Beyond Uniform Hyperbolicity (joint mini-course with Thibault Lefeuvre), KIAS, Korea, June 2027
- Analytic methods in hyperbolic dynamics and geometry, CIRM, France, May 2027
- Lille Dynamics and Geometry Conference, Lille, France, September 2026
- Vanderbilt Colloquium Series (ICM Satellite Conference), Vanderbilt University, July 2026
- May Midwest Microlocal Meeting (MMMM), Northwestern University, May 2026
- Soul and Shape: Metric Structures and Geometric Analysis, University of Oklahoma, April 2026
- Statistics, hyperbolicity and related problems (SHARP), University of Warwick, March 2026
- Analysis, Dynamics, Geometry Seminar, Paris, March 2026
- Dynamics Seminar, University of Maryland, February 2026
- Analysis and Mathematical Physics Seminar, Virginia Tech, November 2025
- Geometry, Topology, Dynamics Seminar, University of Illinois–Chicago, October 2025
- Geometry, Topology Dynamics Seminar, University of Michigan, September 2025
- Dynamische Systeme Workshop, Oberwolfach, Germany, July 2025
- Midwest Summer School in Geometry, Topology, and Dynamics, Madison, WI, June 2025
- Differential Geometry/Geometric Analysis Seminar, University of Chicago, April 2025
- Virtual Seminar on Geometry with Symmetries, April 2025
- Dynamics Seminar, Northwestern University, April 2025
- Bloomington Geometry Workshop, Indiana University-Bloomington, April 2025
- Zoom Geometry Seminar, Pennsylvania State University, April 2024
- Groups, Geometry, and Dynamics Seminar, Yale University, April 2024
- AMS Special Session on Developments of Hyperbolic-like Geometry and Dynamics, Milwaukee, April 2024
- Geometry Seminar, Michigan State University, March 2024
- AMS Special Session on Metric Geometry and Topology, Joint Mathematics Meetings, San Francisco, January 2024
- Geometry and Dynamics Day, Institut Mathématique Jussieu, France, December 2023
- Geometry Seminar, Dartmouth College, October 2023
- Zurich Dynamics Conference, University of Zurich, June 2023

- Dynamics Seminar, University of Toronto, February 2023
- Topology/Geometry Zoom Seminar, University of Oregon, February 2023
- Dynamics Seminar, University of Wisconsin–Madison, February 2023
- Dynamics Seminar, Pennsylvania State University, January 2023
- Dynamics Seminar, University of Chicago, January 2023
- AMS Special Session on Dynamics, Geometry and Group Actions, Joint Mathematics Meetings, Boston, January 2023
- Dynamics Seminar, University of Maryland, December 2022
- Max Dehn Seminar on Geometry, Topology, Dynamics, and Groups, University of Utah, December 2022
- Differential Geometry Seminar (virtual), Heidelberg University, July 2022
- Midwest Dynamical Systems Early Career Conference, University of Notre Dame, May 2022
- Topology Seminar, The Ohio State University, April 2022

CONTRIBUTED TALKS & POSTERS

- Workshop on Dynamical Systems and Related Topics, Pennsylvania State University, November 2025
- Midwest Geometry Conference, Kansas State University, March 2023
- Geometry, Dynamics, and Topology Seminar, University of Michigan, November 2022
- Workshop on Dynamical Systems and Related Topics, Pennsylvania State University, November 2022
- Houston Workshop on Hyperbolic Dynamics, University of Houston, May 2022
- Workshop on Dynamical Systems and Related Topics, University of Maryland, April 2022
- Geometry Seminar, University of Michigan, March 2022
- Flexibility and Rigidity in Dynamical Systems (poster), Simons Center for Geometry and Physics, March 2022
- Topology Students Workshop (virtual), Georgia Institute of Technology, July 2020

LANGUAGES

- English (native)
- French (fluent)
- Russian (fluent)