

# Rose McCarty

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## Employment

**Georgia Institute of Technology** 2024 - PRESENT  
School of Mathematics and School of Computer Science  
*Assistant Professor*

**Princeton University** 2022 - 2023  
Department of Mathematics  
*Instructor and NSF Postdoctoral Fellow* (Sponsoring Scientist: Maria Chudnovsky)

**University of Warsaw** 2022  
Institute of Informatics  
*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. [Universality for graphs with bounded density](#), with Noga Alon, Natalie Dodson, Carmen Jackson, Rajko Nenadov, 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.

## Published

15. *On tree decompositions whose trees are minors*, with Pablo Blanco, Linda Cook, Meike Hatzel, Claire Hilaire, and Freddie Illingworth. Journal of Graph Theory (JGT) 2024.
14. *Sparse induced subgraphs in  $P_6$ -free graphs*, with Maria Chudnovsky, Marcin Pilipczuk, Michał Pilipczuk, and Paweł Rzażewski. Symposium on Discrete Algorithms (SODA) 2024. arXiv: 2307.07330.
13. *Grounded  $L$ -graphs are polynomially  $\chi$ -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 Sokołowski, 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  $\chi$ -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**, School of Mathematics, Georgia Institute of Technology

Combinatorial Analysis (MATH 4032) SPRING 2024

**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	JUN - JUL 2023
PACM summer fellowship at Princeton University	JUN - JUL 2023
Senior thesis at Princeton University	SEP 2022 - APR 2023
REU on Combinatorics and Coding Theory	JUN - JUL 2020

## Service

### Editorial board member

Annals of Combinatorics	FEB 2024 - PRESENT
European Journal of Combinatorics	OCT 2021 - PRESENT
<a href="#">Matroid Union</a> (online math blog – see posts [1, 2])	APR 2020 - PRESENT

### Co-organizer

Colloquium Committee, School of Mathematics	JAN 2024 - PRESENT
<a href="#">Matroid Union Seminar</a> (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