

JACOB RUSSELL

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POSITIONS

Rice University Department of Mathematics

- NSF MSPRF Postdoc 2021 – 2024
Sponsoring scientist: Chris Leininger
- G. C. Evans Instructor 2020 – 2024

EDUCATION

City University of New York (CUNY) Graduate Center June 2020
Ph.D. Mathematics, Advisor: Jason Behrstock

California State University - Sacramento May 2014
B.A. Mathematics, summa cum laude

RESEARCH INTERESTS

The mapping class group and Teichmüller space of a surface, geometric group theory, hierarchically hyperbolic spaces and other generalizations of hyperbolic spaces.

PUBLICATIONS

1. “Equivariant hierarchically hyperbolic structures for 3-manifold groups via quasimorphisms”, with Mark Hagen, Alessandro Sisto, and Davide Spriano. To Appear in **Annales de l’Institut Fourier**, arXiv:2206.12244, 2023
2. “Purely pseudo-Anosov subgroups of general 3-manifold groups”, with Chris Leininger. To appear in **Transactions of the American Mathematical Society**, arXiv:2204.04111, 2022
3. “Structure invariant properties of the hierarchically hyperbolic boundary”, with Carolyn Abbott and Jason Behrstock. To appear in the **Journal of Topology and Analysis**, arXiv:2208.07930, 2023
4. “Thickness and relative hyperbolicity of graphs of multicurves”, with Kate Vokes **Journal of Topology**, vol.15 (4), 2317–2351, 2022
5. “Hierarchical hyperbolicity of graph products”, with Daniel Berlyne. **Groups, Geometry, and Dynamics**. vol 16(2), 523–580, 2022
6. “The (non)-relative hyperbolicity of the separating curve graph”, with Kate Vokes. To appear in **Geometric methods in group theory: papers dedicated to Ruth Charney**, Séminaires et Congrès, arXiv:1910.01051
7. “Convexity in hierarchically hyperbolic spaces”, with Davide Spriano and Hung C. Tran. **Algebraic & Geometric Topology**, vol 23(3), 1167–1248, 2023
8. “Regularity of Morse geodesics and growth of stable subgroups”, with Matthew Cordes, Davide Spriano, and Abdul Zalloum. **Journal of Topology**, vol 15(3), 1217–1247, 2022

9. “The local-to-global property for Morse quasi-geodesics”, with Davide Spriano and Hung C. Tran. **Mathematische Zeitschrift**. vol 300, 1557–1602, 2022
10. “From hierarchical to relative hyperbolicity”. **International Mathematics Research Notices**. vol 2022, 575–624, 2022
11. “Almost HHSs are HHSs”, with Daniel Berlyne. Appendix to *Largest Acylindrical Action and Stability in Hierarchically Hyperbolic Groups*, by Carolyn Abbott, Jason Behrstock, and Matt Durham. **Transactions of the American Mathematical Society, series B**, vol 8, 66–104, 2021
12. “Hierarchically hyperbolic groups are determined by their Morse boundaries”, with Sarah Mousley. **Geometriae Dedicata**. vol 202, 45–67, 2019
13. “A lower bound for the number of finitely maximal C_p -actions on a compact oriented surface”, with Aaron Wootton. **Contemporary Mathematics**. vol 703, 1–11, 2018
14. “Maximal group actions on compact oriented surfaces”, with Valerie Peterson and Aaron Wootton. **Journal of Algebra**. vol 472, 1–14, 2017

PREPRINTS

1. “Hierarchical hyperbolicity of admissible curve graphs” with Aaron Calderon. http://math.rice.edu/~jr92/admissible_curve_graph, 2023
2. “Quasi-isometries of HHGs with one-ended maximal hyperbolic spaces”. Appendix to *Induced Quasi-isometries of Hyperbolic Spaces, Markov Chains, and Acylindrical Hyperbolicity*, by Antoine Goldsborough, Mark Hagen, Harry Petyt, Alessandro Sisto. arXiv:2309.07013, 2023
3. “Relative hyperbolicity and the hierarchically hyperbolic boundary”, with Carolyn Abbott and Jason Behrstock. arXiv:2305.16906, 2023
4. “Extensions of multicurve stabilizers are hierarchically hyperbolic”. arXiv:2107.14116, 2021

GRANTS AND AWARDS

BIRS Workshop 24w5254, <i>Advances in Hierarchical Hyperbolicity</i> .	Summer 2024
NSF Mathematical Sciences Postdoctoral Research Fellowship, grant no. DMS-2103191.	2021 – 2024
Excellence in Teaching Award. CUNY Graduate Center.	2020
Mina Rees Dissertation Fellowship in the Sciences. CUNY Graduate Center.	2019 – 2020
Pre-dissertation Research Fellowship for the Sciences. CUNY Graduate Center.	Summer 2018
GEAR Summer REGS. University of Illinois Urbana–Champaign.	Summer 2017
Doctoral Student Travel Grants. CUNY Graduate Center.	2016, 2018, 2020

TEACHING EXPERIENCE

Rice University	2020 – present
<i>Instructor of record</i>	
<ul style="list-style-type: none"> • Graduate topics course: hyperbolic groups (1 section) • Linear Algebra (2 sections) • Calculus I (1 section) 	

- Baruch College (CUNY)** 2018–2019
Instructor of record
- Applied Calculus and Matrix Algebra (2 sections)
- City College of New York (CUNY)** 2016 – 2017
Instructor of record
- Calculus I (2 sections)
 - College Algebra (1 section)
 - Pre-calculus (1 section)
- W. E. B. Du Bois Scholars Institute** Summer 2015
Curriculum designer and Instructor of record
- Mathematical Problem Solving (3 sections: 2 middle school, 1 high school)

MENTORING

- Rice University**
- Supervised undergraduate research*
- Katherine Chui, hyperbolic cone metrics on surfaces Spring 2022 – present
- Supervised reading courses*
- Geometric group theory (2 students) Spring 2023
 - Graph theory (2 students) and surface topology (1 student) Fall 2021
 - Graph theory (1 student) and surface topology (1 student) Summer 2020
- Mathematical Sciences Research Institute** Summer 2016
Graduate assistant for the MSRI-UP REU program
- Directly supervised research projects for 6 of the 18 undergraduate students.

SERVICE

- Organizer of BIRS Workshop: *Advances in Hierarchical Hyperbolicity*. Banff International Research Station. Summer 2024
- Organizer of the Mentoring in the Mathematical Sciences Workshop. Rice University. November 2023
- Organizer of the Texas Geometry and Topology Conference. Rice University. November 2023
- Instructor with the Houston Math Circle 2021 – 2022
- Organizer of the Anti-racist Teaching Seminar. Rice University Math Department. 2021 – present
- Diversity Committee Co-chair. Rice University Math Department. 2021 – 2023
- Organizer of the Freshmen Math Mentoring Program. Rice University. 2020 – 2021
- Colloquium Committee. Rice University Math Department. 2020 – 2021, 2023 – 2024
- Diversity Committee. Rice University Math Department. 2020 – 2021, 2023 – 2024
- Founder and organizer of the Graduate Student Colloquium. CUNY Graduate Center Mathematics Department. 2015 – 2018
- Mathematics department representative, Doctoral Student Council. CUNY Graduate Center. 2015 – 2017
- Referee work: *Commentarii Mathematici Helvetici*, *Transactions of the AMS*, *Algebraic & Geometric Topology*, *Groups Geometry and Dynamics*, *Topology and its Applications*, *Geometriae Dedicata*, MathSciNet Reviews

SEMINAR TALKS

Geometry/Topology Seminar. University of Chicago	October 2023
Geometry/Topology Seminar. University of Illinois Chicago	October 2023
Max Dehn Seminar. University of Utah	October 2023
Undergraduate Colloquium. Rice University	October 2023
MAXIMALS Seminar. Maxwell Institute for Mathematical Sciences. Harriot–Watt University.	March 2023
Geometric Group Theory Seminar. Oxford University.	February 2023
Topology Seminar. University of Wisconsin at Milwaukee.	December 2022
Math Department Colloquium. University of Tennessee - Knoxville.	December 2022
Geometry and Topology Seminar. University of Bristol.	November 2022
Math Department Colloquium. Texas Christian University.	October 2022
Math Department Colloquium. California State University - Sacramento.	October 2022
Geometry/Topology Seminar. University of California at Davis.	October 2022
Geometric Group Theory Seminar. University of Münster.	May 2022
Topology Seminar. University of Texas at Austin.	March 2022
Complex Analysis, Dynamics, and Geometry Seminar. University of Michigan.	February 2022
Long-distance Seminar on Geometric Group Theory. Mexico City.	February 2022
Topology Seminar. Rice University.	February 2022
Dynamics, Geometry, and Groups Seminar. Queen’s University.	November 2021
Geometric Topology Seminar. Columbia University.	November 2021
Topology Seminar. Brandeis University.	November 2021
Tech Talk. Google.	October 2021
Topology Seminar. University of Arkansas.	April 2021
Topology Seminar. Rice University.	September 2020
Topology Seminar. Brandeis University.	March 2020
Geometric Topology Seminar. Columbia University.	February 2020
Geometry and Topology Seminar. Temple University.	January 2020
Topology Seminar. The Ohio State University.	November 2019
Geometry/Topology Seminar. Georgia Institute of Technology.	October 2019
Geometry and Topology Seminar. SUNY Binghamton.	May 2019
Student Talks Series. CUNY Graduate Center.	April 2019
Algebra, Combinatorics, Topology, Geometry, and Number Theory Seminar. University of North Carolina - Greensboro.	May 2019
Geometric Group Theory Reading Group. University of Bristol.	February 2019
Topology/Geometry Seminar. SUNY Buffalo.	November 2018
Dynamics, Geometry, and Groups Seminar. Queen’s University.	September 2018
Topology & Geometric Group Theory Seminar. Cornell University.	September 2018
Geometry and Topology Seminar. CUNY Graduate Center.	May 2018

CONFERENCE TALKS

Group Actions and Low-dimensional Topology. Agol Lab at ICMAT.	July 2023
Geometric Topology in New York. Columbia University.	June 2023
Geometry of Subgroups. Centre de Recherches Mathématiques.	May 2023

AMS Southeastern Sectional: Special Session on Geometric Group Theory. Georgia Tech.	March 2023
AMS Eastern Sectional: Special Session on Automorphisms of Riemann Surfaces, Subgroups of Mapping Class Groups and Related Topics. Tufts University.	March 2022
AMS Eastern Sectional: Special Session on Subgroups in Nonpositive Curvature. Tufts University.	March 2022
Spring Topology and Dynamical Systems Conference: Special Session on Geometric Group Theory. Baylor University.	March 2022
Beyond Hyperbolicity. The Ohio State University. (contributed)	June 2021
Spring Topology and Dynamics Conference: Special Session on Geometric Group Theory. Murray State University.	May 2021
Young Geometric Group Theory VIII. University of the Basque Country. (breakout session)	July 2019
Graduate Student Conference in Algebra, Geometry, and Topology. Temple University.	June 2019
Graduate Student Topology and Geometry Conference. University of Illinois Urbana-Champaign.	April 2019 July 2018
Geometric and Asymptotic Group Theory with Applications. (contributed) Korean Institute of Advanced Study.	July 2018
Topology Student Workshop. Georgia Institute of Technology.	June 2018
Graduate Student Conference in Algebra, Geometry, and Topology. Temple University.	June 2018
Graduate Student Conference in Algebra, Geometry, and Topology. Temple University.	June 2017
AMS/MAA Joint Meetings: Special Session on Mapping Class Groups. Atlanta, GA.	January 2017

LIGHTNING TALKS

1, 2, 3: Curves, surfaces, and 3-manifolds. Nasholim, Israel.	May 2023
Tech Topology Conference. Georgia Institute of Technology.	December 2022
Mapping Class Groups and $\text{Out}(F_n)$. Institut Henri Poincaré.	May 2022
Of Course! Quasi-isometries and Groups: Rigidity and Classification. Ventotene, Italy.	September 2019
Combinatorial and Algebraic Aspects of Geometric Structures. Chiang Mai University.	July 2019
Aspects of Non-Positive and Negative Curvature in Group Theory. Centre International de Rencontres Mathématiques.	June 2019
Redbud Topology Conference. University of Oklahoma.	April 2019
Tech Topology Conference. Georgia Institute of Technology.	December 2018

REFERENCES

Jason Behrstock, Professor of Mathematics,
CUNY Graduate Center and Lehman College, jason.behrstock@lehman.cuny.edu

Christopher J. Leininger, Professor of Mathematics,
Rice University, cjl12@rice.edu

Ruth Charney, Professor of Mathematics,
Brandeis University, charney@brandeis.edu

Alex Wright, Associate Professor of Mathematics,
University of Michigan, alexmw@umich.edu

Stephen Wang, Associate Teaching Professor (teaching reference),
Rice University, sswang@rice.edu