

EDUCATION

PhD in Mathematics, University of Vermont (UVM), Burlington, VT, USA May 2025

Dissertation: *Odd Covers and Graph Saturation*

Advisor: Puck Rombach

MSc in Mathematical Sciences, UVM May 2022

BA in Mathematics and English, UVM Dec 2017

RESEARCH

Fields of interest

Combinatorics; Graph theory

Publications & Preprints

Vertex addition to a ball graph with application to reliability and area coverage in autonomous swarms, CB, P. Rombach, J. Bagrow, and H. R. Ossareh; *arXiv:2506.19197*, 2025.

On odd covers of cliques and disjoint unions, with A. Clifton, E. Culver, P. Frankl, J. Nie, K. Ozeki, P. Rombach, and M. Yin; *arXiv:2408.08598*, 2024.

Tropical geometry of Rado matroids, with R. Danner; *Discrete Math. Lett.*, 14:27–30, 2024.

Trail Trap: a variant of Partizan Edge Geography, with M. Carr, A. Clifton, S. G. Hartke, V. Iršič, N. Sieger, and R. Whitman; *arXiv:2405.05195*, 2024.

A lower bound on the saturation number and a strengthening for triangle-free graphs, with P. Rombach; *arXiv:2402.11387*, 2024.

Node placement to maximize reliability of a communication network with application to satellite swarms, C.B., J. Bagrow, P. Rombach, and H. Ossareh; in 2023 *IEEE Int. Conf. Systems, Man, and Cybernetics (SMC)*, Honolulu, Oahu, HI, USA; 3466–3473.

Toughness of recursively partitionable graphs, with B. Du Preez, K. E. Perry, and P. Rombach; *Theory Appl. Graphs*, 10(2), Article 4, 2023.

Path odd-covers of graphs, with S. Borgwardt, E. Culver, B. Frederickson, P. Rombach, and Y. Yoo; *arXiv:2306.06487*, 2023.

Odd covers of graphs, with A. Clifton, E. Culver, J. Nie, J. O'Neill, P. Rombach, and M. Yin; *J. Graph Theory*, 104:420–439, 2023.

On the last new vertex visited by a random walk in a directed graph, with P. Horn and P. Rombach; *Discrete Math. Lett.*, 11:96–98, 2023.

Subgraph complementation and minimum rank, with C. Purcell and P. Rombach; *Electron. J. Combin.*, 29(1), 2022.

Technical reports

One Algorithm to Rule Them All, with N. Brown, N. Chicoine, B. Emerick, A. Emmanuel, C. Hammond, K. Oluwasegun, O. Pomerenk, L. Schneegans, and H. Taboe. *Mathematics in Industry Reports* (submitted April 2025).

RESEARCH ASSISTANTSHIPS & FELLOWSHIPS

Vermont Space Grant Consortium Graduate Fellowship, UVM	Jul 2024 – Jun 2025
Graduate Research Assistant, UVM	Aug 2022 – Jan 2024
NASA EPSCoR Award	
Supervisor: Hamid Ossareh	

TEACHING

Graduate Primary Instructor, UVM	
Math1212: Fundamentals of Calculus I	Fall 2019, 2020, 2021
Math1077: Exploring Modern Mathematics	Spring 2020, 2021, 2024
Instructor of Conversational English	2018 – 2019
Collèges Le Grand Beauregard and La Coutancière, La Chapelle sur Erdre, France	
Teaching Assistant	2017, 2018
Johns Hopkins Center for Talented Youth, Bristol, RI	
Course: Paradoxes and Infinities	
Tutor	
UVM Tutoring Center, Burlington, VT	2016 – 2018
Math Help Sessions, UVM	2019 – 2024

MENTORING

Graduate Mentor, Polymath Jr. REU	2024
Project group leader, Graduate Research Workshop in Combinatorics	
Path odd-covers of graphs	2022
Odd covers of graphs	2021

AWARDS

Nam Sang Kil Scholarship in Mathematics, UVM	2023
Graduate Teaching Assistant of the Year, Lecture Instruction Category, UVM	2021
John F. Kenney Award, Excellence in mathematics, UVM	2021

AMS Joint Mathematics Meetings Graduate Student Travel Grant	2021, 2024
AMS Graduate Student Sectional Travel Grant	2023
UVM Graduate College Mini-Grant	2022, 2023
The Phi Beta Kappa Society, Alpha of Vermont	2017

SERVICE

Graduate Student Council	2022 – present
College of Engineering and Mathematical Sciences, UVM	
Math Outreach	
Lectured at Governor’s Institutes of Vermont and MathCounts NW VT Chapter Competition	2023
Prepared lessons on combinatorics for high school students (materials available on website)	

ORGANIZING

Joint Mathematics Meetings, Seattle, WA	2025
<i>AMS Special Session on Graphs, Hypergraphs, and Extremal Combinatorics</i> (Co-organizer)	
AMS Spring Central Sectional Meeting, Cincinnati, OH	2023
<i>Special Session on Extremal Graph Theory</i> (Co-organizer)	
UVM Combinatorics Seminar, Burlington, VT (Co-organizer)	2023

WORKSHOPS

15th Emléktábla Workshop – Extremal combinatorics group	2024
SIAM Mathematical Problems in Industry Workshop	2024
Graduate Research Workshop in Combinatorics	2021, 2022
Masamu Advanced Study Institute and Workshops of the Southern Africa Mathematical Sciences Association	2020, 2021, 2023

RELEVANT SKILLS

Coding: Python, \LaTeX and TikZ, HTML, SageMath
 Languages: English (native), French (advanced)

GRADUATE COURSES

Mathematical Sciences Research Institute (MSRI), Berkeley, CA	2022
Random Graphs summer graduate school	

Department of Mathematics & Statistics, UVM

2019 – 2023

Spectral graph theory, extremal graph theory, probabilistic combinatorics, matroids and polytopes, symmetric functions, analysis (functional, complex, measure), algebraic geometry, algebraic topology, abstract algebra

TALKS GIVEN

AMS Spring Eastern Sectional Meeting,* Hartford, CT	Apr 2025
Iowa State University Discrete Math Seminar,* virtual	Feb 2025
Joint Mathematics Meetings,* Seattle, WA	Jan 2025
AMS Special Session on <i>Coloring Problems in Combinatorics</i>	
AMS Special Session on <i>Random Walks on Graphs and Related Parameters</i>	
Summit280, Budapest, Hungary	Jul 2024
NY Graph Theory Workshop,* CUNY Graduate Center, New York, NY	May 2024
NY Combinatorics Seminar,* CUNY Graduate Center, New York, NY	May 2024
AMS Spring Eastern Sectional Meeting,* Howard University, Washington, DC	Apr 2024
AMS Special Session on <i>Recent Trends in Graph Theory</i>	
Dartmouth-UVM Math Day, Dartmouth College, Hanover, NH	Feb 2024
Joint Mathematics Meetings,* San Francisco, CA	Jan 2024
AMS Special Session on <i>Extremal and Probabilistic Combinatorics</i>	
Southern Africa Mathematical Sciences Association (SAMSA) Annual Conference	Nov 2023
University of Pretoria, Pretoria, South Africa	
IEEE Int. Conf. on Systems, Man, and Cybernetics, Honolulu, HI	Oct 2023
AMS Fall Eastern Sectional Meeting,* University at Buffalo (SUNY), Buffalo, NY	Sep 2023
Governor's Institute of Vermont (outreach),* UVM, Burlington, VT	Jul 2023
Rutgers Graduate Combinatorics Seminar,* virtual	Apr 2023
54th Southeastern International Conference on Combinatorics, Graph Theory & Computing (SEICCGTC), Florida Atlantic University, Boca Raton, FL	Mar 2023
MathCounts Northwest VT Chapter Competition (outreach),* UVM, Burlington, VT	Feb 2023
Iowa State University Discrete Math Seminar,* virtual	Jan 2023
Joint Mathematics Meetings, Boston, MA	Jan 2023
AMS Special Session on <i>Research from the Graduate Research Workshop in Combinatorics (GRWC)</i>	
UVM Combinatorics Seminar,* UVM, Burlington, VT	Nov 2022

*Indicates an invited talk

Dartmouth Combinatorics Seminar,* Dartmouth College, Hanover, NH	Nov 2022
Virginia Commonwealth University Discrete Math Seminar,* virtual	Oct 2022
SIAM DM22, Carnegie Mellon University, Pittsburgh, PA	Jun 2022
53rd SEICCGTC, virtual	Mar 2022
UMass Amherst Discrete Math Seminar,* Amherst, MA	Mar 2022
UVM Combinatorics Seminar,* UVM, Burlington, VT	Jan 2022
AMS Fall Central Sectional Meeting, virtual	Oct 2021
UVM Combinatorics Seminar,* UVM, Burlington, VT	Sep 2021
SIAM DM21, virtual	Jul 2021
Northeast Combinatorics Network Discrete Math Day, virtual	Apr 2021
Graduate Students Combinatorics Conference, virtual	Apr 2021
63rd Midwestern Graph Theory Conference (MIGHTY), virtual	Apr 2021
52nd SEICCGTC, virtual	Mar 2021