Sarah Brauner

Contact

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CV updated on May 25, 2021

Education

2017—	**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," arXiv:2005.05953, 2020. *Under review at the Journal of the London Mathematical Society.*

3. (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).

2. (With F. Glebe and D. Perkinson) "Enumerating Linear Systems on Graphs," *Mathematische Zeitschrift* (2020) 296(3): 1101-1134. arXiv:1906.04768.

1. (With T. Friedmann) "A Simplified Presentation of Specht Modules," arXiv:1803.10918, 2018. *Submitted.*

Refereed Conference Preceedings

2. "Eulerian representations for real reflection groups" *Séminaire Lotharingien de Combinatoire* (2021), Formal Power Series and Algebraic Combinatorics (FPSAC), *To appear.* (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).

Awards and Honors

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
	Three year graduate fellowship
2017	UMN School of Mathematics Naresh Jain Fellowship
	Travel and technology fellowship; $1500.
2016	Phi Beta Kappa
2016	Reed College Meier Award for Distinguished Thesis in Economics
	Awarded to 1-2 graduating students annually
2012-2016	Reed College Commendation for Academic Excellence (awarded annually)

Grants

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

Invited Talks

	Eulerian representations for real reflection groups
2021	*Women in Combinatorics and Representation Theory*
	UC Riverside Diversity and Excellence Workshop (online)
2020	*Arrangements at Home III: Algebraic Aspects*
	Virtual Conference
2020	*Graduate Online Combinatorics Colloquium*
2020	*University of Minnesota Combinatorics Seminar* (online)
	Random walks and hyperplane arrangements
2020	*Reed College Mathematics Colloquium*
	Reed College, Portland, OR
	Enumerating Linear Systems on Graphs
2019	*AMS Central Fall Sectional Meeting: Combinatorial Algebraic Geometry*
	University of Wisconsin, Madison WI
2019	*CAGE (Combinatorics, Algebra, and Geometry) Seminar*
	Drexel University, Philadelphia PA
2019	*AMS Northeast Spring Sectional Meeting: Chip Firing and Divisor Theory*
	University of Hartford, Hartford CT
2019	*Smith College Mathematics Colloquium Lunch Talk*
	Smith College, Northampton MA
	On Specht Modules and the CataLAnKe Theorem
2018	*AMS Central Fall Sectional Meeting: Combinatorics in Algebra and Geometry*
	University of Michigan, Ann Arbor MI

Contributed Talks and Posters

2021	**Eulerian representations for real reflection groups** (Talk)
	Formal Power Series and Algebraic Combinatorics 2021 (FPSAC)
	Representation Theory: Categories and Combinatorics (Postdoc seminar)
	Institute for Advanced Studies Program for Women in Mathematics
2019	**Enumerating Linear Systems on Graphs** (Poster)
	Formal Power Series and Algebraic Combinatorics (FPSAC)
	Ljubljana, Slovenia
	ALGECOM XVI
	Loyola University, Chicago, IL
2018	**A generalization of the free Lie algebra and its representations** (Talk)
	USTARS (Underrepresented Students in Topology and Algebra) Conference
	Reed College, Portland OR

Teaching

	University of Minnesota
2019-2020	TA, 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)
	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
	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
2013-2016	Tutor for Introductory Analysis, Multivariate Calculus, Linear Algebra
2016	Grader, Math 382: Algorithms & Data Structures
2015-2016	TA and Grader, Microeconomic Theory
2013-2014	TA and Grader, Introduction to Economics

Organizing

2018 —	**Mathematics Project at Minnesota (MPM)**
	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.
2020—	*Co-organizer* with H. Chandramouli, E. Banaian, M. Philbin
2018-2019	*Mentor:* Planned and implemented several workshop sessions

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.
	Co-organizer with E. Banaian, G. Dorpalen-Barry, E. Kelley, E. Stucky, L. Webster
2018-2020	**UMN Math Club**
	Weekly club for undergraduate math majors to build community and foster mathematical curiosity
	Co-organizer with M. Avery
Fall 2019	**Hyperplane arrangement seminar and reading group**
2018-2019	**UMN Graduate Student Combinatorics and Algebra Seminar**
	Co-organizer with E. Banaian

MENTORING

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

OUTREACH

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

BIOGRAPHY

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