

## Carolyn R. Abbott

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<b>Appointments</b>	<b>Assistant Professor</b> <b>Landsman Career Development Chair in the Sciences</b> Brandeis University	January 2025 – present
	<b>Assistant Professor</b> Brandeis University	July 2021 – present
	<b>NSF Postdoctoral Fellow</b> Columbia University	June 2019 – May 2021
	<b>NSF Postdoctoral Fellow</b> University of California, Berkeley	June 2018 – May 2019
	<b>Morrey Visiting Assistant Professor</b> University of California, Berkeley	August 2017 – June 2018
<b>Education</b>	<b>University of Wisconsin-Madison, Madison, WI</b> Ph.D. in Mathematics, Advisor: Tullia Dymarz	May 2017
	<b>Cornell University, Ithaca, NY</b> Master of Arts and Teaching in Secondary Mathematics Education, New York State Teaching Certificate in Mathematics 7–12	May 2007 June 2007
	<b>Jagiellonian University, Krakow, Poland</b> Diploma in Polish language	June 2005
	<b>Tufts University, Medford, MA</b> B.A. in Mathematics and Asian Studies, Magna Cum Laude	May 2004
<b>Visiting Positions</b>	<b>Mathematical Sciences Research Institute</b> <i>Program Associate in Geometric Group Theory Semester</i>	Fall 2016
	<b>The Graduate Center at CUNY</b> <i>Visiting Research Scholar</i>	Spring 2016, Spring 2017
<b>Research Interests</b>	Geometric group theory, including applications to hyperbolic geometry, computation, and random walks.	
<b>Grants</b>	<b>NSF CAREER Grant DMS-2340341</b> , \$549,981 <i>CAREER: Large-scale geometry and negative curvature</i>	2024 - 2029
	<b>NSF Grant DMS-2106906</b> , \$263,986 <i>Group actions on hyperbolic spaces</i>	2021 - 2025
	<b>NSF Conference Grant DMS-2453830</b> , \$40,000 <i>Conference: Groups in Geometry, Analysis, and Logic</i>	2025-2026

Publications &  
Preprints

1. Abbott, Carolyn R. *Not all finitely generated groups have universal acylindrical actions*, Proc. Amer. Math. Soc., 144(10):4151–4155, 2016.
2. Abbott, C., Balasubramanya, S., and Osin, D., *Hyperbolic structures on groups*, Algebr. Geom. Topol., 19-4 (2019), 1747–1835.
3. Abbott, C. and Dahmani, F. *Property  $P_{naive}$  for acylindrically hyperbolic groups*, Math. Z., 291(1-2):555-568, 2019.
4. Abbott, C., Hume, D., and Osin, D. *Extending group actions on metric spaces*, J. Topol. Anal., 12(3): 625–665, 2020.
5. Abbott, C. and Hume, D. *The geometry of generalized loxodromic elements.*, Ann. I. Fourier (Grenoble), 70(4): 1689–1713, 2020.
6. Abbott, C., Behrstock J., and Durham, M. *Largest acylindrical actions and stability in hierarchically hyperbolic groups*, Trans. Amer. Math. Soc. Ser. B, 8: 66–104, 2021.
7. Abbott, C. and Hume, D. *Actions of small cancellation groups on hyperbolic spaces*, Geom. Dedicata, 212(1), 325–363, 2021.
8. Abbott, C. and Behrstock, J. *Conjugator lengths in hierarchically hyperbolic groups*, Groups Geom. Dyn. **17**, no. 3, 805–838, 2023.
9. Abbott, C. and Rasmussen, A. *Actions of solvable Baumslag-Solitar groups on hyperbolic metric spaces*, Algebr. Geom. Topol. **23**, no. 4, 1641–1692, 2023.
10. Abbott, C., Manning, J. *Acylindrically hyperbolic groups and their quasi-isometrically embedded subgroups*, Michigan Math. J. **74** (2024), no. 2, 357–402.
11. Abbott, C. and Hull, M. *Random walks and quasi-convexity in acylindrically hyperbolic groups*, J. Topol. **14**, no. 3, 992–1026, 2021.
12. Abbott, C. and Rasmussen, A. *Largest hyperbolic actions and quasi-parabolic actions in groups*, J. Topol. Anal. **16** (2024), no. 4, 495–539.
13. Abbott, C., Balasubramanya, S., Rasmussen, A. *Higher rank confining subsets and hyperbolic actions of solvable groups*. Adv. Math. **424**, Paper No. 109045, 47pp, 2023.
14. Abbott, C., Behrstock, J., and Russell, J. *Structure invariant properties of the hierarchically hyperbolic boundary*. J. Top. Anal., <https://doi.org/10.1142/S1793525323500516>, 2024.
15. Abbott, C., Ng, T., and Spriano, D. *Hierarchically hyperbolic groups and uniform exponential growth*, Math. Z. **306** (2024), no. 1, Paper No. 18, 33pp.
16. Abbott, C., Miller, N., and Patel, P. *Infinite-type loxodromic isometries of the relative arc graph*. Algebr. Geom. Topol. **25** (2025), no. 1, 563–644.
17. Abbott, C., Balasubramanya, S., and Rasmussen, A. *Valuations, completions, and hyperbolic actions of metabelian groups*. J. Lon. Math. Soc. (2) **109** (2024), no. 6, Paper No. e12916, 72pp.
18. Abbott, C., Nguyen, H.T., and Rasmussen, A. *Largest hyperbolic actions of 3-manifold groups*. Bull. Lond. Math. Soc. **56** (2024), no. 10, 3090–3113.
19. Abbott, C., Behrstock, J., and Russell, J. *Relative hyperbolicity, thickness, and the hierarchically hyperbolic boundary*. arXiv:2305.16906. To appear in Michigan Math. J.

20. Abbott, C. and Martinez-Pedroza, E. *The quasi-isometry invariance of the coset intersection complex*. arXiv:2404.16628. To appear in *Algebr. Geom. Topol.*
21. Abbott, C. and Incerti-Medici, M. *Hyperbolic projections and topological invariance of sublinear Morse boundaries*. arXiv:2212.09539. Submitted.
22. Abbott, C., Miller, N., and Patel, P. *Shift maps are not type-preserving*. arXiv:2212.09156. Submitted.
23. Abbott, C., Hoganson, H., Loving, M., Patel, P., and Skipper, R. *A new construction of subgroups of big mapping class groups*. arXiv:2109.05976. Submitted.
24. Abbott, C., Hagen, M., Petyt, H., and Zalloum, A. *Uniform undistortion from barycentres, and applications to hierarchically hyperbolic groups*. arXiv:2305.09742. Submitted.
25. Abbott, C. and Zbinden, S. *A non-loxodromic Morse element in a Morse local-to-global group*. arXiv:2502.21176. Submitted.
26. Abbott, C., Genevois, A., and Martinez-Pedroza, E. *Homotopy types of complexes of hyperplanes in quasi-median graphs and applications to right-angled Artin groups*. arxiv:2503.08411. Submitted.

**Invited Talks  
(Conferences)**

Upstate New York Topology Seminar, Plenary Talk	March 2025
Joint Math Meetings Special Session <i>Combinatorial and Probabilistic Methods in Group Theory</i>	January 2025
Graduate Student Topology and Geometry Conference	April 2024
Group Actions and Low Dimensional Topology	July 2023
Escuela de Teoría Geométrical de Grupos	June 2023
Interactions between Algebraic Topology & Geometric Group Theory	May 2023
Geometry of Subgroups, CRM (minicourse)	May 2023
AMS Southeast Sectional Meeting, Georgia Tech <i>Geometric group theory</i>	March 2023
Spring Topology and Dynamics Conference	March 2023
Hyperbolic groups and their generalizations, IHP	June 2022
Women in Groups, Geometry, and Dynamics Retreat	August 2021
Charney Fest	July 2021
Beyond Hyperbolicity Conference	July 2021
The Interface of Low Dim'l Group Actions & Geom. Structures	January 2021
Geometric group theory: Non-positively curved groups, NCNGT	May 2020
Joint Math Meetings Special Session <i>Women in topology</i>	January 2020
Big Mapping Class Groups AIM Workshop	May 2019
Arches Topology Conference	April 2019
Spring Topology and Dynamics Conference, Semi-plenary speaker	March 2019
AMS Sectional Meeting Special Session, University of Arkansas <i>Groups in Low-dimensional Topology and Dynamics, I</i>	November 2018
Graphs, Surfaces, and Cube Complexes, Warwick	July 2018
Boundaries of Groups, CIRM-Luminy	June 2018
Workshop on Large Scale Geometry and Applications, Fields Institute	May 2018

AMS Sectional Meeting Special Session, Vanderbilt University <i>Non-positive curvature and boundaries</i>	April 2018
Joint Math Meetings Special Session <i>Boundaries for groups and spaces</i>	January 2018
Young Geometric Group Theorists Conference	March 2018
Virginia Topology Conference	November 2017
Geometric Groups on the Gulf Conference	March 2017
Spring Topology and Dynamics Conference	March 2017
Wasatch Topology Conference	August 2016
Beyond Hyperbolicity Conference, Cambridge University	June 2016
GAGTA Conference, Stevens Institute of Technology	June 2016
AMS Sectional Meeting Special Session, Loyola University <i>Metric Geometry</i>	October 2015

**Invited Talks  
(Colloquia)**

Vanderbilt University	June 2024
University of Utah	March 2024
Rice University	November 2023
University of Wisconsin, Madison	March 2023
Queens University, Ontario	January 2023
Bowdoin College	November 2021
University of Wisconsin, Milwaukee	October 2021
California State University, Chico	April 2019
St. Johns University	February 2019
Tufts University	November 2018
City College of New York	April 2016
Swarthmore College	March 2016

**Invited Talks  
(Seminars)**

University of Albany, Topology Seminar	February 2025
Harvard University, Open Neighborhoods Seminar	November 2024
The Graduate Center at CUNY, Geometry and Topology Seminar	May 2024
Yale University, Topology Seminar	April 2024
University of Buffalo, Topology Seminar	March 2024
Vanderbilt University, Topology Seminar	March 2024
University of Oklahoma, Topology Seminar	February 2024
Tufts University, Geometry and Geometric Group Theory Seminar	October 2023
Boston College, Topology Seminar	March 2023
University of Wisconsin, Madison, Dynamics Seminar	March 2023

University of Texas, Austin, Topology Seminar	February 2022
Brandeis University, Topology Seminar	January 2022
Tufts University, Geometry and Geometric Group Theory Seminar	October 2021
University of Chicago, No Boundaries Seminar	April 2021
McGill University, Geometry/Topology Seminar	March 2021
Virtual Geometric Group Theory Seminar in Mexico	January 2021
Vanderbilt University, Group Theory and Geometry Seminar	March 2020
Columbia University, Geometry/Topology Seminar	April 2019
Temple University, Geometry Topology Seminar	March 2019
University of Florida, Geometry Topology Seminar	October 2018
Stanford University, Geometry/Topology Seminar	April 2018
University of California, Davis, Geometry Topology Seminar	April 2018
Yale University, Geometry Topology Seminar	March 2018
University of California, Irvine, Geometry Topology Seminar	February 2018
University of California, Santa Barbara, Geometry Topology Seminar	January 2018
University of California, Berkeley, Geometry Topology Seminar,	August 2017
University of Nice, Dynamics Seminar	April 2017
Columbia University, Geometry/Topology Seminar	February 2017
Institute Fourier, Grenoble Alps, Geometry/Topology Seminar	March 2017
Rice University, Geometry/Topology Seminar	March 2017
Boston College, Geometry/Topology Seminar	March 2017
University of Illinois - Chicago, Geometry Topology Seminar	February 2017
Cornell University, Geometry Topology Seminar	February 2017
Temple University, Geometry Topology Seminar	February 2017
MSRI, Postdoctoral seminar	December 2016
Brandeis University, Seminar	March 2016
The Graduate Center at CUNY, Hyperbolic Geometry Seminar	March 2016
The Graduate Center at CUNY, Geometry and Topology Seminar	February 2016
Temple University, Graduate Student Seminar	January 2016
Vanderbilt University, Group Theory and Geometry Seminar	November 2015

**Conferences  
Organized**

Groups in Geometry, Analysis, and Logic	May 2025
AMS Western Sectional Meeting special session "Huge groups from a geometric viewpoint"	May 2025
AWM Research Symposium Special Session "Groups, Geometry, and Dynamics"	May 2025

JMM Special Session “Women in Groups, Geometry, and Dynamics” January 2025  
 Advances in Hierarchical Hyperbolicity May 2024  
 Young Geometric Group Theorists (YGGT) March 2024  
*Scientific committee*  
 Groups, Actions, and Geometry August 2023  
 Spring Topology and Dynamics Conference (STDC) 2023–2026  
*Steering committee*  
 Quotients of Hierarchically Hyperbolic Groups August 2022  
 JMM Special Session “Geometric group theory” March 2022  
 AMS Northeast Sectional Meeting special session March 2022  
 “Geometric group theory”

**University Service**      **Diversity, Equity, Inclusion, and Social Justice (DEIS-J) Committee** (Fall 2023 – current)  
**Summer Undergraduate Research Fellowship (SURF) Selection Committee** (Spring 2024)

**Departmental Service**      **Undergraduate Advising Head II** (Fall 2023 – current): responsible for transfer credits and study abroad credits  
**Undergraduate Committee** (Fall 2022 – current)  
**Curriculum Self-Study Committee** (Fall 2024)  
**Tenure-track Hiring Committee** (2022 – 2023): for two positions

**Other Service**      **Associate Editor, K3 Problem List** (2025 – current): Editor of Chapter 2 of the 3rd version of Kirby’s Problem List in Low-Dimensional Topology, which will be published as a book  
**Member, MAA Committee on the T. Christine Stevens Award** (2023 – current): Review nominations for this leadership development award  
**EDI Reviewer, BIRS Proposals** (2021 – current): Evaluate BIRS conference proposals on their EDI merit  
**Co-organizer, Brandeis Topology Seminar** (Fall 2021 – current): Plan and organize the weekly Topology seminar  
**Editor, AMS Blog on Teaching and Learning** (Spring 2021 – current) Solicit and edit columns, write columns  
**NSF Panel Member**: Spring 2020, Fall 2022, Fall 2024  
**Referee Work** (2018 – present): *J. Topol. Anal., Groups Geom. Dyn., J. Éc. polytech., Geom. Dedicata, IMRN, Michigan Math. J., Geom. Top., Ann. H. Lebesgue, Notices of the AMS, Forum Math. Sigma, Contemp. Math.*  
**Co-organizer, UC Berkeley Geometry-Topology Seminar** (Fall 2017 – Spring 2019): Plan and organize the weekly Geometry/Topology seminar.  
**Organizer, UC Berkeley New Postdoc Talks** (Fall 2017, Fall 2018): Organize session for new postdocs to introduce themselves and their work to the department.

**Organizer, MSRI Working Seminar on  $\text{Out}(F_n)$ -complexes** (Fall 2016): Plan and organize a seminar open to all members of MSRI.

**Founder, Directed Reading Program** (Fall 2015): Program pairs undergraduates with graduate student mentors for a semester-long independent study.

**Member, CTAPP Committee** (Fall 2014 – Fall 2015): Evaluate TAs in the math department, determine policies for TA responsibilities and pay structure.

**Graduate Coordinator, Madison Math Circle** (Spring 2014 – Fall 2015): Organized refreshments and supplies, and coordinated weekly talks by graduate students and faculty on various topics in mathematics for middle and high school students.

**Mentor and Administrative Assistant, Instructional Excellence Program** (Fall 2013 – Fall 2015): Mentor new TAs in the math department, plan and run training workshops on interactive teaching, facilitating group work, writing quizzes, and grading, observe new TAs and give feedback.

**Fundraising Event** (September 2015): Assistant to Jordan Ellenberg in UW-Madison fundraiser held in New York City.

**Math Help Desk** (Fall 2013 – Fall 2015): Advised undergraduate students on which math courses were most appropriate for them to take and helped them find a class that fit in their schedule.

**Student Orientation, Advising, and Registration** (January 2014, June 2014, August 2015): Advised new undergraduate students on which math courses were most appropriate for them to take, as well as helped students plan a course of study if their interest was mathematics.

**Graduate Coordinator, Women in Math at Wisconsin** (Fall 2014 – Fall 2015): Coordinate events for women in the math department, including inviting colloquium speakers and organizing social events.

**Project Mentor, Women in Math at Wisconsin: High School Math Night** (Fall 2013): Mentor for local high school women, with weekly work on an RSA encryption project, through the Women in Math at Wisconsin organization.

## Mentoring

**Current graduate students:** Kaitlyn Ragosta, Joshua Perlmutter, Rachmiel Klein, John-Michael Figueroa

**Postdocs:** Thomas Ng (current), Assaf Bar-Natan (2022-2024)

**Masters students:** Andrew Dias (graduated August 2024)

**AWM Mentor** (Summer 2023 – current): Meet regularly with and mentor several women early in their graduate studies.

**Summer Undergraduate Research Fellow (SURF) advisor** (Summer 2024): Led research project for rising senior on Morse boundaries.

**Senior Thesis Advisor** (2024-2025): Advise undergraduate student writing a senior thesis on laminations of infinite-type surfaces.

**Mentor, Topology Students Workshop** (June 2024): Provided professional advice to graduate student participants; ran workshop on the job market.

**Thesis committee member:** Qing Liu (March 2021), Ian Montague (March 2023), Jill Mastrocola (March 2024), Andrew Dias (August 2024), Jiayi Lou (Tufts University, August 2025)

**Oral exam committee member:** mathematics graduate student at University of Utah (March 2023)

**Senior Thesis Advisor, UC Berkeley** (Spring 2018): Advise undergraduate student writing a senior honors thesis defining train track splittings on orbifolds.

## Awards

**Michael L. Walzer ‘56 Award for Teaching (2024):** for a combination of superlative scholarship with inspired teaching.

**Perlmutter Faculty Fellow**, 2024-2025 academic year

Nominated: **Dean’s Mentoring Award (2023)**

**Letters & Sciences Teaching Fellow Award (2015):** a campus-wide award for TAs who have achieved outstanding success as students and teachers at UW-Madison

**Elizabeth S. Hirschfelder Scholarship (2014):** for exceptional work by a female Ph.D. student.

**Department of Mathematics Teaching Award (2014):** for first-rate teaching

**University Housing’s Honored Instructor Award (2012, 2014, and 2015):** for excellent teaching, based on student nominations

**Edward A. Sheldon Award (2007):** for excellent female teachers, based on academic achievement

**Robert Noyce Scholarship (2006):** for superb teachers committed to working in high needs districts

**Tufts University Maxine Gordon Award (2004):** for an outstanding math major with a strong literary interest

**Tufts University Class of 1942 Prize Award (2004):** for the student most likely to become an outstanding university professor

Nominated: **Exceptional Service (2015):** a campus-wide award for outstanding TAs who perform exceptional service related to the educational mission of their department and our university

Nominated: **Early Excellence in Teaching Award (2013):** campus-wide award for outstanding and inspirational performance on the part of TAs with fewer than four semesters of teaching experience

Nominated: **Cornell University Mathematics Graduate Student Teaching Award (2006):** for excellent teaching, based on student nominations

## Teaching Experience

### Brandeis University

*Instructor*

Fall 2021

- Courses taught: Math 15a: Linear Algebra, Math 221: Graduate topics course titled “Hyperbolic groups,” Math 221A&B: Topology I & II, Math 271A: The geometry and topology of 3-manifolds, Math 271B: Graduate topic course titled “Mapping class groups”
- Average Teaching Evaluation Score: 4.78/5.00

### Columbia University

*Instructor*

Spring 2020, Fall 2020



- Courses taught: Calculus III

**University of California, Berkeley**

*Instructor*

2017-2018

- Courses taught: Abstract Algebra and Honors Linear Algebra and Differential Equations
- Average Teaching Evaluation Score: 6.35/7.00

**University of Wisconsin - Madison**

*Instructor*

2012-2015

- Courses taught: Calculus 1, 2, and 3, and Problem Solving: Algebra, Probability, Statistics
- Selected as a TA coordinator in 2015 (overseeing first-year TAs)
- Selected for Wisconsin Emerging Scholars section in 2014-15 (sections that provide extra support for students from underprivileged backgrounds)
- Average Teaching Evaluation Score: 4.93/5.00

**The Anderson School**, New York, NY

March 2009 – June 2012

*7th and 8th Grade Mathematics Teacher*

- Taught Integrated Algebra and Integrated Geometry, founded an honors program for gifted students, Robotics Club advisor, MathCounts Coach

**The Bronx High School of Science**, Bronx, NY

August 2007 – January 2009

*High School Mathematics Teacher*

- Courses Taught: Algebra, Geometry, Trigonometry

**Cornell University**, Ithaca, NY

*Instructor*

- Courses Taught: Calculus 1, Calculus for Engineers, Calculus for Life and Social Sciences, Introduction to College Mathematics