

# MurphyKate Montee

Dept. of Mathematics and Statistics  
Carleton College  
Northfield, MN 55057 USA

mmontee@carleton.edu  
mmontee.people.sites.carleton.edu  
+1 (920) 495-0024

## Education

---

PhD in Mathematics <i>University of Chicago</i>	2020
MA in Mathematics <i>Univeristy of Chicago</i>	2016
MASt in Mathematics <i>University of Cambridge</i>	2014
BS in Mathematics (Honors) and Music <i>University of Notre Dame</i>	2013

## Professional Appointments

---

<b>Carleton College</b> Clare Booth Luce Assistant Professor of Mathematics	2020-present
---	--------------

## Research Interests

---

Random groups, CAT(0) cube complexes and cubulated groups, Geometric group theory

## Awards and Fellowships

---

Class of '49 Fellowship (for Faculty Development at Carleton)	2022
Clare Boothe Luce Professorship	2021-present
Carleton College Summer Research Circle	2021
Project Next Fellow <i>Selected as member of Brown'20 cohort by Mathematical Association of America</i>	2020
Chicago Center for Teaching Fellow	2019-2020
Graduate Student Leadership Award <i>Awarded by University of Chicago Student Council</i>	2017
Churchill Foundation Fellowship	2014
NSF Graduate Research Fellowship	2013
Alice T Schafer Prize <i>Awarded by Association for Women in Mathematics for excellence in mathematics</i>	2013

## Grants

---

Erwin Schrödinger Institute, Vienna: Research in Pairs <i>Dynamical, geometric and analytic properties of random groups</i>	2024
NSF LEAPS-MPS: Cubulation and Property (T) in Random Groups (\$162,975, DMS-2317001)	2023
AIM SQuaRE: Algebraic and Combinatorial Properties of Skew-adjacency Matrices of Tournaments	2023
Writing Across the Curriculum and Curricular Innovation Grant <i>with Kate Meyer, for developing 'magnetic poetry' style kits for introductory proof writing</i>	2023
Warhol Curatorial Fellowship <i>\$50,000 to develop exhibit titled Inventing the Mathematician: Decolonizing Mathematics</i>	2022
Writing Across the Curriculum and Curricular Innovation Grant <i>\$8000 for summer workshop on pedagogy of writing in math</i>	2022
FaCE Grant <i>\$25,000 for workshop series on Incorporating Race and Social Justice Issues Into Math and CS Curriculum</i>	2022
University of Chicago Women's Board <i>\$30,000 for Women in STEM Symposium</i>	2019
Inclusive Pedagogy Grant <i>\$5,000 from University of Chicago</i>	2019

## Research Works in Progress

---

- [2] \*\*\*Revathi Mandava, Raka Mitra, and MurphyKate Montee. Negative curvature in the cellular structure of kale leaves. In progress
- [1] Sara Klanderman, MurphyKate Montee, Andrzej Piotrowski, Alex Rice, and Bryan Shader. Boundedness of seidel tournament seeds. In progress

## Mathematical Research Papers

---

- [10] Eduard Einstein, Suraj Krishna, MurphyKate Montee, Thomas Ng, and Martin Steenbock. Random quotients of free products of groups. arXiv:2502.08630. Revisions requested
- [9] Kasia Jankiewicz and MurphyKate Montee. Centers of Artin groups defined on cones. *Proceedings of the Edinburgh Math Society*, 68(1):44–50, 2025
- [8] Sara Klanderman, MurphyKate Montee, Andrzej Piotrowski, Alex Rice, and Bryan Shader. Determinants of seidel tournament matrices. *Linear Algebra and its Applications*, 707:126–3151, 2025
- [7] \*\*\*Lee Li and MurphyKate Montee. Can the derivative of an inverse equal the inverse of a derivative? *College Mathematics Journal*, 56(3):193–199, May 2025
- [6] MurphyKate Montee. Finding Fibonacci in the hyperbolic plane. *Mathematics Magazine*, 97(3):321–327, 2024
- [5] MurphyKate Montee. Random groups at density  $d < 3/14$  act non-trivially by isometries on CAT(0) cube complexes. *Transactions of the AMS*, 376(3):1653–1682, March 2023
- [4] \*\*\*Erik Carlson, Willem Fletcher, MurphyKate Montee, Chi Nguyen, Jarne Renders, and Xingyi Zhang. Graphs with many hamiltonian paths. *Involve: a journal of mathematics*, 18(4), 2025
- [3] MurphyKate Montee. Property (T) in  $k$ -gonal random groups. *Glasgow Mathematical Journal*, 64(3):734–738, 2022
- [2] Colin Adams, Thomas Crawford, Benjamin DeMeo, Michael Landry, Alex Tong Lin, Seojung Park, Saraswathi Venkatesh, and Farrah Yhee. Knot projections with a single multi-crossing. *J. Knot Theory Ramifications*, 24(3), 2015
- [1] MurphyKate Montee. Complementary regions of multi-crossing projections of knots, 2015. arXiv:1210.0453

\*\*\*Indicates publications with undergraduate students.

## Related Publications

---

- [3] *Reading Circle: Trust in Numbers*. With Claudio Gómez-González. Carleton College LTC Blog. April 18, 2020.
- [2] *Applying Teaching Techniques Across Disciplines*. With Brooke McCorkle-Okazaki and Anya Vostinar. Carleton College LTC Blog. April 12, 2020.
- [1] *Inclusive Assessment Practices in STEM*. With Broder, Day-Cooney, et al. Chicago Center for Teaching. 2019.

## Research Talks

---

*What does a typical group look like?*

University of Minnesota - Duluth Colloquium

2025

*Centers of Artin Groups on Cones*

AWM Research Symposium <i>UW Madison</i>	2025
Spring Topology and Dynamics Symposium <i>Christopher Newport University</i>	2025
Joint Math Meetings <i>Seattle, WA</i>	2025
Universität Wien	2024
<i>Cubulation of random quotients of free products</i>	
University of Minnesota Combinatorics Seminar	2025
Bowling Green and University of Toledo Geometry/Topology Seminar	2024
Combinatorial Non-Positive Curvature (BIRS 24w5179) <i>Banff, Can.</i>	2024
Cornell University Topology and Geometric Group Theory Seminar	2023
Workshop in Geometric Topology <i>Colorado College</i>	2023
<i>Hyperbolicity and Cubulation in Random Groups</i>	
Cornell University Oliver Club Colloquium	2023
<i>Property (T) and cubulation in random groups</i>	
Technion Geometry and Topology Seminar <i>Haifa, Israel</i>	2022
UW Madison Dynamics Seminar	2022
AWM Research Symposium: Women in Groups, Geometry, and Dynamics <i>U Minnesota</i>	2022
Temple University Geometry and Topology seminar	2022
ENS Group Theory Seminar	2021
CUNY Geometry and Topology Seminar	2021
Beyond Hyperbolicity, <i>OSU</i>	2021
54th Spring Topology and Dynamical Systems Conference	2021
<i>Random groups at density <math>d &lt; 3/14</math> act non-trivially on a <math>CAT(0)</math> cube complex</i>	
University of Notre Dame Geometry and Topology Seminar	2021
Bristol University BRIJES Seminar	2021
Washington University in Saint Louis Geom/Top Seminar	2020
Tufts University Geometry Seminar	2019
University of Illinois at Chicago Geometry Seminar	2019
Young Geometric Group Theory Conference (Contributed) <i>Bilbao, Sp</i>	2019
Three Manifolds and Geometric Group Theory (Contributed) <i>CIRM, Luminy, Fr</i>	2018
Joint Mathematics Meetings, Mathematics Research from the SMALL Undergraduate Research Program	2018

## Other Presentations

---

<i>Geometry and Other Math: Why do we do it?</i> Guest Lecture, Sensory Cultures of Religion (Carleton)	2025
<i>Teaching Writing to Undergraduate Mathematicians</i> UChicago Math Pedagogy Seminar	2025
<i>Panel: Chicago Center for Teaching Fellowships</i> UChicago Center for Teaching	2023
<i>A 'Liberal Arts Laboratory': Teaching with Archives, Maps, and Rare Books</i> with R Bramlett, K Lewis, J Morton, A Sango, T Lamb, Carleton LTC Lunch	2022
<i>Alternative Assessment: A Linear Algebra Case Study</i> UChicago Math Pedagogy Seminar	2022
<i>Object Based Learning with Art and Exhibitions</i> with Sara Cluggish, Carleton LTC Winter Conference	2021

## Museum Exhibits

---

<i>The Manifest, The Hidden: Geometry and Islam in Contemporary Art</i> Perlman Teaching Museum	2026
Co-curated with Sara Cluggish, Kambiz GhaneaBassiri, and Kamala GhaneaBassiri	

## Selected Conferences Attended

---

Non-positive curvature and applications <i>Newton Institute, Cambridge UK</i>	2025
William Rowan Hamilton Geometry and Topology Workshop: Martin Bridson <i>Trinity College, Dublin</i>	2025
Combinatorial Non-Positive Curvature (24w5179) <i>Banff International Research Station, Banff, Can</i>	2024
AMS Central Sectional Meeting <i>University of Milwaukee</i>	2024

young Geometric Group Theory <i>Bristol University, UK</i>	2024
Groups, Actions, and Geometries <i>Tufts University</i>	2023
Workshop in Geometric Topology <i>Colorado College</i>	2023
Communicating Mathematics <i>Cornell University</i>	2022
Research Experiences for Undergraduate Faculty <i>AIM</i>	2022
Hyperbolic Groups and their Generalizations <i>IHM, Paris, Fr</i>	2022
AWM Research Symposium: Women in Groups, Geometry, and Dynamics <i>U Minnesota</i>	2022
Groups Acting on Fractals <i>CIRM, Luminy, Fr</i>	2022
Beyond Hyperbolicity <i>OSU</i>	2021
54th Spring Topology and Dynamical Systems Conference	2021
Young Geometric Group Theory VIII <i>Bilbao, Sp</i>	2019
Aspects of Non-positive and Negative Curvature in Group Theory <i>CIRM, Luminy, Fr</i>	2019
Graphs, Surfaces, and Cube Complexes <i>Warwick, UK</i>	2018
Joint Mathematics Meetings	2018
Women and Mathematics: Geometry and Randomness in Group Theory <i>IAS</i>	2017
Workshop on Geometric Structure on 3-Manifolds <i>IAS</i>	2015
Chicago Summer School on Topology <i>University of Chicago</i>	2015

## Teaching

---

### Instructor of Record

#### Carleton College

Tessellation <i>Math 295</i>	Sp26
Abstract Algebra <i>Math 342</i>	Sp21, Sp23, F24, W26
Geometries <i>Math 244</i>	Sp22, W26
Linear Algebra with Applications <i>Math 134</i>	F25
Mathematical Structures <i>Math 236</i>	W21, W22, S25
Linear Algebra <i>Math 232</i>	F21*, W23*, W25
Calculus 2 <i>Math 120</i>	F20*, W21, W22, F22
Geometric Group Theory <i>Math 395</i>	F22

#### University of Chicago

Elementary Functions and Calculus I <i>MATH 13100</i>	W19, W20
Elementary Functions and Calculus II <i>MATH 13200</i>	Sp19, Sp20
Linear Algebra <i>MATH 19620</i>	F18
Number Theory (for Secondary Teachers, SESAME Program) <i>MATH50300</i>	W18
Calculus Review Camp <i>Harris School of Public Policy</i>	Sm 17, Sm 18, Sm19
Fundamentals of Teaching Mathematics <i>Chicago Center for Teaching</i>	F19
How To Solve It	F17, F18

### Undergraduate Research Advising

Revathi Mandava: <i>Curvature in Leafy Greens</i> (with Raka Mitra)	W24-present
Kunwu Lyu, Jiayu Xu: <i>Characteristic Polynomials of Ladder Tournaments</i>	Sm25
Nathan Cheng, Lee Li, Nhi Luong, Yang Tan, Xingyi Zhang: <i>Cubulations of Random Groups</i>	Sm24-Sp25
Lee Li: <i>Investigating Derivatives of Inverses and Inverses of Derivatives</i>	Sp23
Akash Ganguly, Xingyi Zhang: <i>Petal Permutations of Highly Knotted Unknots</i>	W23, S23
Chi Nguyen, Xingyi Zhang: <i>Minimal Hamiltonian-Connected Graphs</i>	W21
<i>X. Zhang was awarded Honors in Independent Study for this project</i>	
Erik Carlson, Will Fletcher: <i>Hamiltonian Paths in Non-Hamiltonian Graphs</i>	W21, S21

### Comps Projects

<i>Groups Acting on CAT(0) Cube Complexes</i>	2026
<i>Tournaments</i>	2024-2025
<i>Using History of Math and Ethnomathematics as a Learning Tool in Higher Education</i>	2022
<i>Geometric Group Theory: Hyperbolic and Automatic Groups and the Word Problem</i>	2021

**Undergraduate Directed Readings****University of Chicago Directed Reading Program**

Xingyu Wang: <i>Random Groups and Hyperbolicity</i>	F19
Eric Silva: <i>Riemannian geometry and the Gauss-Bonnet Theorem</i>	Sp16
Eric Silva: <i>Solving the word problem in hyperbolic groups</i>	W16
Jake Koenig: <i>Generating the mapping class group with Dehn twists</i>	F15

**University of Chicago Research Experience for Undergraduates**

Charlotte Rieder: <i>Finitely generating the mapping class groups with Dehn twists</i>	Sm17
Mary Stelow: <i>Hamiltonicity in Cayley graphs and digraphs of finite abelian groups</i>	Sm17
Can Liu: <i>Ramsey theory</i>	Sm16
Emily Gentles: <i>Simple random walks</i>	Sm16

*Key: F = Fall Term, W = Winter Term, Sp = Spring Term, Sm = Summer Term, \* = Two Sections*

**Service****Conference/Seminar Organizing**

Co-organizer, Minnesota Groups and Geometry in Community (MaGGiC) Seminar <i>Joint seminar between Carleton and UMN. Website: sites.google.com/carleton.edu/maggic</i>	2024
Co-organizer, Points, Lines, Angles and Shapes (Carleton College) <i>Symposium on mathematics and art. Website: carleton.edu/math-art-symposium/</i>	2024
Co-organizer, Women in STEM Symposium (University of Chicago) <i>Led a team of nine people to organize and run a two-day symposium with 200 attendees. This event was an extension of the Women in MATH symposium I created as Vice-President of UChicago AWM. Fund-raised over \$50,000. Website: voices.uchicago.edu/womeninstem</i>	2019, 2020

**Outreach**

Interviewee, Girls Talk Math Summer Program <i>Spoke with high school girls interested in math; they produced a podcast based on conversation.</i>	2023
Selection panel, Churchill Foundation Scholarship	2021
Judge, Science Ambassador Scholarship <i>Served on selection committee awarding a full scholarship annually to an undergraduate woman in a STEM major, funded by Cards Against Humanity.</i>	2016-2019
Guest Speaker, Six21 in London, England <i>Gave a talk and led a workshop on women in mathematics to high-school students at Six21, a sixth form in London, England. Also led problem-solving sessions in individual classes throughout the day.</i>	2017

**Professional Service**

Panelist, Undergraduate Research Discussion Group, at NCUWM	2021, 2023-2026
NSF Review Panelist	2024
Co-Organizer, Racial and Social Justice in Math and CS Curriculum Workshop Series	2022-2023
Co-Organizer, Panel on Group Work in Mathematics, run by MAA	2021
Referee for: Algebraic & Geometric Topology, Bulletin of the London Mathematical Society, Discrete and Applied Mathematics, Transactions of the AMS	

**Carleton College**

Faculty Affairs Committee Member	2024-2027	Faculty GeMMS Coordinator ( <i>Gender Minorities in Mathematics and Statistics</i> )	2020-present
Advancing the Liberal Arts Taskforce Member for the College's Strategic Plan			2022-2023
Budget Committee Member			2022-2023
Faculty Compensation Committee Member (Liaison to Budget Committee)			2022-2023
Sophomore Writing Portfolios Reviewer			2021, 2022
Student Fellowships Committee Member			2021-2022

Summer STEM Salon Speaker (*Tiling Rectangles with Squares*) 2021  
 Anti-Racism in Mathematics and Statistics Workshop Co-organizer 2021

### University of Chicago

Mentor, Physical Sciences Division Office of Equity, Diversity, and Inclusion 2019-2020  
 Creator, Fundamentals of Teaching Mathematics Professional Development Workshop 2019  
*Planned and facilitated four 90-minute sessions training graduate students in evidence-based pedagogy, specifically in the context of mathematics education. Topics included active learning and constructivism, designing assessments, inclusive teaching practices, and student centered teaching.*  
 Chapter President, AWM 2018-2019  
 Creator, How to Solve It 2017-2018  
*Created and led a weekly program designed to help undergraduate women develop problem solving and mathematical communication skills.*  
 Representative, University of Chicago Dean of Students Advisory Committee 2016-2018  
 Representative, Departmental Ombudsperson 2016-2018  
 Chapter Vice-President, AWM 2016-2018  
 Organizer, University of Chicago Women in Math Symposium 2017

### Selected Professional Development

---

Summer Workshop on Writing in Math Classes 2022  
*Organizer. With Josh Davis, Claudio Gómez-González, Rafe Jones, Kate Meyer, Steve Scheirer, Caroline Turnage-Butterbaugh*  
 Teaching Circle (Carleton College LTC) 2022  
*with Anya Vostinar (CS) and Brooke McCorkle-Okazaki (Music)*  
 Reading Groups (Carleton College LTC) 2020-2022  
*Grading for Equity, Cheating Lessons, Data Feminism, Ungrading*  
 Winter Teaching Workshops (Carleton College LTC) 2020-2021  
 Summer Reading Circle (Carleton College LTC)  
*Trust in Numbers by Theodore Porter, with Claudio Gómez-González*  
 Student Observer Program (Carleton College LTC) 2021  
 Certificate in College Teaching (Chicago Center for Teaching) 2020  
*Program by Chicago Center for Teaching to help graduate students develop and reflect on their teaching practices; discuss, appraise, and implement pedagogical practices in their own teaching; and receive formative assessment on their teaching. More information at <https://teaching.uchicago.edu/courses-certificates>.*  
 Institute of Maths Pedagogy Cuddesdon, UK 2019  
*Intensive four-day conference focusing on visualization and imagery in math pedagogy. Run by Anne Watson and John Mason.*  
 Individual Teaching Consultation University of Chicago 2019  
 Course Design and College Teaching 2017  
*Term-long class on designing and implementing a plan for teaching a new course as the instructor of record.*

### Professional Memberships

---

Mathematical Association of America (MAA)  
 American Mathematical Society (AMS)  
 Association for Women in Mathematics (AWM)