Emily Stark

Wesleyan University
Department of Mathematics

Education

Ph.D. in Mathematics, Tufts University	2015
Advisor: Genevieve Walsh	
M.S. in Mathematics, Tufts University	2011
B.A. in Mathematics, Pomona College	2009
Budapest Semesters in Mathematics	Fall 2007

Employment

Assistant Professor, Wesleyan University	2020-present
Wylie Assistant Professor/Lecturer, The University of Utah	2019-2020
Postdoctoral fellow, Technion - Israel Institute of Technology	2016-2019
Postdoctoral fellow, University of Haifa, Department of Mathematics	2015-2016

Research Interests

My research lies in geometric group theory and low-dimensional topology. My interests include spaces with non-positive curvature, quasi-isometric classification and rigidity, notions of commensurability, group boundaries, and surfaces and 3-manifolds.

Awards and Honors

NSF Standard Grant DMS-2204339, PI	$2022 - 2025$
Title: Rigidity and boundaries in non-positive curvature	
NSF Conference Standard Grant DMS-2309427, Co-PI	August 2023
Title: Groups, Actions, and Geometries Conference	
Erwin Schrödinger Institute, Vienna, Research in Teams Grant, 1-month stay	July 2023
Zuckerman STEM Leadership Fellowship	$2017 - 2019$
National Science Foundation Graduate Research Fellowship	$2009 - 2012$
Tufts University Provost Fellowship	2009

Papers

(18) Graphically discrete groups and rigidity. (Joint with A. Margolis, S. Shepherd, D. Woodhouse.) arXiv:2303.04843. *Submitted.*

(17) Coarse Alexander Duality for pairs and applications. (Joint with C. Hruska, H. Tran.) arXiv:2011.00059. *Submitted.*

(16) Free products from spinning and rotating families. (Joint with M. Bestvina, R. Dickmann, G. Domat, S. Kwak, P. Patel.) **L'Enseignement Mathematique.** To appear.

(15) Planar lattice subsets with minimal vertex boundary. (Joint with R. Gupta, I. Levcovitz, A. Margolis.) **Electronic Journal of Combinatorics.** 28 (2021) no. 3.

(14) Surprising circles in Morse boundaries of right-angled Coxeter groups. (Joint with M. Graeber, A. Karrer, N. Lazarovich.) **Topology and its Applications.** 294 (2021) No. 107645.

(13) Action rigidity for free products of hyperbolic manifold groups. (Joint with D. Woodhouse.) **Annales de l'Institut Fourier.** To appear.

(12) Cannon–Thurston maps for CAT(0) groups with isolated flats. (Joint with B. Beeker, M. Cordes, G. Gardam, R. Gupta.) **Mathematische Annalen.** To appear.

(11) Hyperbolic groups that are not commensurably coHopfian. (Joint with D. Woodhouse.)
   International Mathematics Research Notices. no 1. (2021) 582-598.

(10) Nonplanar graphs in boundaries of CAT(0) groups. (Joint with K. Schreve.)
   Groups, Geometry, and Dynamics. 14 (2020) no. 4, 1205-1221.

(9) The visual boundary of hyperbolic free-by-cyclic groups. (Joint with Y. Algom-Kfir and A. Hilion.)
   Israel Journal of Mathematics. 244 (2021) no. 2, 501-538.

(8) Quasi-isometric groups with no common model geometry. (Joint with D. Woodhouse.)
   Journal of the London Mathematical Society. (2) 99 (2019), 853–871.

(7) Detecting a subclass of torsion-generated groups.
   Algebraic and Geometric Topology. 18-7 (2018) 4037-4068.

(6) Surface group amalgams that (don't) act on 3-manifolds. (Joint with C. Hruska and H. Tran.)
   American Journal of Mathematics. (2020) 142(3):885-921.

(5) Topological rigidity fails for quotients of the Davis complex.
   Proceeding of the American Mathematical Society, 146 (2018), no. 12, 5357-5366.

(4) Commensurability for certain right-angled Coxeter groups and geometric amalgams of free groups. (Joint with P. Dani and A. Thomas.) **Groups, Geometry, and Dynamics.** 12 (2018) 1273-1341.

(3) Abstract commensurability and quasi-isometry classification of hyperbolic surface group amalgams.
   Geometriae Dedicata, (2017) 186(1), 39-74.

(2) Intrinsically linked graphs in $\mathbb{R}P^3$. (Joint with J. Federman, J. Foisy, K. McNamara.)
   Involve Journal of Mathematics. (2017) Vol.10-1, $1-20$.

(1) Intrinsically linked graphs in projective space. (Joint with J. Bustamante, J. Federman, J. Foisy, K. Kozai, K. Matthews, K. McNamara, K. Trickey.) **Algebraic and Geometric Topology, 3** (2009) No. 9, $1255-1274$.

Invited Conference Talks

Geometry of Subgroups, CRM Montreal	May 2022
AMS Sectional: Ends and Boundaries of Groups; Mihalik Conference, U. Cincinnati, OH	April 2022
Hyperbolic Groups and Their Generalizations, IHP, Paris, France	June 2022
New York Regional Graduate Mathematics Conference, Syracuse (Plenary speaker)	April 2022
AMS Sectional: Subgroups in Nonpositive Curvature, Tufts University (virtual)	March 2022
Spring Topology and Dynamics Conference, Waco, TX (Semi-plenary speaker)	March 2022
Cascade Topology Conference (virtual)	November 2021
Young Geometric Group Theory X, Newcastle, UK (virtual) (Plenary talk)	July 2021
AMS Sectional: Groups, Geometry, and Topology, Georgia Tech (virtual)	March 2021
Groups and Geometry in the South East, Oxford, England (virtual)	June 2020
Virtual Geometric Group Theory, CIRM, Luminy, France (virtual)	June 2020
AMS Sectional: Geometric Group Theory and Teichmuller Theory, Riverside, CA	November 2019
Non-positive curvature, Warsaw, Poland	May 2019
Summer Conference on Topology and its Applications, WKU (Semi-plenary speaker)	July 2018
Topological and Homological Methods in Group Theory, Bielefeld, Germany	April 2018
Structure of 3-manifold groups, CIRM, Luminy, France	February 2018
Israeli Mathematical Union Annual Meeting, Akko, Israel	May 2017
Spring Topology and Dynamics Conference, Jersey City	March 2017

Non-Positive Curvature in Action, Cambridge, England	January 2017
Israeli Mathematical Union Annual Meeting, Ein Bokek, Israel	June 2016
Topological Methods in Group Theory, Ohio State University	June 2014
Workshop in Geometric Topology, University of Wisconsin-Milwaukee	June 2014
AWM Research Symposium poster session, Santa Clara, CA	March 2013
Binghamton University Graduate Conference in Algebra and Topology	November 2012
Southern California Student Conference on Spatial Graphs, Caltech	April 2009

Invited Seminar Talks and Colloquia

Wesleyan University Topology et al Seminar	October 2022
Louisiana State University Topology Seminar	October 2022
Yale University Geometry and Topology Seminar	September 2022
University of Utah Max Dehn Seminar	September 2022
UNCG Algebra, Number Theory, Topology, Geometry Seminar (virtual)	March 2022
Tufts Geometric Group Theory and Topology Seminar	March 2022
Warwick Geometry and Topology Seminar (virtual)	December 2021
Oxford Topology Seminar (virtual)	November 2021
PATCH Seminar, Bryn Mawr (2 talks)	October 2021
Münster Geometric Group Theory Seminar (virtual)	July 2021
Binghamton Geometry and Topology Seminar (virtual)	April 2021
UNAM Geometric Group Theory Seminar (virtual)	April 2021
Vanderbilt Topology and Group Theory Seminar (virtual)	March 2021
Tufts Geometric Group Theory and Topology Seminar (virtual)	October 2020
Ohio State University Topology Seminar (virtual)	October 2020
ETH Zürich Geometry Seminar (virtual)	June 2020
New York Group Theory Seminar, CUNY (virtual)	May 2020
University of Oklahoma Colloquium	February 2020
University of Oklahoma Geometry and Topology Seminar	February 2020
University of Wisconsin-Madison Geometry and Topology Seminar	October 2019
BYU Topology Seminar	October 2019
University of Oxford Topology Seminar	October 2019
University of Utah Max Dehn Seminar	September 2019
University of Haifa Colloquium	June 2019
Karlsruhe–Heidelberg RTG Colloquium, KIT	May 2019
University of Haifa Geometry and Topology Seminar	November 2018
Temple University Geometry and Topology Seminar	October 2018
Tufts University Geometric Group Theory and Topology Seminar	October 2018
University at Albany Algebra/Topology Seminar	October 2018
Cornell University Topology Seminar	October 2018
University of California Santa Barbara Topology Seminar	June 2018
University of Wisconsin-Milwaukee Topology Seminar	April 2018
CUNY Geometry and Topology Seminar	April 2018
University of Haifa Geometry and Topology Seminar	December 2017
University of Michigan Topology Seminar	October 2017
Tufts University Geometric Group Theory and Topology Seminar	October 2017
Technion University Geometry and Topology Seminar	January 2017
MSRI Seminar, Berkeley, CA	October 2016
Tufts University Geometric Group Theory and Topology Seminar	September 2016

Technion University Geometry and Topology Seminar	December 2015
University of Haifa Geometry and Topology Seminar	November 2015
CCNY Mathematics Colloquium	October 2015
University of Illinois-Chicago Geometry, Topology, and Dynamics Seminar	April 2015
University of Wisconsin-Milwaukee Topology Seminar	April 2015
Brandeis University Topology Seminar	April 2015
Louisiana State University Topology Seminar	February 2015
Bowdoin College Mathematics Colloquium	December 2014
CUNY Geometry and Topology Seminar	November 2014
Tufts University Geometric Group Theory and Topology Seminar	February 2014
Claremont Colleges Topology Seminar	October 2008

Teaching experience

Wesleyan University Courses   2020–present

Math 523, Graduate Topology I (Fall 2022)

Math 121, Calculus I (Fall 2022)

Math 524, Graduate Topology I (Spring 2022)

Math 244, Point-Set Topology (Spring 2022)

Math 223, Linear Algebra (Fall 2021)

Math 122, Calculus II (Fall 2021)

Math 526, Graduate Topology II: Geometric Group Theory (Spring 2021)

Math 121, Calculus I (Spring 2021)

Math 223, Linear Algebra (Fall 2020)

Math 245, Algebraic Topology (Fall 2020)

Wesleyan University Tutorials   2020–present

Reading course with graduate student Arianna Zikos. (Spring 2023)

Reading group on surface subgroups (Fall 2022)
    with faculty I. Adeboye, D. Constantine, C. Leidy, Y. Chang, and graduate students

Reading course with graduate student Arianna Zikos. (Fall 2022)

Honors reading course with undergraduate student Bram Silbert. (Fall 2022)

Reading group on Fuchsian buildings (Spring 2022)
    with D. Constantine, S. Shrestha; E. Shrestha, L. Yardimici, A. Zikos.

Reading course with graduate student Arianna Zikos. (Spring 2022)

Reading course with graduate student Jacob Tolman. (Spring 2022)

Reading group on Fuchsian buildings (Fall 2021)
    with D. Constantine, S. Shrestha; E. Shrestha, L. Yardimici, A. Zikos.

Reading course with graduate student Arianna Zikos. (Fall 2021)

Reading course with undergraduate Duncan Kreutter. (Summer 2021)

The University of Utah   2019-2020

Calculus I (Spring 2020, Fall 2019)

Summer Projects in Mathematics, Technion   September 2018

Co-directed a project on geometric group theory for undergraduates and masters students

Summer@ICERM, Brown University   Summer 2015

Research experience for undergraduates; Mentor to groups in applied topology and dynamics

Tufts University	2012-2015

Instructor:

    Applied Calculus II (Spring 2014, Fall 2013, Spring 2013)

    Calculus II (Summer 2013), *Introduction to Calculus* (Fall 2012)

Teaching Assistant:

    Math of Social Choice (Spring 2015), *Discrete Math* (Fall 2014)

Teaching Assistant, CIRM, Luminy, France	January 2014

Hyperbolic groups mini-course

Teaching Mentor & Grader, Pomona College	2008-2009

Calculus III, Real Analysis I, Galois Theory

Service

Wesleyan Topology et al Seminar Co-organizer	Fall 2021–present
Co-organizer, Groups, Actions, and Geometries Conference, Tufts University	August 2023
Wesleyan Putnam Exam Advisor	Fall 2022
Wesleyan Mathematics Department Colloquium Committee	AY2021-2022
Wesleyan Mathematics Departmental Advisory Committee	Spring 2021
Wesleyan Putnam Exam Advisor	Fall 2020
Organizer and founder, Tufts University Graduate Student Seminar	2010-2015
Co-organizer, JMM MRC Special Session in Geometric Group Theory.	January 2014

Outreach

Middletown Girls in Science Camp, Session on Mathematics	August 2022
Yale SUMRY REU speaker	July 2022
Wesleyan Women in Science student lunch guest	March 2022
Association for Women in Mathematics Panel, Tufts University	March 2022
SUNY Potsdam REU speaker	July 2021
Wesleyan Women in Science student lunch guest	April 2021
Natural Sciences and Mathematics lunch seminar speaker, Wesleyan University	April 2021
Undergraduate Colloquium, University of Utah Pre-REU	June 2020
Undergraduate Colloquium, University of Utah	February 2020
Department lunch seminar speaker, Technion	January 2019
Math/Stats club speaker, Mount Holyoke College	October 2018
Math Circles for elementary and secondary students	2012 - 2015

    Instructor, Harvard Math Circle (Fall 2013, Spring 2014, Fall 2014, Spring 2015)

    Lead organizer, Tufts Math Circle (Fall 2013)

    Instructor, Tufts Math Circle (Spring 2012, Fall 2012, Spring 2013, Fall 2013)

    Guest Lecturer, Northeastern Math Circle (Spring 2013)

Volunteer tutor, Community Learning Center, Cambridge, MA	Jan. 2011 - Jan. 2012

Weekly one-on-one sessions with an adult learner

Volunteer instructor, Museum of Science, Boston	Oct. 2009 - Jan. 2011

Facilitated weekly activities in the Discovery Center

Selected programs attended

Mathematical Research Communities: Geometric Group Theory, Snowbird, UT	June 2013
PCMI-IAS Graduate Summer School in Geometric Group Theory, Park City, UT	July 2012