

# Matthew Cordes

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- CONTACT INFORMATION      ETH Zürich  
D-MATH  
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- RESEARCH INTERESTS      Geometric group theory; geometric and topological aspects of infinite groups. Generalizations of hyperbolicity. Hyperbolic and CAT(0) spaces and their boundaries.
- EMPLOYMENT
- ETH Zürich**  
ETH Zürich Postdoctoral Fellow  
Zürich, Switzerland  
September 2018–present
- Technion–Israel Institute of Technology**  
Zuckerman STEM Leadership Postdoctoral Fellow  
Haifa, Israel  
September 2016–August 2018
- EDUCATION
- Brandeis University**, Ph.D. May 2016  
Advisor: Ruth Charney  
Thesis title: *Morse boundaries of geodesic metric spaces.*
- Carleton College**, BA 2010
- Budapest Semesters in Mathematics**, Fall 2009
- PUBLICATIONS
- Foundations of approximate geometric group theory.* (With Tobias Hartnik & Vera Tonić) In preparation.
- Cannon–Thurston maps for CAT(0) groups with isolated flats* (With Benjamin Beeker, Giles Gardam, Radhika Gupta, & Emily Stark) Submitted. (arXiv:1810.13285)
- Quasi-mobius homeomorphisms of the Morse boundary.* (With Ruth Charney & Devin Murray) Submitted. (arXiv:1801.05315)
- A survey on Morse boundaries & stability.* To appear “**Beyond Hyperbolicity**” LMS **Lecture notes.** (arXiv:1704.07598)
- Relatively hyperbolic groups with fixed peripherals.* (With David Hume) To appear **Israel Journal of Mathematics.** (arXiv:1609.05154)
- 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.

TALKS

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)

TEACHING  
EXPERIENCE

**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

**ETH Zürich Postdoctoral Fellowship**, 2018–present

**Zuckerman STEM Leadership postdoctoral fellowship**, 2016–2018

**Jerome Levine Award for Best Dissertation**

**GAANN fellowship**, 2011–2014

SUMMER  
RESEARCH  
CLUSTER

**Random Groups** (Summer 2014) Medford, MA

A multi-level research group (faculty, graduate students, undergraduates) engaged in a mix of research projects and experimental work on random groups for six weeks at Tufts University. Organized by Moon Duchin as part of her CAREER grant.

SERVICE

**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-led 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 10 students selected from schools in New York City with strong academic potential that might be overlooked by traditional college selection.

CONFERENCES  
ATTENDED

*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