

Mathematics Department
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Current Position

PhD Candidate, Mathematics Department, University of Utah.
Advised by Ken Bromberg.

Education

- 2015 MS in Mathematics, Miami University. Advised by Dan Farley.
2013 BS in Mathematics, Lehigh University.

Research Interests

I am interested in geometry, low dimensional topology and geometric group theory. Specifically my current research focuses on Teichmüller space, big mapping class groups, and an analog of $\text{Out}(F_n)$ for infinite graphs. While a master's student I studied Thompson's groups.

Preprints and Publications

- 2022 *The L^p metrics on Teichmüller space.* (In preparation.)

Coarse geometry of pure mapping class groups of infinite graphs, with George Domat and Sanghoon Kwak. <http://arxiv.org/abs/2201.02559>
- 2021 *Finding and combining indicable subgroups of big mapping class groups,* with Carolyn Abbott, Marissa Loving, Priyam Patel, and Rachel Skipper. (Submitted.)
<https://arxiv.org/abs/2109.05976>
- 2018 R. Berns-Zieve, D. Fry, J. Gillings, H. Hoganson, H. Matthews. *Groups with context-free co-word problem and embeddings into Thompson's group V .* <http://arxiv.org/abs/1407.7745>
Appears in: Broaddus, N., Davis, M., Lafont, J., and Oritz, I. (Eds.). (2018). *Topological Methods in Group Theory* (London Mathematical Society Lecture Note Series). Cambridge: Cambridge University Press.
- 2016 R. Akhtar, B. Burns, H. Hoganson, H. Mansfield, O. Sobieska, and Z. Woods. *Splitting techniques and the Betti numbers of secant powers.* *Involve* 9 (2016), no. 5, 737-750.
<https://projecteuclid.org/journals/involve-a-journal-of-mathematics/volume-9/issue-5>

Awards

AMS Virtual Grad Student Travel Grants to JMM, January 2022.

NSF Research and Training Grant Fellowship #1840190, University of Utah, Fall 2020, Spring 2020.

NSF Research and Training Grant Fellowship #1246989, University of Utah, Spring 2016, Fall 2015.

Zoltan Balogh Memorial Award in Recognition of Outstanding Scholarship, Miami University, awarded May 2015. *A memorial fund established to provide a yearly prize to students who have distinguished themselves, not only by excellent course work but also by going beyond the usual requirements for the degree.*

Talks

INVITED TALKS

2022 * AMS Spring Southeastern Sectional Meeting, special session “Trends in Teichmüller Theory”.

* University of Arkansas Topology seminar. February 10.

Groups and Dynamics Seminar at UT Austin. January 12.

* “The L^p metrics on Teichmüller space:” JMM special session on geometric group theory. (postponed.)

2021 “A Graph Analogue of Big Mapping Class Groups:” Big Surf Seminar, <http://fanoni.perso.math.cnrs.fr/bigsurf.html>.

“Indicable Subgroups of Big Mapping Class Groups:” Topology Seminar at the Ohio State University.

“The L^p metrics on Teichmüller space:” Redbud Topology Workshop, Oklahoma State University (given virtually).

CONTRIBUTED TALKS

2020 “The L^p metrics on Teichmüller space:” Topology Students Workshop, Georgia Tech (given virtually).

2014 “A Variation of Thompson’s Group V with Context-free Co-word Problem”:

1. Algebra Seminar, Miami University.
2. BUGCAT Conference, Binghamton University.

2013 “Identities in Quasigroups and Loops”: JMM Undergraduate Poster Session.

SELECTED EXPOSITORY TALKS AT THE UNIVERSITY OF UTAH

- 2019 “Spectral Interpretations of Property (T) ”: Stallings Seminar.
“Proofs without Words”: Undergraduate Student Colloquium.
“Groups Quasi-Isometric to \mathbb{H}^3 Act Geometrically”: Stallings Seminar.
- 2017 “Euclidean Cone Metrics from Quadratic Differentials”: Stallings Seminar.
“Contact Graph of a $CAT(0)$ Cube Complex is Quasi-Isometric to a Tree”: Stallings Seminar.
- 2016 “Venn Diagrams: Beyond Math 1030”: Graduate Student Colloquium.
- 2015 “An Introduction to the Thompson’s Groups”: Mini-Max Dehn Seminar.

Conference Organization

- 2022 * Co-organizer for the conference *Workshop for Inclusive Teaching Practices*. At the University of Utah, Spring 2022.
- 2021 Co-organizer of the Infinite-type surfaces and big mapping class groups session of the Nearly Carbon Neutral Geometric Topology conference. Held virtually. <https://www.ncngt.org>

Conferences Attended

- 2022 * AMS Spring Southeastern Sectional Meeting, special session “Trends in Teichmüller Theory”. University of Virginia.
* Joint Mathematics Meetings. Seattle, Washington. (Postponed.)
- 2021 Women in Groups, Geometry and Dynamics Research Retreat, Big Mapping Class Groups project. Glacier National Park, Montana.
Artin Groups, $CAT(0)$ Geometry and related topics. The Ohio State University.
Nearly Carbon Neutral Geometric Topology. *I was a co-organizer of the Infinite-type surfaces and big mapping class groups session*. Held virtually.
- 2020 Topology Students Workshop. Georgia Institute of Technology (held virtually).
Young Geometric Group Theory IX. Saint-Jacut-de-la-mer, France.
Riemann Surfaces and their Moduli Spaces. University of Utah.
- 2019 Wasatch Topology Conference. Midway, Utah.
Aspects of Geometric Group Theory. IHES summer school.
Young Geometric Group Theory VIII. Bilbao, Spain.
- 2018 Wasatch Topology Conference. Midway, Utah.
- 2014 Binghamton University Graduate Conference in Algebra and Topology. Binghamton University, New York.

Undergraduate Advising

Mentor for the Directed Reading Program at University of Utah. Reading:

1. “Fractal Geometry: Mathematical Foundations and Applications” by Kenneth Falconer, Fall 2022.

2. Assorted Readings on Thompson Groups, Amenability, Property (T) , PL-Morse theory, Spring 2020.
3. “Heads or Tails: An Introduction to Limit Theorems in Probability” by Emmanuel Lesigne, Fall 2019.
4. “Riemannian Geometry” by do Carmo, Spring 2019. (co-advisor with James Farre.)

SUMSRI: Summer Undergraduate Mathematical Sciences Research Institute at Miami University. (REU)

1. Graduate Advisor, Summer 2015.
 - “Quasi-Automorphism Groups of Type F_∞ ”
 - “Discrete Morse Theory and Fundamental Groups in Moduli Spaces of Planar Linkages”
 - “Rational Homology and Discrete Morse Theory on Thompson’s Group T ”
2. Graduate Advisor, Summer 2014. “Groups with Context-Free co-Word Problem and Embeddings into Thompson’s Group V ”
3. Graduate Advisor, Summer 2013. “Betti Numbers of Splittable Graphs”
4. Participant, Summer 2012. “Identities in Quasigroups and Loops”

Teaching

UNIVERSITY OF UTAH

- Calculus III: Spring 2021
- Business Algebra: Summer 2019
- Calculus I: Spring 2019
- Engineering Calculus II: Spring, Summer and Fall 2017, Summer 2018, * Spring 2022
- Introduction to Quantitative Reasoning: Fall 2016

MIAMI UNIVERSITY

- Calculus I: Spring 2015
- Precalculus: Fall 2013, Spring 2014, Fall 2014

MISCELLANEOUS

- Math 13: A one week intensive bridge course for students transitioning from a traditional Calc I course into Engineering Calc II. January 2022, University of Utah.
- Complex Analysis qualifying exam preparatory sessions. August 2021, University of Utah.

Note: I was the instructor of record for all the above courses.

Teaching Enrichment

- * *Workshop for Inclusive Teaching Practices*, a conference at the University of Utah upcoming in Spring 2022. I am a co-organizer.
- *Learning Assistant Utilizing Instructors' Pedagogy Power Ups*, led by Jess Cleeves. Workshops designed to help instructors maximize the impact of LAs in their courses. Spring 2019.
- *Orchestrating a Productive Mathematical Conversation*, led by Brendan Kelly. Weekly series of conversations on facilitating mathematical discussion in the classroom. Summer 2018.
- Graduate Student Teaching Seminar at University of Utah. Spring 2017.

Service to the Profession

GRADUATE STUDENT ADVISORY COMMITTEE POSITIONS

- Chair of the Professional Development sub-committee. Fall 2021 through Spring 2022.
- Co-chair of the Retention, Promotion, Tenure and Hiring sub-committee. Fall 2020 through Spring 2021.
- Professional Development sub-committee. Fall 2020 through Spring 2021.
- Mentor for the Peer Mentoring Program for Incoming Graduate Students. Fall 2020 through Spring 2021.
- Co-chair of the Graduate Student Advisory Committee. Summer 2018, and the Spring 2019 through Spring 2020 semesters.
- Recruitment sub-committee. Spring 2017 and Spring 2018.
- Graduate Student Life sub-committee. Summer 2017 through Spring 2018.

ASSOCIATION FOR WOMEN IN MATHEMATICS

- I started a mentoring network pairing undergraduate math majors with graduate student mentors through the University of Utah's chapter of the AWM.
- Chair of the AWM mentoring committee Fall 2018 through Spring 2020.
- Organizer of AWM lunch discussions Fall 2019 through Spring 2020.

UNIVERSITY COMMITTEES

- Graduate student representative on the College of Science 2019-20 Scholarship and Awards Committee.
- Graduate student representative on the College of Science Academic Appeals Committee and Academic Misconduct Committee. The term lasted October 2019 through July 2021.