

Matthew Cordes

CONTACT INFORMATION	ETH Zürich D-MATH Rämistrasse 101 8092 Zürich Switzerland	Web: https://www.mcordes.com Email: mbcordes@gmail.com
RESEARCH INTERESTS	Geometric group theory; the geometric and topological aspects of infinite groups; approximate groups; generalizations of hyperbolicity; boundaries.	
EMPLOYMENT	Heriot-Watt Assistant Professor Start date: January 2024 ETH Zürich Senior Assistant funded by a Swiss National Science Foundation Ambizione Fellowship September 2020–present ETH Zürich Postdoctoral Fellow September 2018–August 2020 Technion–Israel Institute of Technology Zuckerman STEM Leadership Postdoctoral Fellow September 2016–August 2018	
EDUCATION	Brandeis University , Ph.D. May 2016 Advisor: Ruth Charney Thesis title: <i>Morse boundaries of geodesic metric spaces.</i> Carleton College , BA 2010 Budapest Semesters in Mathematics , Fall 2009	
PUBLICATIONS	<i>Foundations of geometric approximate group theory.</i> (With Tobias Hartnick, Vera Tonić) Submitted. (arXiv:2012.15303) <i>Regularity of Morse geodesics and growth of stable subgroups.</i> (With Jacob Russell, Davide Spriano, Abdul Zalloum) Journal of Topology , 2022. <i>An embedding of the Morse boundary in the Martin boundary.</i> (With Matthieu Dus-saule, Ilya Gekhtman) Algebraic & Geometric Topology , 2022. <i>Complete topological descriptions of certain Morse boundaries.</i> (With Ruth Charney, Alessandro Sisto) Groups, Geometry, and Dynamics , 2023. <i>Cannon–Thurston maps for CAT(0) groups with isolated flats</i> (With Benjamin Beeker, Giles Gardam, Radhika Gupta, Emily Stark) Mathematische Annalen , 2022.	

A survey on Morse boundaries & stability. “Beyond Hyperbolicity” London Mathematical Society Lecture Note Series Book 454, 2019.

Quasi-mobius homeomorphisms of the Morse boundary. (With Ruth Charney, Devin Murray) **Bulletin of the London Mathematical Society**, 2019.

Relatively hyperbolic groups with fixed peripherals. (With David Hume) **Israel Journal of Mathematics**, 2019.

Boundary convex cocompactness and stability of subgroups of finitely generated groups. (With Matthew Gentry Durham) **Int Math Res Notices**, 2017.

Stability and the Morse boundary. (With David Hume) **Journal of the London Mathematical Society**, 2017.

Morse boundaries of proper geodesic spaces. **Groups, Geometry, and Dynamics**, 2017.

Random nilpotent groups I. (With Moon Duchin, Yen Duong, Meng-Che Ho, Ayla P. Sánchez) **Int Math Res Notices**, 2018.

SUPERVISION

ETH Zürich

Master’s Thesis

- C. Zhao – ongoing
Title: Translation length in Coxeter groups
- H. Gui – Spring 2023
Title: Medium scale curvature and injective metric spaces
- S. Zbinden – Spring 2021
Title: Morse boundaries of free products
- V. Nusbaumer – Spring 2021
Title: Bass–Serre theory, cubulations, and splittings

Bachelor’s Thesis

- A. Langreiter – Fall 2022
Title: Groups acting on hyperbolic spaces
- L. Lambert – Fall 2020
Title: Braid groups and the Burau representation
- K. Donhauser – Fall 2019
Title: Boundaries of hyperbolic groups and classification of elements

Semesterarbeit

- A. Langreiter – ongoing
Title: TBD
- C. Zhao – Fall 2022
Title: Buildings
- V. Nusbaumer – Fall 2019
Title: Graph braid groups and surface groups

TEACHING
EXPERIENCE

Instructor, ETH Zürich

- Ethics in Mathematics – Spring 2023, Fall 2024
- A Survey of Geometric Group Theory student seminar – Spring 2022, Spring 2020
Student led lectures on various topics on geometric group theory chosen from “Office Hours with a Geometric Group Theorist” edited by Matt Clay and Dan Margalit.
- Coxeter groups from a geometric viewpoint – Fall 2021
Introduction to the theory of finite Coxeter groups, infinite Coxeter groups, and the Davis complex.
- Fuchsian groups – Spring 2019
Introduction to the hyperbolic plane and the theory of discrete subgroups of $\mathrm{PSL}(2, \mathbb{R})$.

Teaching fellow, Brandeis University, 2011–2016.

Primary instructor of four courses on topics including precalculus, differential and integral calculus to freshman and sophomores. Served as teaching assistant for Multivariable Calculus, Advanced Calculus, Mathematical Statistics, Introduction to Proofs, Introduction to Real Analysis, and Introduction to Topology.

Math graduate student bootcamp, Brandeis University, August 2015

Co-led an intensive 5 day topology workshop for the incoming math graduate class at Brandeis.

The Math Circle, Boston, Spring 2012

Taught weekly courses on fractals to gifted high school students.

Graduate student tutor, Brandeis University, 2011–2012.

Provided tutoring sessions in pre-calculus and calculus.

AWARDS,
FELLOWSHIPS,
GRANTS

Ambizione Fellowship (SNSF) (602,720 CHF), 2020–2024

ETH Zürich Postdoctoral Fellowship (229,600 CHF), 2018–2020

Zuckerman STEM Leadership postdoctoral fellowship (80,000 USD), 2016–2018

Jerome Levine Award for Best Dissertation

GAANN fellowship, 2011-2014

TALKS

GAGTA 2023 - Groups and Dynamics — Vienna, Austria (2024)

Topology Oberseminar LMU München — Munich, Germany (2023)

CIMAT Applied Geometry and Topology Seminar — Guanajuato, Mexico (2022)

ETHZ Geometry Graduate Colloquium — Zurich, Switzerland (2022)

Univ. of Austria Research Seminar in Geometry and Analysis on Groups (virtual) — Vienna, Austria (2021)

Texas A&M Groups and Dynamics Seminar (virtual) — College Station, Texas (2021)

Artin Groups, CAT(0) Geometry, and Related Topics — Columbus, Ohio (2021)

Cambridge Geometric Group Theory Seminar (virtual) — Cambridge, UK (2021)

WWU Münster Geometric Group Theory Seminar (virtual) — Münster, Germany (2021)

Queens University Dynamics, Geometry, & Groups Seminar (virtual) — Kingston, Canada (2020)

The Ohio State Topology and Geometric Group Theory Seminar (virtual) — Columbus, Ohio (2020)

LG&TBQ — Ann Arbor, Michigan (2019)

University of Nantes Geometry Seminar — Nantes, France (2018)

ETHZ Geometry Seminar — Zurich, Switzerland (2018)

Nonpositively Curved Groups on the Mediterranean — Nahsholim, Israel (2018)

UC Santa Barbara Topology Seminar — Santa Barbara, CA (2018)

Tufts Geometric Group Theory Seminar — Medford, MA (2018)

Technion Geometry & Topology Seminar — Haifa, Israel (2017)

Univ. of Austria Research Seminar in Geometry and Analysis on Groups — Vienna, Austria (2017)

Non-positively curved groups and spaces — Regensburg, Germany (2017)

Brandeis Topology Seminar — Waltham, MA (2017)

Workshop on Group Theory on the Occasion of Arye Juhasz' 70th Birthday — Haifa, Israel (2017)

Technion Geometry & Topology Seminar — Haifa, Israel (2016)

University of Haifa Geometry & Topology Seminar — Haifa, Israel (2016)

Invited participant to AIM workshop on Boundaries of Groups — San Jose, CA (2016)

Beyond Hyperbolicity — Cambridge, UK (2016)

Graduate Student Math Conference in Topology & Geometry — Providence, RI (2016)

CUNY Geometry & Topology Seminar — New York, NY (2016)

University of Michigan Topology Seminar — Ann Arbor, MI (2016)

Wesleyan University Topology et al. Seminar — Middletown, CT (2015)

McGill University Geometric Group Theory Seminar — Montréal, Canada (2015)

Tufts Geometric Group Theory Seminar — Medford, MA (2015)

Univ. of Wisconsin–Madison Geometry and Topology Seminar — Madison, WI (2015)

Univ. of Wisconsin–Milwaukee Topology Seminar — Milwaukee, WI (2015)

Geometric Group Theory (Januszkiewicz conference) — Wrocław, Poland (2015)

Université catholique de Louvain Group Theory Seminar — Louvain-la-Neuve, Belgium (2015)

Brandeis Topology Seminar — Waltham, MA (2014)

SERVICE

Spectra Board Member, 2022– present
 At large board member and member of the budget committee – The Association for LGBT Mathematicians.

Panelist for Diversity, Equity, and Inclusion Panel, Young Geometric Group Theory X, 2021

VMM Representative, ETH Zürich, 2021–present
 Member of the Executive Board of the Association of the Mid-Level Faculty (doctoral students, post-docs, and senior scientists) in the Mathematics Department at ETHZ. I am the diversity representative for the Executive Board.

Organizer of ETHZ Geometry seminar, ETH Zürich, 2020–present

Graduate student representative, Brandeis University, 2012–2016
 Responsibilities include organizing the graduate student seminar and other graduate student activities, coordinating with faculty to improve graduate student experience, and welcoming new students into the department.

Posse Foundation, Brandeis University, 2012–2015
 Yearly co-lead an exploration of an accessible topic such as basic knot theory or cake cutting algorithms and discussion about math classes at Brandeis with the STEM Posse headed to Brandeis. The Posse is a group of 10 students selected from schools in New York City with strong academic potential that might be overlooked by traditional college selection.

CONFERENCES
 ATTENDED

[GAGTA 2023 – Groups and Dynamics](#) (July 2023), Vienna, Austria

[Counting problems](#) (September 2021), Ventotene, Italy

[Artin Groups, CAT\(0\) geometry and related topics](#) (July 2021), Columbus, Ohio

[Of course! Quasi-isometries and groups: rigidity and classification](#) (September 2019),

Ventotene, Italy

Groups with hyperbolic features (August 2019) Zürich, Switzerland

LG&TBQ (June 2019) Ann Arbor, Michigan

Groups, geometries, and spaces in honor of Alessandra Iozzi (January 2019) Zürich, Switzerland

Boundaries of Groups (June 2018) Luminy, France

3-manifolds and Geometric Group Theory (June 2018) Luminy, France

Nonpositively Curved Groups on the Mediterranean (May 2018) Nahsholim, Israel

Young Geometric Group Theory VII (March 2018) Les Diablerets, Switzerland

Structure of 3-manifold groups (February 2018) Luminy, France

Manifolds & Groups (September 2017) Regensburg, Germany

Non-positively curved groups and spaces (September 2017) Regensburg, Germany

Moduli Spaces (September 2017) Ventotene, Italy

Thematic School on quasi-isometric rigidity (July 2017) Toulouse, France

Young Geometric Group Theory VI (March 2017) Oxford, United Kingdom

Workshop on Group Theory on the Occasion of Arye Juhasz' 70th Birthday (January 2017) Haifa, Israel

MSRI workshop on geometry of mapping class groups and $Out(F_n)$ (October 2016) Berkeley, CA

AIM workshop on Boundaries of Groups (October 2016) San Jose, CA

Beyond Hyperbolicity (June 2016) Cambridge, United Kingdom

Geometry of Groups in Montevideo (April 2016) Montevideo, Uruguay

Young Geometric Group Theory V (February 2016) Karlsruhe Institute of Technology

Impacts of Geometric Group Theory (Levitt & Lustig conference) (July 2015) CIRM, Luminy

Geometric Group Theory (Januszkiewicz conference) (June 2015) Wrocław, Poland

Workshop on Mapping Class Group and $Out(F_n)$ (May 2015) Austin, TX

Young Geometric Group Theory IV (January 2015) Spa, Belgium

Geometry on Groups and Spaces, ICM Satellite Conference on Geometric Group Theory and Geometric Structures (August 2014) Daejeon, Korea

Third Young Geometric Group Theory Meeting (January 2014) Luminy, France

Introductory School of the IHP Trimester on Random Walks and Asymptotic Geometry of Groups (January 2014) Luminy, France

AMS Mathematics Research Communities in Geometric Group Theory (June 2013)
Snowbird, UT

Cube Complexes and 3-Manifolds (May 2013)
University of Illinois at Chicago

Graduate Student Topology & Geometry Conference (April 2013)
University of Notre Dame

RTG Graduate Workshop on Geometric Group Theory (June 2012)
University of California—Berkeley