

# Emily Stark

Wesleyan University  
Department of Mathematics

## Education

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

## Employment

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|---|--------------|
| 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

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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

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| NSF Standard Grant DMS-2204339, PI   | 2022 – 2025 |
| <i>Title: Rigidity and boundaries in non-positive curvature</i>            |             |
| NSF Conference Standard Grant DMS-2309427, Co-PI                           | August 2023 |
| <i>Title: Groups, Actions, and Geometries Conference</i>                   |             |
| 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

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- (19) Graphically discrete groups and rigidity. (Joint with A. Margolis, S. Shepherd, D. Woodhouse.)  
arXiv:2303.04843. *Submitted*.
- (18) Failure of quasi-isometric rigidity for infinite-ended groups. (Joint with N. Lazarovich)  
**Contemporary Mathematics**. To appear.
- (17) Coarse Alexander Duality for pairs and applications. (Joint with C. Hruska, H. Tran.)  
**Algebraic and Geometric Topology**. To appear.
- (16) Free products from spinning and rotating families. (Joint with M. Bestvina, R. Dickmann, G. Domat, S. Kwak, P. Patel.) **L'Enseignement Mathématique**. 69 (2023), no. 3-4, 235-260.
- (15) Action rigidity for free products of hyperbolic manifold groups. (Joint with D. Woodhouse.)  
**Annales de l'Institut Fourier**. 74 (2024), no. 2, 50-544.
- (14) Cannon–Thurston maps for CAT(0) groups with isolated flats. (Joint with B. Beeker, M. Cordes, G. Gardam, R. Gupta.) **Mathematische Annalen**. 384 (2022), no.1-2, 963-987.

- (13) Planar lattice subsets with minimal vertex boundary. (Joint with R. Gupta, I. Levcovitz, A. Margolis.)  
**Electronic Journal of Combinatorics.** 28 (2021) no. 3.
- (12) 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.
- (11) Hyperbolic groups that are not commensurably coHopfian. (Joint with D. Woodhouse.)  
**International Mathematics Research Notices.** no 1. (2021) 582-598.
- (10) 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.
- (9) Nonplanar graphs in boundaries of CAT(0) groups. (Joint with K. Schreve.)  
**Groups, Geometry, and Dynamics.** 14 (2020) no. 4, 1205-1221.
- (8) 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.
- (7) Quasi-isometric groups with no common model geometry. (Joint with D. Woodhouse.)  
**Journal of the London Mathematical Society.** (2) 99 (2019), 853-871.
- (6) Detecting a subclass of torsion-generated groups.  
**Algebraic and Geometric Topology.** 18-7 (2018) 4037-4068.
- (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

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|---|----------------|
| Dubrovnik X - Topology and Dynamical Systems, Croatia                               | June 2024      |
| Riverside Workshop on Geometric Group Theory (4-lecture mini-course)                | May 2024       |
| GAGTA, CIRM, Luminy, France   | February 2024  |
| Fairfield Algebra Regional Meeting  | December 2023  |
| AMS Sectional: Geometry of Groups and Spaces, Buffalo, NY                           | September 2023 |
| Geometry of Subgroups, CRM Montreal   | May 2023       |
| AMS Sectional: Ends and Boundaries of Groups; Mihalik Conference, U. Cincinnati, OH | April 2023     |
| 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      |

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| 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

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| Columbia University Geometric Topology Seminar                     | April 2024     |
| University of Wisconsin-Madison Group Actions and Dynamics Seminar | December 2024  |
| 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   |

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| 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

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| Wesleyan University Courses   | 2020–present |
| <i>Math 523, Graduate Topology II: Low-dimensional geometries</i> (Fall 2024)   |              |
| <i>Math 228, Discrete Math</i> (Fall 2024)                                      |              |
| <i>Math 523, Graduate Topology I</i> (Fall 2023)                                |              |
| <i>Math 121, Calculus I</i> (Fall 2023)   |              |
| <i>Math 523, Graduate Topology I</i> (Fall 2022)                                |              |
| <i>Math 121, Calculus I</i> (Fall 2022)   |              |
| <i>Math 524, Graduate Topology I</i> (Spring 2022)                              |              |
| <i>Math 244, Point-Set Topology</i> (Spring 2022)                               |              |
| <i>Math 223, Linear Algebra</i> (Fall 2021)                                     |              |
| <i>Math 122, Calculus II</i> (Fall 2021)  |              |
| <i>Math 526, Graduate Topology II: Geometric Group Theory</i> (Spring 2021)     |              |
| <i>Math 121, Calculus I</i> (Spring 2021)                                       |              |
| <i>Math 223, Linear Algebra</i> (Fall 2020)                                     |              |
| <i>Math 245, Algebraic Topology</i> (Fall 2020)                                 |              |
| Wesleyan University Tutorials   | 2020–present |
| <i>Reading course with graduate student Arianna Zikos.</i> (Fall 2024)          |              |
| <i>Reading course with graduate student Eleanor Rhoads.</i> (Fall 2024)         |              |
| <i>Reading group on connectivity in group boundaries.</i> (Fall 2024)           |              |
| <i>Reading course with graduate student Arianna Zikos.</i> (Spring 2024)        |              |
| <i>Reading course with graduate student Eleanor Rhoads.</i> (Spring 2024)       |              |
| <i>Reading group on volume in hyperbolic groups</i> (Fall 2023)                 |              |
| <i>with faculty K. Collins, D. Constantine, Y. Chang, and graduate students</i> |              |
| <i>Reading course with graduate student Arianna Zikos.</i> (Fall 2023)          |              |

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| <i>Reading course with graduate student Eleanor Rhoads.</i> (Fall 2023)   |                |
| <i>Reading group on surface subgroups</i> (Fall 2022)<br>with faculty I. Adeboye, D. Constantine, C. Leidy, Y. Chang, and graduate students |                |
| <i>Reading course with graduate student Arianna Zikos.</i> (Fall 2022)  |                |
| <i>Honors reading course with undergraduate student Bram Silbert.</i> (Fall 2022)   |                |
| <i>Reading group on Fuchsian buildings</i> (Spring 2022)<br>with D. Constantine, S. Shrestha; E. Shrestha, L. Yardimici, A. Zikos.          |                |
| <i>Reading course with graduate student Arianna Zikos.</i> (Spring 2022)  |                |
| <i>Reading course with graduate student Jacob Tolman.</i> (Spring 2022)   |                |
| <i>Reading group on Fuchsian buildings</i> (Fall 2021)<br>with D. Constantine, S. Shrestha; E. Shrestha, L. Yardimici, A. Zikos.            |                |
| <i>Reading course with graduate student Arianna Zikos.</i> (Fall 2021)  |                |
| <i>Reading course with undergraduate Duncan Kreutter.</i> (Summer 2021)   |                |
| The University of Utah  | 2019-2020      |
| <i>Calculus I</i> (Spring 2020, Fall 2019)  |                |
| Summer Projects in Mathematics, Technion  | September 2018 |
| <i>Co-directed a project on geometric group theory for undergraduates and masters students</i>  |                |
| Summer@ICERM, Brown University  | Summer 2015    |
| <i>Research experience for undergraduates; Mentor to groups in applied topology and dynamics</i>  |                |
| Tufts University  | 2012-2015      |
| Instructor:   |                |
| <i>Applied Calculus II</i> (Spring 2014, Fall 2013, Spring 2013)  |                |
| <i>Calculus II</i> (Summer 2013), <i>Introduction to Calculus</i> (Fall 2012)   |                |
| Teaching Assistant:   |                |
| <i>Math of Social Choice</i> (Spring 2015), <i>Discrete Math</i> (Fall 2014)  |                |
| Teaching Assistant, CIRM, Luminy, France  | January 2014   |
| <i>Hyperbolic groups mini-course</i>  |                |
| Teaching Mentor & Grader, Pomona College  | 2008-2009      |
| <i>Calculus III, Real Analysis I, Galois Theory</i>   |                |

### **Graduate Student Advising at Wesleyan**

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Ph.D. advisor of Arianna Zikos (May 2025 expected graduation.)  
 Ph.D. advisor of Eleanor Rhoads (May 2027 expected graduation.)

### **Service to Wesleyan**

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| Wesleyan Topology et al Seminar Co-organizer                   | Fall 2021–present |
| Wesleyan Mathematics Departmental Student Engagement Committee | Fall 2024         |
| Wesleyan Putnam Exam Advisor                                   | Fall 2024         |
| Wesleyan Mathematics Departmental Advisory Committee           | Fall 2023         |
| Wesleyan Putnam Exam Advisor                                   | Fall 2022         |
| Wesleyan Mathematics Department Colloquium Committee           | AY2021-2022       |
| Wesleyan Mathematics Departmental Advisory Committee           | Spring 2021       |
| Wesleyan Women’s Ultimate Frisbee Team Advisor                 | Fall 2020         |
| Wesleyan Mathematics Department Secretary                      | Fall 2020         |

Wesleyan Putnam Exam Advisor Fall 2020

### Service

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Co-organizer, AMS Special Session in Geometric Group Theory, U. Albany October 2024  
Co-organizer, AMS Special Session in Geometric Group Theory, UW-Milwaukee April 2024  
Co-organizer, Groups, Actions, and Geometries Conference, Tufts University August 2023  
Organizer and founder, Tufts University Graduate Student Seminar 2010-2015  
Co-organizer, MRC Special Session in Geometric Group Theory. JMM, Baltimore January 2014

### Outreach

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Middletown Girls in Science Camp, Session on Mathematics August 2024  
University of Hartford Undergraduate Mathematics Colloquium September 2023  
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  
Women in Groups, Geometry, and Dynamics research group co-leader Summer 2021  
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

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Mathematical Research Communities: Geometric Group Theory, Snowbird, UT June 2013  
PCMI-IAS Graduate Summer School in Geometric Group Theory, Park City, UT July 2012  
University of Nebraska IMMERSE Summer Program June-July 2009

**Citizenship:** United States of America