

Sarah Brauner

CONTACT

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CV updated on February 1, 2022

EDUCATION

- 2017—2023 **University of Minnesota**
PhD Candidate in Mathematics
Advisor: Vic Reiner
- 2019 M.S. in Mathematics
- 2016-2017 **Smith College**
Post-Baccalaureate Program for Women in Mathematics, GPA: 4.0
- 2012-2016 **Reed College**
B.A. in Mathematics/Economics, GPA: 3.87

RESEARCH INTERESTS

Algebraic combinatorics and its intersection with representation theory, algebraic topology

PUBLICATIONS AND PREPRINTS

4. “[Eulerian representations for real reflection groups](#),” *To appear in the Journal of the London Mathematical Society* (2022). [arXiv:2005.05953](#).
3. (With T. Friedmann) “[A Simplified Presentation of Specht Modules](#),” *Journal of Pure and Applied Algebra* (2022): 226(7). [arXiv:1803.10918](#).
2. (With E. Banaian, H. Chandramouli, K. Klinger-Logan, A. Nadeau and M. Philbin.) “[A Workshop to Build Community and Broaden Participation in Mathematics: Reflections on the Mathematics Project at Minnesota](#),” *PRIMUS* (2021).
1. (With F. Glebe and D. Perkinson) “[Enumerating Linear Systems on Graphs](#),” *Mathematische Zeitschrift* (2020) 296(3): 1101-1134. [arXiv:1906.04768](#).

REFEREED CONFERENCE PRECEEDINGS

2. “[Eulerian representations for real reflection groups](#)” *Séminaire Lotharingien de Combinatoire* **85B** (2021), Article # 15. Formal Power Series and Algebraic Combinatorics (FPSAC), Ramat Gan, Israel. (Talk).
1. (With F. Glebe and D. Perkinson) “[Enumerating Linear Systems on Graphs](#)” *Séminaire Lotharingien de Combinatoire* **82B** (2019), Article # 17. Formal Power Series and Algebraic Combinatorics (FPSAC), Ljubljana, Slovenia. (Poster).

IN PREPARATION

3. (With P. Commins and V. Reiner) “Invariant theory of the free LRB.”
2. “A Type B analog of the Whitehouse representation.”
1. (With A. Christiansen and N. Pham.) “Symmetries of complete linear systems on graphs.”

AWARDS AND HONORS

2022	Best Graduate Student Paper (FPSAC 2021)
2021	UMN School of Mathematics Outstanding Service Award
2021	UMN President's Student Leadership and Service Award
2019-2023	NSF Graduate Research Fellowship
2017-2023	UMN College of Science and Engineering Graduate Fellowship <i>Three year graduate fellowship</i>
2017	UMN School of Mathematics Naresh Jain Fellowship <i>Travel and technology fellowship; \$1500.</i>
2016	Phi Beta Kappa
2016	Reed College Meier Award for Distinguished Thesis in Economics <i>Awarded to 1-2 graduating students annually</i>
2012-2016	Reed College Commendation for Academic Excellence (received annually)

GRANTS

2021	MAA Tensor Grant for the Mathematics Project at Minnesota <i>With E. Banaian, M. Philbin, PI Paul Carter; \$6000.</i>
2020	NSA Mathematical Sciences Program for Graduate Student Combinatorics Conference 2021 <i>With E. Banaian, G. Dorpalen-Barry, E. Kelley, E. Stucky, L. Webster, PI Vic Reiner; \$25,000[†].</i>
2020	MAA Tensor Grant for the Mathematics Project at Minnesota <i>With E. Banaian, H. Chandramouli, M. Philbin, PI Paul Carter; \$6000[†].</i>
2019	UMN Campus Climate Grant for the Mathematics Project at Minnesota <i>With E. Banaian, H. Chandramouli, M. Philbin; \$500.</i>
2017	Smith College Summer Research Fellowship Program <i>To conduct research with T. Friedmann; \$4500</i>
2014	Reed College McGill Lawrence Grant <i>To conduct research in South Africa; \$3000</i>

INVITED SEMINAR AND CONFERENCE TALKS

	A Type B analog of the Whitehouse representation
2022	<i>RTG seminar in Combinatorics, Geometry, Representation Theory and Topology</i> University of Oregon, Eugene, OR
2022	<i>Algebra and Discrete Mathematics Seminar</i> UC Davis, Davis, CA
2021	CAGE (Combinatorics, Algebra, and Geometry) Seminar University of Pennsylvania, Philadelphia PA
2021	<i>UMass Amherst Discrete Math Seminar</i> University of Massachusetts, Amherst, MA
2021	<i>Cornell Discrete Geometry and Combinatorics Seminar</i> Cornell University, Ithaca, NY
2021	<i>Dartmouth Combinatorics Seminar</i> Dartmouth College, Hanover, NH
	Eulerian representations for real reflection groups
2021	<i>Women in Combinatorics and Representation Theory</i> UC Riverside Diversity and Excellence Workshop (online)

[†] Due to COVID-19, both conferences were made virtual and only a portion of the grants were used.

2020	<i>Arrangements at Home III: Algebraic Aspects</i> Virtual Conference
2020	<i>Graduate Online Combinatorics Colloquium</i>
2020	<i>University of Minnesota Combinatorics Seminar</i> (online) Enumerating Linear Systems on Graphs
2019	<i>AMS Central Fall Sectional Meeting: Combinatorial Algebraic Geometry</i> University of Wisconsin, Madison WI
2019	<i>CAGE (Combinatorics, Algebra, and Geometry) Seminar</i> Drexel University, Philadelphia PA
2019	<i>AMS Northeast Spring Sectional Meeting: Chip Firing and Divisor Theory</i> University of Hartford, Hartford CT On Specht Modules and the CataLANKe Theorem
2018	<i>AMS Central Fall Sectional Meeting: Combinatorics in Algebra and Geometry</i> University of Michigan, Ann Arbor MI

INVITED COLLOQUIUM

2022	Colby College, Waterville, ME
2020	Reed College, Portland, OR
2019	Smith College, Northampton, MA

TEACHING

	BEAM (Bridge to Enter Advanced Mathematics)
2021	Junior Faculty: Designed and taught intensive 2-week course on discrete geometry to rising eighth graders
2018	Junior Faculty: Designed and taught 6-week course on Logical Reasoning to rising seventh graders
	University of Minnesota
2019-2020	TA, UMTYMP Calculus II (year-long course covering introduction to proofs and basic linear algebra) for UMN Talented Youth in Mathematics Program (UMTYMP)
2019	TA, UMN REU in Combinatorics
2021	Instructor of record for Senior Capstone Project (Maxwell McKinney)
	Smith College
2016-2017	TA in Tutoring Center, Calculus I, II, III and Linear Algebra
	Reed College
2014-2016	TA in Tutoring Center, Calculus I, II, III and Linear Algebra

ORGANIZING

2018 —	Mathematics Project at Minnesota (MPM) Co-organizer of an annual 4-day workshop for undergraduates from underrepresented groups to increase participation and success in mathematics. As co-organizer I obtain funding, recruit 30+ undergraduate participants and oversee 10-15 graduate student volunteers to plan and implement each workshop session.
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2021-2022	Graduate Online Combinatorics Colloquium (GOCC) Weekly seminar highlighting the work of graduate students in combinatorics.
April 2021	Graduate Student Combinatorics Conference (GSCC) 2021 Weekend conference organized by and for graduate students. The conference featured over 80 graduate student talks, three plenary talks and community building activities. Held online due to COVID-19.
2018-2020	UMN Math Club Weekly club for undergraduate math majors to build community and foster mathematical curiosity
Fall 2019	Hyperplane arrangement seminar and reading group
2018-2019	UMN Graduate Student Combinatorics and Algebra Seminar

MENTORING

Fall 2021	Directed reading project (DRP) mentor with Abigail Goldman-Nagel on chip-firing
2021—	Advisor for Habiba Heshmat, Marie Therese Guerrier, and Mirta Hernandez Carrion
2020—	Research mentor for undergraduate Maxwell McKinney <i>Directing research project on combinatorics of McKay-Cartan quivers</i> <i>Served as official UMN Senior Capstone Advisor Spring 2021</i>
2019—	Research mentor for undergraduates Nhung Pham and Annika Christiansen <i>Directing research project on chip-firing; paper forthcoming</i> <i>Assisted both students in obtaining University funding</i>
Fall 2018	Directed Reading Project (DRP) mentor with Sophie Perron on graph theory
2018—	Mentor for undergraduate math majors through MPM <i>Assist with application materials for fellowships, REUs and graduate school</i>
2018-2019	Mentor and host for incoming graduate students
2017-2019	UMN Women in Science and Engineering Graduate Mentor <i>Mentor for UMN undergraduates interested in STEM</i>
2013	Reed College International Student Mentor

OUTREACH

	Teacher at Saturday Enrichment for MathCEP, University of Minnesota
2019	<i>Logic Games and Puzzles</i> (grades 5-6)
2018	<i>Fractals and Chaos</i> (grades 5-6)
2018	<i>Graph Theory</i> (grades 7-8)
2017	<i>Cryptology</i> (grades 5-6)
2017-2019	Volunteer math tutor for adults seeking GED, <i>Franklin Public Library</i>
2016	MathFest Teaching Assistant: Platonic Solids (grades 6-8), <i>Reed College</i>
2012-2016	Volunteer tutor for low-income youth (grades 9-12), <i>Friends of the Children</i>

BIOGRAPHY

BORN:	January 9, 1993 in New York, NY
CITIZENSHIP:	United States