THIAGO HOLLEBEN

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EDUCATION

Universidade Federal do Rio de Janeiro, Brazil *March 2016 - July 2017 (interrupted)*
Major in Mathematics

Universidade Federal do Rio de Janeiro, Brazil *July 2017 - 2020*
Bachelor in Applied Mathematics

Universidade Federal do Rio de Janeiro, Brazil *August 2019 - December 2021*
Master's degree in Mathematics
Dissertation title: The log-concavity of chromatic polynomials.
Advisor: Seyed Hamid Hassanzadeh

Dalhousie University, Canada *September 2022 - current*
PhD in Mathematics
Advisor: Sara Faridi

ACADEMIC ACHIEVEMENTS

Glendon McCormick Scholarship (2024)

AARMS Graduate Scholarship (2024)

Jane Street Graduate Research Fellowship Award Honorable mention (2024)

Professor Michael Edelstein Memorial Graduate Prize (2023)
Annual prize awarded to a graduate student who shows great promise in the mathematical sciences.

Honours undergraduate research project (2018)
Received an award for best undergraduate research project on the algebraic and combinatorial properties
of Edge Ideals.
Advisor: Seyed Hamid Hassanzadeh

PAPERS ACCEPTED/PUBLISHED

1. *The weak Lefschetz property of whiskered graphs.* Lefschetz Properties. SLP-WLP 2022. Springer INdAM Series, vol 59. Springer, Singapore. doi.org/10.1007/978-981-97-3886-1_5. (2023) With Susan M. Cooper, Sara Faridi, Lisa Nicklasson, Adam Van Tuyl. arxiv:2306.04393

2. *The weak Lefschetz property and mixed multiplicities of monomial ideals.* J Algebr Comb 60, 295–317 (2024). doi.org/10.1007/s10801-024-01337-8. arxiv:2306.13274.

3. *Lefschetz properties of squarefree monomial ideals via Rees algebras.* Journal of Algebra 668, 572-599. (2025) doi.org/10.1016/j.jalgebra.2024.12.030 arxiv:2404.12471.

PAPERS SUBMITTED

1. *Spherical complexes.* (2023) With Sara Faridi. (Submitted) arXiv:2311.07727

2. *Coinvariant stresses, Lefschetz properties and random complexes.* (2025) (Submitted) arxiv:2501.12108

3. *A probabilistic parking process and labeled IDLA.* (2025) (Submitted) With Pamela E. Harris, J. Carlos Martínez Mori, Amanda Priestley, Keith Sullivan and Per Wagenius arxiv:2501.11718

4. *Roller Coaster Gorenstein algebras and Koszul Gorenstein algebras failing the weak Lefschetz property.* (2025) With Lisa Nicklasson arxiv:2502.00155

PREPRINTS AT FINAL STAGE

1. *Realizing resolutions of powers of extremal ideals.* With Trung Chau, Art Duval, Sara Faridi, Susan Morey, Liana Şega.

2. *Spheres and balls as independence complexes.* With Susan M. Cooper, Sara Faridi, Lisa Nicklasson, Adam Van Tuyl.

PRESENTATIONS

1. *Coinvariant stresses, Lefschetz properties and random complexes.* Combinatorial Algebra meets Algebraic Combinatorics, Toronto. January 2025 (talk)

2. *When PDEs meet (Combinatorial) Commutative Algebra II.* Dalhousie Commutative Algebra seminar. November 2024.

3. *When PDEs meet (Combinatorial) Commutative Algebra I.* Dalhousie Commutative Algebra seminar. October 2024.

4. *Simplicial complexes arising from integer programs.* Graduate Online Combinatorics Colloquium. October 2024. (online invited talk)

5. *Inverse PDE problems in Geometry.* Dalhousie graduate student seminar. September 2024. (talk)

6. *Inverse PDE problems in Combinatorics.* Dalhousie honours student seminar. September 2024. (talk)

7. *Lefschetz properties and analytic spread.* Combinatorics and Geometry in Ioaninna. September 2024 (talk)

8. *Roller-Coaster, graphs and Perazzo forms.* Uwefest, Notre Dame university. August 2024 (poster)

9. *Roller-Coaster, graphs and Perazzo forms.* Joint AMS-UMI meeting, Palermo. July 2024 (invited talk)

10. *Lefschetz properties of squarefree monomial ideals via Rees algebras.* Lefschetz properties in Algebra, Geometry, Topology and Combinatorics, Poland. June 2024 (talk)

11. *Lefschetz properties of monomial ideals via Rees algebras.* AMS Sectional meeting, San Francisco. May 2024 (invited talk)

12. *Lefschetz properties of monomial ideals via Rees algebras.* COMA/NAG Graduate seminar, MSRI/SLMath. May 2024 (invited talk)

13. *Lefschetz properties and mixed multiplicities.* Recent developments in Commutative Algebra, MSRI/SLMath. April 2024 (poster)

14. *Powers of a simplex: Resolutions meet Partitions.* Combinatorial Algebra meets Algebraic Combinatorics, Montreal. January 2024 (talk)

15. *Positivity through analytic spread.* Connections workshop, MSRI/SLMath. January 2024 (poster)

16. *Rees algebras and Lefschetz properties of squarefree monomial ideals.* Commutative Algebra section: Canadian Mathematics Society winter meeting, Montreal. December 2023 (invited talk)

17. *Rees algebras and Lefschetz properties of squarefree monomial ideals.* Stockholm Commutative Algebra seminar. October 2023 (online talk)

18. *Lefschetz properties of squarefree monomial ideals.* 10th Heidelberg Laureate Forum, Heidelberg University, Germany. September 2023 (poster, lightning talk)

19. *Algebraic geometry in the wild.* Dalhousie graduate student seminar. October 2023 (talk)

20. *Unimodality and log-concavity in Mathematics.* Dalhousie honours student seminar. October 2023 (talk)

21. *Lefschetz properties of squarefree monomial ideals.* BrianFest, University of Lincoln-Nebraska. August 2023 (poster)

22. *Homological Invariants of ternary graphs.* 34o Colóquio Brasileiro de Matemática, Instituto de Matemática Pura e Aplicada, Brazil. July 2023 (poster)

23. *The weak Lefschetz property and mixed multiplicities of monomial ideals.* MSRI/SLMath Summer School: Commutative Algebra and its Interaction with Algebraic Geometry, Notre Dame university. May 2023 (poster)

24. *Degree of the inverse of a birational monomial map.* MSRI/SLMath Summer School: Commutative Algebra and its Interaction with Algebraic Geometry, Notre Dame university. May 2023 (lightning talk)

25. *The weak Lefschetz property and mixed multiplicities of monomial ideals.* Workshop on Lefschetz Properties in Algebra, Geometry, Topology and Combinatorics, Fields institute. May 2023 (talk)

26. *Lefschetz properties and mixed multiplicities via hyperplane arrangements.* International Centre for Theoretical Physics workshop, Italy. May 2023 (poster)

27. *The weak Lefschetz property and mixed multiplicities of squarefree monomial ideals.* International Centre for Theoretical Physics summer school, Italy. May 2023 (talk)

28. *Homological invariants of ternary graphs.* Banff International Research Station workshop: Interactions Between Topological Combinatorics and Combinatorial Commutative Algebra. April 2023 (talk)

29. *Homological invariants of ternary graphs.* Southern Regional Algebra Conference, Tulane university. March 2023 (online talk)

30. *Homological invariants of ternary graphs.* Combinatorial Algebra meets Algebraic Combinatorics, Waterloo University. January 2023 (poster)

31. *The log-concavity of chromatic polynomials.* Universidade Federal do Rio de Janeiro, Brazil. July 2022 (talk, in portuguese)

32. *Exploring examples with Macaulay2.* Universidade Federal do Rio de Janeiro, Brazil. July 2022 (talk, in portuguese)

33. *Hilbert functions in Combinatorics.* Universidade Federal do Rio de Janeiro, Brazil. July 2022 (talk, in portuguese)

34. *A combinatorial interpretation of the primary decomposition of edge ideals.* Universidade Federal do Rio de Janeiro undergraduate student seminar, Brazil. 2019 (talk, in portuguese)

35. *A brief dictionary between Algebra and Combinatorics.* Semana de Integração Acadêmica da Universidade Federal do Rio de Janeiro, Brazil 2018 (talk, in portuguese)

TEACHING POSITIONS

Instructor: Engineering Mathematics II at Dalhousie Univeristy
Summer of 2023

Teaching assistant at Dalhousie university
Fall of 2022 - current
Teaching assistant at Universidade Federal do Rio de Janeiro
First semester of 2019
Teaching assistant at Universidade Federal do Rio de Janeiro
First and second semester of 2018

LEADERSHIP POSITIONS

Organizer of Week of Applied Mathematics and Mathematical Engineering (SEM^{2}Ap)
Organized virtual Week of Applied Mathematics and Mathematical Engineering (SEM^{2}Ap) in 2020
More info on: Webpage, Youtube, Instagram
Organizer of weekly student seminar at Universidade Federal do Rio de Janeiro
Organized weekly seminars at Universidade Federal do Rio de Janeiro during the second semester of 2019.

SKILLS

Programming: Macaulay2, Sage, Python, Javascript, Julia