Rylee Alanza Lyman

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Research
Interests

Geometric group theory, geometric topology, outer automorphism groups, mapping class groups, Coxeter groups, deformation spaces of group actions, hyperbolic and CAT(0) geometry.

Appointments

Rutgers University at Newark, Postdoctoral Associate, NSF Postdoctoral Fellow   2020–2025

Education

Tufts University, PhD in Mathematics (Advisor: Kim Ruane)   May 2020
Tufts University, MS in Mathematics   May 2017
Columbia University, BA in Mathematics (honors) & Music, *cum laude*   May 2015

Research

End Invariants of Outer Automorphisms of Free Products of Finite and Cyclic Groups
   In preparation.

Étale Groupoids and Mapping Class Groups of Orbifolds and Graphs of Groups
   In preparation. (with Tyrone Ghaswala)

Exponential Dehn Functions for Deformation Groups of Free Splittings
   In preparation. (with Lee Mosher)

Conformal Dimension for Coxeter group boundaries
   In preparation. (with E. Field, R. Gupta and E. Stark)

A Family of CAT(0) Outer Automorphism Groups of Free Products
   Submitted.
   Available at arXiv:2209.04711 [Math.GR]

On Whitehead's Cut Vertex Lemma
   J. Group Theory.
   Available at arXiv:2205.06071 [Math.GR]

Lipschitz Metric Isometries Between Outer Spaces of Virtually Free Groups
   Submitted.
   Available at arXiv:2203.09008 [Math.GR]

CTs for Free Products
   Submitted.
   Available at arXiv:2203.08868 [Math.GR]

Train Track Maps on Graphs of Groups
   Groups Geom. Dyn.
   Available at arXiv:2102.02848 [Math.GR]

Extensions of Hyperbolic Groups Have Locally Uniform Exponential Growth
   Submitted. (with Robert Kropholler and Thomas Ng)
   Available at arXiv:2012.14880 [Math.GR]

Folding-like Techniques for CAT(0) Cube Complexes
   Math. Proc. Camb. Philos. Soc. **173(1)** (2022), 227-238
   (with Michael Ben-Zvi and Robert Kropholler)
   Available at arXiv:2011.05374 [Math.GR]

Some New CAT(0) Free-by-Cyclic Groups
   Mich. Math. J.
   Available at: arXiv:1909.03097 [Math.GR]

Nielsen Realization for Infinite-Type Surfaces
   Proc. Amer. Math. Soc. **149** (2021), 1791–1799 (with S. Afton, D. Calegari and L. Chen)
   Available at arXiv:2002.09760 [Math.GT]

Train Tracks on Graphs of Groups and Outer Automorphisms of Hyperbolic Groups
   PhD thesis. Available at arXiv:2005.00164 [Math.GR]

Talks

Geometry & Topology Seminar   Sep 2022
   City University of New York

Wasatch Topology Conference   Aug 2022
   University of Utah, Brigham Young University

Big Mapping Class Groups at BC   Aug 2022
     Boston College

Mathematics Colloquium   May 2022
     State University of New York at Albany

Joint Mathematics Meetings   Mar 2022
     Topics and Generalizations in Geometric Group Theory, Seattle
     Low-Dimensional Manifolds, Seattle

Special Session, AMS Sectional Meeting   Mar 2022
     Subgroups in Nonpositive Curvature, Tufts University

Spring Topology and Dynamical Systems Conference   Mar 2022
     Baylor University

Tetrahedral Geometry/Topology Seminar   Mar 2022
     West Chester University

Joint Geometry & Topology Seminar   Nov 2021
     Bowling Green State University, University of Toledo

Geometry & Topology Seminar   Nov 2021
     Temple University

Mathematics & Statistics Colloquium   Nov 2021
     Swarthmore College

North British Geometric Group Theory Seminar   Nov 2021
     Newcastle University

Bi-College Math/Stat Colloquium   Oct 2021
     Haverford College

World of Geometric Group Theory   Aug 2021

Groups and Geometry in the South East   June 2021
     Oxford University

Nearly Carbon Neutral Geometric Topology   June 2021

Dynamics and Group Geometry Early Researchers Seminar   May 2021
     Warwick University

Geometric Group Theory and Topology Seminar   Mar 2021
     Tufts University

MAXIMALS Algebra, Geometry and Topology Seminar   Mar 2021
     Heriot-Watt University

Geometry and Topology Seminar   Feb 2021
     Bristol University

Geometry and Topology Seminar   Feb 2021
     Yale University

Random and Arithmetic Structures in Topology Seminar   Dec 2020
     Mathematical Sciences Research Institute

Geometry and Topology Seminar   Nov 2020
     City University of New York

Geometry and Topology Seminar   Oct 2020
     Binghamton University

Pure Math Seminar   Oct 2020
     University of North Carolina–Greensboro

Big Surf(aces) Seminar   Oct 2020

Mathematics Colloquium   Sep 2020
     Rutgers University–Newark

Geometric Group Theory without Boundaries   July 2020
     Mini-course on Bass–Serre Theory

Trends in Low-Dimensional Topology   June 2020

Geometry and Topology Online   June 2020
     Warwick Mathematics Institute

Topology Seminar   May 2020
     University of California Riverside

Geometric Topology Seminar   Apr 2020
     Columbia University

	Topology Seminar	Mar 2020
	University of Wisconsin at Milwaukee	
	Pick My Brain Seminar	Feb 2020
	Northeastern University	
	Geometric Group Theory Seminar	Jan 2020
	McGill University	
	Hyperbolic Lunch	Jan 2020
	University of Toronto	
	Dynamics, Geometry and Groups Seminar	Jan 2020
	Queens University	
	Boston Topology Seminar	Jan 2020
	Brandeis University	
	Special Session, AMS Sectional Meeting	Oct 2019
	Effective and Quantitative Advances in Low Dimensional Topology and Geometric Group Theory, Binghamton University	
	Algebra/Topology Seminar	Oct 2019
	State University of New York at Albany	
	Graduate Seminar	Sep 2019
	Temple University	
	Geometry and Topology Seminar	Sep 2019
	Temple University	
	LG&TBQ	June 2019
	University of Michigan	
	Graduate Student Conference in Algebra, Geometry and Topology	June 2019
	Temple University	
	Spring Topology and Dynamical Systems Conference	Mar 2019
	University of Alabama at Birmingham	
	Geometric Group Theory and Topology Seminar	Nov 2018
	Tufts University	
	Eminar Tufts Student Seminar, *6 talks*	2017–2019
CONFERENCE PARTICIPATION	**Nearly Carbon Neutral Geometric Topology**	Sep 2022
	Communicating Mathematics	Aug 2022
	Cornell University	
	Geometry, Arithmetic and Groups	Jun 2022
	Lightning Talk, University of Texas at Austin	
	Sage Days Duluth	Jun 2022
	Lightning Talk, University of Minnesota at Duluth	
	YGGT X	July 2021
	Lightning Talk, Newcastle University	
	Artin Groups, CAT(0) Geometry and Related Topics	July 2021
	The Ohio State University	
	ParaDIGMS Spring Conference	April 2021
	AMS, IMSI	
	Tech Topology Conference	Dec 2020
	Lightning Talk, Georgia Institute of Technology	
	RTG Mini-Conference	Feb 2020
	University of Utah	
	Tech Topology Conference	Dec 2019
	Lightning Talk, Georgia Institute of Technology	
	Algorithms in Complex Dynamics and Mapping Class Groups	Nov 2019
	ICERM, Brown University	
	Junior Geometry and Topology in the Midwest	Oct 2019
	University of Wisconsin at Madison	

	Wasatch Topology Conference	Aug 2019
	University of Utah, Brigham Young University	
	Aspects of Geometric Group Theory	July 2019
	Institut des Hautes Études Scientifiques	
	Young Geometric Group Theory VIII	July 2019
	Lightning Talk, Colegio Mayor Miguel de Unamuno	
	Spring Opportunities Workshop	Apr 2019
	American Institute of Mathematics	
	Graduate Student Topology and Geometry Conference	Mar 2019
	Lightning Talk, University of Illinois at Urbana-Champaign	
	Junior Geometry and Topology in the Midwest	Oct 2018
	University of Wisconsin at Madison	
	Women and Mathematics Program	May 2016
	Institute for Advanced Study	

Outreach	Panelist, "US-Based Jobs Panel," YGGT X	July 2021
	Co-organizer, Geometric Group Theory Without Boundaries Summer School	July 2021
	Participant, ParaDIGMS Diversity in Graduate Mathematical Sciences conference	Apr 2021
	Panelist, "Gender in Mathematics" Rutgers University	Mar 2021
	Co-organizer, Geometric Group Theory Without Boundaries Summer School	July 2020
	Co-organizer, Tufts Directed Reading Program	AY 2018–20
	Mentor, Tufts Directed Reading Program	Fall 2019
	Mentor, Tufts Directed Reading Program	Summer 2016

Teaching	**Rutgers University**	
	Calculus II	Spring 2022
	Calculus II	Fall 2021
	Basic Linear Algebra	Fall 2021
	Calculus II	Spring 2021
	Topology	Fall 2020
	Tufts University	
	Co-organizer, Graduate Development Seminar	Spring 2020
	Co-organizer, Graduate Development Seminar	Fall 2019
	Math of Social Choice	Summer 2019
	Math of Social Choice	Spring 2019

Awards	Robert P. Guertin Student Leadership Award finalist	2020
	Head Teaching Assistant	AY 2019–20

Service	Organizer, Geometric Group Theory Reading Seminar	AY 2019–20
	Treasurer, Tufts Organization of Graduate Students in Mathematics	AY 2018–19
	Mathematics Department Graduate Union Steward	AY 2017–19
	Mathematics Department Representative, Tufts Graduate Student Council	AY 2017–18
	Graduate Student Member, Tufts Committee on Curricula	AY 2017–18

Other	**Languages:** English (native), German (intermediate), Japanese (intermediate)
	Citizenship: United States of America