

# Ronen Wdowinski

Combinatorics Group – Institute of Discrete Mathematics  
Graz University of Technology (TU Graz)  
Steyrergasse 30, 8010 Graz, Austria

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## CURRENT POSITION

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### Postdoctoral Researcher

Sep. 2024 – present

**Supervisor:** Mihyun Kang

Graz University of Technology (TU Graz), Graz, Austria

## EDUCATION

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### PhD in Combinatorics and Optimization

May 2021–Aug. 2024

**Supervisor:** Penny Haxell

**Thesis title:** Arboricity and transversal problems on bounded degree graphs

University of Waterloo, Waterloo ON, Canada

### Master of Mathematics (Combinatorics and Optimization)

Sep. 2019–Apr. 2021

**Supervisor:** Penny Haxell

University of Waterloo, Waterloo ON, Canada

### Bachelor of Science (Major: Mathematics)

Aug. 2015–Jun. 2019

Rice University, Houston TX, USA

## PREVIOUS EMPLOYMENT

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### Instructor

Jan.–Apr. 2024

University of Waterloo, Faculty of Mathematics

MATH 136: Linear Algebra 1 for Honours

### Teaching Assistant

Sep. 2019–Dec. 2023

University of Waterloo, Faculty of Mathematics

- MATH 239: Introduction to Combinatorics three terms, 2019–2020
- MATH 249: Introduction to Combinatorics (Advanced) two terms, 2021–2023
- CO 250: Introduction to Optimization two terms, 2020–2021
- CO 331: Coding Theory two terms, 2021–2022
- CO 342: Introduction to Graph Theory one term, 2022
- CO 351: Network Flow Theory one term, 2021
- CO 370: Deterministic OR Models one term, 2023
- CO 442: Graph Theory two terms, 2020–2022

### Researcher

May–Jul. 2018

University of Texas at Tyler, Tyler TX, USA

- Studied and characterized special inverse semigroups arising from  $C^*$ -algebras and path categories.

### Research Assistant

Jun.–Aug. 2017

University of Miami, Miami FL, USA

- Applied signal processing techniques to the detection of earthquakes along faultlines, programmed in MATLAB.

## PUBLICATIONS AND PREPRINTS

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1. R. Wdowinski, **Hall's theorem for reconfigurations and higher dimensional topological connectedness**, arXiv:2511.04863 (2025), submitted.
2. A. Geisler, M. Kang, M. Sarantis, R. Wdowinski, **Sampling from the antiferromagnetic Ising model on bipartite, regular expander graphs**, (2025), submitted.
3. A. Geisler, M. Kang, M. Sarantis, R. Wdowinski, **Counting independent sets in percolated graphs via the Ising model**, arXiv:2504.08715 (2025), submitted.
4. R. Wdowinski, **Bounded degree graphs and hypergraphs with no full rainbow matchings**, *European Journal of Combinatorics* 133 (2026), 104316.
5. P. Haxell, R. Wdowinski, **Constructing graphs with no independent transversals**, *Electronic Journal of Combinatorics* 31(2) (2024), P2–39.
6. S. Cambie, P. Haxell, R. Kang, R. Wdowinski, **A precise condition for independent transversals in bipartite covers**, *SIAM Journal of Discrete Mathematics* 38(2) (2024), 1451–1461.
7. P. Haxell, R. Wdowinski, **Degree criteria and stability for independent transversals**, *Journal of Graph Theory* 106(2) (2024), 352–371.
8. R. Wdowinski, **On an  $f$ -coloring generalization of linear arboricity of multigraphs**, *Discrete Mathematics* 347(2) (2024), 113777.
9. R. Wdowinski, **Orientation-based edge-colorings and linear arboricity of multigraphs**, *Journal of Graph Theory* 102(4) (2023), 633–647.
10. A. Donsig, J. Gensler, H. King, D. Milan, R. Wdowinski, **On zigzag maps and the path category of an inverse semigroup**, *Semigroup Forum* 100 (2020), 790–805.
11. E. Blaisdell, A. Gyárfás, R. A. Krueger, R. Wdowinski, **Partitioning the power set of  $[n]$  into  $C_k$ -free parts**, *Electronic Journal of Combinatorics* 26(3) (2019), P3–38.

## PRESENTATIONS

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### Conferences and Workshops

1. *Hall's theorem for reconfigurations via colorful simplices*. Discrete Mathematics Meeting, Graz, Austria, Sep. 2025.
2. *Counting independent sets in percolated graphs via the Ising model*. Random Structures & Algorithms (RS&A), Vienna, Austria, Aug. 2025.
3. *Degree conditions for independent transversals*. SFB Kick-off Event, Payerbach, Austria, Sep. 2024.
4. *Bounded degree (hyper)graphs with no transversals*. Fulkerson 100, Waterloo ON, Canada, Jul. 2024.
5. *Bounded degree hypergraphs with no full rainbow structures*. SIAM Conference on Discrete Mathematics (DM24), Spokane WA, USA, Jul. 2024.
6. *Linear arboricity and its  $f$ -coloring generalization via orientations*. CanaDAM 2023, Winnipeg MB, Canada, Jun. 2023.
7. *The linear arboricity of sparse multigraphs via orientations*. 26th Ontario Combinatorics Workshop, Waterloo ON, Canada, May 2022.
8. *Characterization of zigzag inverse semigroups*. Mathfest 2018, Denver CO, USA, Aug. 2018.

### Seminar presentations

1. *Degree conditions for independent transversals*. Advanced Topics in Discrete Mathematics seminar at TU Graz, Graz, Austria, Mar. 2025.
2. *Degree conditions for independent transversals*. Combinatorics, Geometry and Topology seminar at ISTA, Klosterneuburg, Austria, Feb. 2025.
3. *Constructing graphs with no independent transversals*. Graphs and Matroids Seminar at University of Waterloo, Waterloo ON, Canada, Mar. 2024.
4. *An  $f$ -coloring generalization of linear arboricity*. Graphs and Matroids Seminar at University of Waterloo, Waterloo ON, Canada, Mar. 2023.

5. *Linear arboricity and its  $f$ -coloring generalization via orientations.* Invited talk at the Discrete Math Seminar at Georgia State University. Online, Oct. 2022.
6. *The linear arboricity of sparse multigraphs via orientations.* Graphs and Matroids Seminar at University of Waterloo. Waterloo ON, Canada, Jun. 2022.
7. *Partitioning the power set of  $[n]$  into  $C_k$ -free parts.* Budapest Semesters in Mathematics. Budapest, Hungary, Dec. 2018.
8. *Higher-order Szegő theorems.* Science in a Flash recruitment event. Rice University, Houston TX, USA, Apr. 2018.
9. *Recurrent behavior in a nonlinear oscillator chain.* Geometry Lab. Rice University, Houston TX, USA, Apr. 2017.

## AWARDS

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### University of Waterloo

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| 1. SIAM Student Travel Award   | 2024       |
| 2. Ontario Graduate Scholarship + President's Graduate Scholarship<br>One of only five recipients for the 2023 Waterloo international competition. | 2023–2024  |
| 3. International Doctoral Student Award  | 2021–2024  |
| 4. Sinclair Graduate Scholarship   | 2021       |
| 5. Combinatorics and Optimization Graduate Award   | 2021, 2023 |
| 6. International Master's Award of Excellence  | 2019–2021  |

### Rice University

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| 1. Trustee Distinguished Scholarship                                | 2015–2019 |
| 2. Lynn L. Elsenhans Scholarship for mathematical sciences          | 2018–2019 |
| 3. Stephen B. Smith Scholarship (Study abroad scholarship)          | 2018      |
| 4. Judge's Choice Award for Science in a Flash (Presentation award) | 2018      |

## SERVICE

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1. Co-organizer of Graz Combinatorics Seminar at TU Graz (Jan. 2025 – Jan. 2026).
2. Co-organizer of Combinatorics Workshop at Strobl, Austria (Aug. 2025).
3. Co-organizer of SFB reading group on matchings at TU Graz (May 2025).

## ADDITIONAL ACTIVITY: PROGRAMS, SCHOOLS, RESEARCH VISITS, REFEREE

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1. *SFB Summer School:* planar maps, domino tilings, and Markov chains. Pörtschach am Wörthersee, Austria, Sep. 2025.
2. *IAS/Park City Mathematics Institute (PCMI) research program.* Extremal and probabilistic combinatorics, Park City, Utah, Jul. 2025.
3. *ISTA One-Week Research Visit.* Hosted by Benjamin Moore and Matthew Kwan, Klosterneuburg, Austria, Feb. 2025.
4. *DIMEA Combinatorial Potluck 2024.* Workshop with research groups from Brno, Graz, ISTA, and Passau about extremal and probabilistic combinatorics, Brno, Czechia, Nov. 2024.
5. *SLMath Summer School:* concentration inequalities and localization techniques in high dimensional probability and geometry. Berkeley CA, USA, Jul. 2023.
6. *Budapest Semesters in Mathematics.* Undergraduate study abroad, Budapest, Hungary, Sep.–Dec. 2018.
7. *Refereed for:* Proceedings of American Mathematical Society, Journal of Combinatorial Theory Series B, Random Structures & Algorithms, Electronic Journal of Combinatorics, Journal of Graph Theory, Discrete Mathematics, Discrete Applied Mathematics, European Journal of Mathematics.