

Rose McCarty

Department of Mathematics
Princeton University
Fine Hall, Washington Road,
Princeton NJ 08544 USA

EMAIL: rm1850@math.princeton.edu
WEB: math.princeton.edu/~rm1850/

Employment

- Princeton University**, Department of Mathematics 2022 - CURRENT
Instructor
NSF Postdoctoral Fellow (Sponsoring Scientist: Maria Chudnovsky)
- University of Warsaw**, Institute of Informatics 2022
Postdoc in ERC project (Principal Investigator: Marcin Pilipczuk)

Education

- University of Waterloo** 2022
Ph.D. in Combinatorics and Optimization (Supervisor: Jim Geelen)
Thesis: “[Local structure for vertex-minors](#)”
- Georgia Institute of Technology** 2017
B.Sc. in Discrete Mathematics, highest honors

Papers

Preprints

20. *First-order model checking on monadically stable graph classes*, with Jan Dreier, Ioannis Eleftheriadis, Nikolas Mählmann, Michał Pilipczuk, and Szymon Toruńczyk. arXiv: 2311.18740, 2023.
19. *Sparse universal graphs for sparse graph families*, with Noga Alon, Natalie Dodson, Carmen Jackson, and Lani Southern. arXiv: 2311.05500, 2023.
18. *Prime and polynomial distances in colourings of the plane*, with James Davies and Michał Pilipczuk. arXiv: 2308.02483, 2023.
17. *Decomposing a signed graph into rooted circuits*. arXiv: 2308.01456, 2023.
16. *Induced C_4 -free subgraphs with high average degree*, with Xiying Du, António Girão, Zach Hunter, and Alex Scott. arXiv: 2307.08361, 2023.

15. *On tree decompositions whose trees are minors*, with Pablo Blanco, Linda Cook, Meike Hatzel, Claire Hilaire, and Freddie Illingworth. arXiv: 2302.12106, 2023.

Accepted

14. *Sparse induced subgraphs in P_6 -free graphs*, with Maria Chudnovsky, Marcin Pilipczuk, Michał Pilipczuk, and Paweł Rzażewski. To appear at SODA 2024. arXiv: 2307.07330.

Published

13. *Grounded L -graphs are polynomially χ -bounded*, with James Davies, Tomasz Krawczyk, and Bartosz Walczak. Discrete & Computational Geometry, 2023.
12. *Geometric graphs with unbounded flip-width*, with David Eppstein. Conference version: Canadian Conference on Computational Geometry (CCCG). arXiv: 2306.12611, 2023.
11. *Flipper games for monadically stable graph classes*, with Jakub Gajarský, Nikolas Mählmann, Pierre Ohlmann, Michał Pilipczuk, Wojciech Przybyszewski, Sebastian Siebertz, Marek Sokolowski, and Szymon Toruńczyk. Conference version: International Colloquium on Automata, Languages and Programming (ICALP), Track B, 2023. Full version: arXiv: 2301.13735.
10. *Colouring polygon visibility graphs and their generalizations*, with James Davies, Tomasz Krawczyk, and Bartosz Walczak. Conference version: Symposium on Computational Geometry (SoCG), 2021. Full version: Journal of Combinatorial Theory, Series B (JCTB), 2023.
9. *Dense induced subgraphs of dense bipartite graphs*. SIAM Journal on Discrete Math (SIDMA), 2021.
8. *Obstructions for bounded shrub-depth and rank-depth*, with O-joung Kwon, Sang-il Oum, and Paul Wollan. Journal of Combinatorial Theory, Series B (JCTB), 2021.
7. *Sublinear separators in intersection graphs of convex shapes*, with Zdeněk Dvořák and Sergey Norin. SIAM Journal on Discrete Math (SIDMA), 2021.
6. *Circle graphs are quadratically χ -bounded*, with James Davies. Bulletin of the London Mathematical Society, 2020.
5. *The grid theorem for vertex-minors*, with Jim Geelen, O-joung Kwon, and Paul Wollan. Journal of Combinatorial Theory, Series B (JCTB), 2020.
4. *7-Connected graphs are 4-ordered*, with Yan Wang and Xingxing Yu. Journal of Combinatorial Theory, Series B (JCTB), 2020.
3. *The extremal function for bipartite linklessly embeddable graphs*, with Robin Thomas. Combinatorica, 2019.

2. *The extremal function and Colin de Verdière graph parameter*. The Electronic Journal of Combinatorics, 2018.

Thesis

1. *Local structure for vertex-minors*, University of Waterloo, 2021.

Selected talks

Plenary talks

European Conference on Combinatorics, Graph Theory and Applications (EUROCOMB), Czech Republic 2023

Invited conference and workshop talks

Structural Graph Theory Bootcamp, Warsaw 2023
 MATRIX-IBS Workshop: Structural Graph Theory Downunder, Australia 2023
 AMS Special Session on Logic, Combinatorics, and their Interactions, Atlanta 2023
 Tenth Annual Workshop on Geometry and Graphs, Barbados 2023
 Workshop on Graph Theory and Combinatorics
 in Memory of Robin Thomas, Atlanta 2022
 Structural Graph Theory Workshop at Gułtowy 2022
 Banff Graph Product Structure Theory Workshop, online 2021
 Dagstuhl Seminar on Sparsity, online 2021
 Canadian Discrete and Algorithmic Math Conference (CanaDAM), online 2021
 Width Parameters Workshop (JCRAALMA), online 2021
 CMS Winter Meeting, Toronto 2019
 Canadian Discrete and Algorithmic Math Conference (CanaDAM), Vancouver 2019
 Oberwolfach Meeting on Graph Theory, Oberwolfach 2019
 SIAM Conference on Discrete Math, Denver 2018
 Workshop on Structure in Graphs and Matroids (SiGMa), Waterloo 2017

Invited seminar talks

Shanghai Center for Mathematical Sciences Combinatorics Seminar, online 2023
 Te Herenga Waka (Victoria University of Wellington), Wellington 2023
 Rutgers University, Discrete Math Seminar, New Brunswick 2023
 Oxford, Discrete Math and Probability Seminar, online 2022
 Tulane University, Algebra and Combinatorics Seminar, New Orleans 2022
 Louisiana State University, Combinatorics Seminar, Baton Rouge 2022

Jagiellonian University, Theoretical Computer Science Seminar, Kraków	2022
Georgia Tech, Graph Theory Seminar, Atlanta	2022
Georgia Tech, Combinatorics Seminar, Atlanta	2021
University of Birmingham, Combinatorics Seminar, online	2021
Princeton University, Discrete Math Seminar, online	2021
Korean Institute for Basic Science, Virtual Discrete Math Colloquium, online	2021
Matroid Union, Graphs and Matroids Seminar, online	2020
Louisiana State University, Combinatorics Seminar, online	2020
LaBRI, Graphs and Optimization Seminar, online	2020
Georgia Tech, Graph Theory Seminar, online	2020
Iowa State University, Discrete Zoominar, online	2020
Incheon National University, Combinatorics Seminar, Incheon	2019
IBS/KAIST, Joint Discrete Math Seminar, Daejeon	2019
LaBRI, Graphs and Optimization Seminar, Bordeaux	2019
Georgia Tech, Graph Theory Seminar, Atlanta	2018

Teaching

Instructor, Department of Mathematics, Princeton University

Calculus I FALL 2023

Instructor, Dept. Combinatorics and Optimization, U. Waterloo

Network Flow Theory FALL 2018

Teaching Assistant, Dept. Combinatorics and Optimization, U. Waterloo

Outstanding TA Award (awarded once a semester) SPRING 2020

Combinatorial Optimization (graduate level) FALL 2020

Graph Theory (graduate level) FALL 2019

Intro to Graph Theory SPRING 2020, SPRING 2019

Intro to Combinatorics WINTER 2020, SUMMER 2018

Intro to Optimization (advanced level) WINTER 2018

Linear Algebra for Engineering FALL 2017

Supervising

Undergraduate research

REU on Combinatorics and Coding Theory
PACM summer fellowship at Princeton University
Senior thesis at Princeton University
REU on Combinatorics and Coding Theory

JUN - JUL 2023
JUN - JUL 2023
SEP 2022 - APR 2023
JUN - JUL 2020

Service

Editorial board member

European Journal of Combinatorics	OCT 2021 - PRESENT
Matroid Union (online math blog – see posts [1, 2])	APR 2020 - PRESENT

Co-organizer

Matroid Union Seminar (weekly online seminar)	APR 2020 - APR 2021
Graphs and Matroids Seminar (weekly local seminar)	SEP 2019 - MAR 2020

Referee

Combinatorica
Journal of Combinatorial Theory Series B (JCTB)
Advances in Combinatorics
Journal of Graph Theory (JGT)
SIAM Journal on Discrete Mathematics (SIDMA)
European Journal of Combinatorics (EJC)
Advances in Applied Mathematics
Journal of Combinatorics
Symposium on Discrete Algorithms (SODA)
Mathematical Foundations of Computer Science (MFCS)
Workshop on Graph-Theoretic Concepts in Computer Science (WG)

Speaker

REU on Combinatorics and Coding Theory	2023
Noetherian Ring Seminar at Princeton University	2023
Magnet Alumni Speaker Series at Wheeler High School	2020
Waterloo Math Undergrad Research Conference	2019
Undergrad Research Program in Combinatorics and Optimization	2019