MurphyKate Montee

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Education

PhD in Mathematics *University of Chicago*	2020
MA in Mathematics *Univeristy of Chicago*	2016
MASt in Mathematics *University of Cambridge*	2014
BS in Mathematics (Honors) and Music *University of Notre Dame*	2009

Professional Appointments

Carleton College 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

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

Grants

- University of Chicago Women's Board *$30,000 to host a Women in STEM Symposium* — 2019
- Inclusive Pedagogy Grant *$5,000 from University of Chicago* — 2019

Teaching

Instructor of Record

Carleton College

Geometries *Math 244*	Sp22
Linear Algebra *Math 232*	F21*
Calculus 2 *Math 120*	F20*, W21, W22
Mathematical Structures *Math 236*	W21, W22
Abstract Algebra *Math 342*	Sp21

University of Chicago

Elementary Functions and Calculus I *MATH 13100*	W19, W20
Elementary Functions and Calculus II *MATH 13200*	Sp19, Sp20

Linear Algebra *MATH 19620*	F18
Number Theory (for Secondary Teachers, SESAME Program) *MATH50300*	W18
Calculus Review Camp *Harris School of Public Policy*	Sm 17, Sm 18, Sm19
Fundamentals of Teaching Mathematics *Chicago Center for Teaching*	F19
How To Solve It	F17, F 18

Undergraduate Research Advising

Erik Carlson, Will Fletcher: *Hamiltonian Paths in Non-Hamiltonian Graphs* arXiv:2106.13372.	2021

Comps Projects

Using History of Math and Ethnomathematics as a Learning Tool in Higher Education	2022
Geometric Group Theory: Hyperbolic and Automatic Groups and the Word Problem	2021

Undergraduate Directed Readings

University of Chicago Directed Reading Program

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

University of Chicago Research Experience for Undergraduates

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

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

Publications

[7] *Random groups at density $d < 3/14$ act non-trivially by isometries on CAT(0) cube complexes.* Submitted. arXiv:2106.14931

[6] ****Hamiltonian Paths in Non-Hamiltonian Graphs.* With Erik Carlson, Willem Fletcher. Submitted. arXiv:2106.13372

[5] *Property (T) in k-gonal random groups.* Submitted. arXiv:2104.01621.

[4] *Mathematics of the Fon People.* With Theresa Helke. Submitted.

[3] *Inclusive Assessment Practices in STEM.* (With Broder, Day-Cooney, et al.) Chicago Center for Teaching. 2019.

[2] *Knot projections with a single multi-crossing.* With C. Adams, T. Crawford, B. DeMeo, M. Landry, A. Lin, S. Park, S. Venkatesh, F. Yhee. Journal of Knot Theory and its Ramifications **24** (3), 2015. arXiv:1208.5742

[1] *Complementary regions of multi-crossing projections of knots.* 2015. arXiv:1210.0453

***Indicates publications with students.

Research Talks

Property (T) and cubulation in random groups

CUNY Geometry and Topology Seminar	2021
Beyond Hyperbolicity, *OSU*	2021
54th Spring Topology and Dynamical Systems Conference	2021

Random groups at density $d < 3/14$ act non-trivially on a CAT(0) cube complex

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) *Bilbao, Sp*	2019
Three Manifolds and Geometric Group Theory (Contributed) *CIRM, Luminy, Fr*	2018
Joing Mathematics Meetings, Mathematics Research from the SMALL Undergraduate Research Program	2018

Conferences Attended

- Beyond Hyperbolicity, *OSU*   2021
- 54th Spring Topology and Dynamical Systems Conference   2021
- Young Geometric Group Theory VIII *Bilbao, Sp*   2019
- Aspects of Non-positive and Negative Curvature in Group Theory *CIRM, Luminy, Fr*   2019
- Graphs, Surfaces, and Cube Complexes *Warwick, UK*   2018
- Joint Mathematics Meetings   2018
- Women and Mathematics: Geometry and Randomness in Group Theory *IAS*   2017
- Workshop on Geometric Structure on 3-Manifolds *IAS*   2015
- Chicago Summer School on Topology *University of Chicago*   2015

Professional Development

- Reading Groups (Carleton College LTC)   2020-2021
  Grading for Equity, Cheating Lessons
- 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.
- What does an anti-racist classroom look like? *University of Chicago*   2019
- 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.
- Inclusive Exams in STEM *University of Chicago*   2019
- Mitigating Implicit Bias in the Classroom *University of Chicago*   2019
- Inclusive Teaching in STEM, with Kimberly Tanner *University of Chicago*   2019
- Individual Teaching Consultation *University of Chicago*   2019
- Promoting an Inclusive Classroom Climate *University of Chicago*   2018
- Teaching in the Distracted Classroom *University of Chicago*   2018
- 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.

Service

Outreach
- Selection panel, Churchill Foundation Scholarship   2021

- Organizer, Women in STEM Symposium   2019, 2020
  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: https://voices.uchicago.edu/womeninstem

- Judge, Science Ambassador Scholarship   2016-2019
  Served on selection committee awarding a full scholarship annually to an undergraduate woman in a STEM major, funded by Cards Against Humanity.

- Guest Speaker, Six21 in London, England   2017
  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.

Professional Service

- Panelist, Undergraduate Research, at Nebraska Conference for Undergraduate Women in Mathematics   2021
- Co-Organizer, Panel on Group Work in Mathematics, run by MAA   2021
- Referee for: Bulletin of the London Mathematical Society, Discrete and Applied Mathematics, Transactions of the AMS

Carleton College

- Sophomore Writing Portfolios Reviewer   2021
- Speaker, Summer STEM Salon (*Tiling Rectangles with Squares*)   2021
- Co-organizer, Anti-Racism in Mathematics and Statistics Workshop   2021
- Faculty GeMMS Coordinator (*Gender Minorities in Mathematics and Statistics*)   2020-present

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

Professional Memberships

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

Hobbies

Classical Vocal Performance (Soprano), Baking Pastries, Knitting, Open-Water Swimming