

# THIAGO HOLLEBEN

[hollebenthiago@dal.ca](mailto:hollebenthiago@dal.ca) · [website](#)

## EDUCATION

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**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

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**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

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1. *Rees algebras, Symbolic powers and Lefschetz properties of squarefree monomial ideals.* (to be submitted)
2. *Computing homotopy type and homological invariants of independence complexes of ternary graphs.* (2023) With Sara Faridi. [arXiv:2311.07727](#)
3. *The weak Lefschetz property of whiskered graphs.* (2023) With Susan M. Cooper, Sara Faridi, Lisa Nicklasson, Adam Van Tuyl. [arxiv:2306.04393](#). Lefschetz Properties: Current and New Directions, Springer INdAM series, to appear.
4. *The weak Lefschetz property and mixed multiplicities of monomial ideals.* (2023) [arxiv:2306.13274](#)

## IN PROGRESS

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1. *Powers of a simplex.* With Trung Chau, Art Duval, Sara Faridi, Susan Morey, Liana Şega.
2. *On the weak Lefschetz properties of squarefree Gotzmann ideals.* With Sara Faridi.
3. *Pseudomanifolds, generalized whiskerings and the weak Lefschetz property.* With Susan M. Cooper, Sara Faridi, Lisa Nicklasson, Adam Van Tuyl.
4. *Edge ideals of weighted oriented forests via polarization.* With Manohar Kumar.

## PRESENTATIONS

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1. *Powers of a simplex: Resolutions meet Partitions*. Combinatorial Algebra meets Algebraic Combinatorics, Montreal. January 2024
2. *Positivity through analytic spread*. Connections workshop, MSRI/SLMath. January 2024.
3. *Rees algebras and Lefschetz properties of squarefree monomial ideals*. Commutative Algebra section: Canadian Mathematics Society winter meeting, Montreal. December 2023 (invited talk)
4. *Rees algebras and Lefschetz properties of squarefree monomial ideals*. Stockholm Commutative Algebra seminar. October 2023 (online talk)
5. *Lefschetz properties of squarefree monomial ideals*. 10th Heidelberg Laureate Forum, Heidelberg University, Germany. September 2023 (poster, lightning talk)
6. *Algebraic geometry in the wild*. Dalhousie graduate student seminar. October 2023 (talk)
7. *Unimodality and log-concavity in Mathematics*. Dalhousie honours student seminar. October 2023 (talk)
8. *Lefschetz properties of squarefree monomial ideals*. BrianFest, University of Lincoln-Nebraska. August 2023 (poster)
9. *Homological Invariants of ternary graphs*. 34o Colóquio Brasileiro de Matemática, Instituto de Matemática Pura e Aplicada, Brazil. July 2023 (poster)
10. *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)
11. *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)
12. *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)
13. *Lefschetz properties and mixed multiplicities via hyperplane arrangements*. International Centre for Theoretical Physics workshop, Italy. May 2023 (poster)
14. *The weak Lefschetz property and mixed multiplicities of squarefree monomial ideals*. International Centre for Theoretical Physics summer school, Italy. May 2023 (talk)
15. *Homological invariants of ternary graphs*. Banff International Research Station workshop: Interactions Between Topological Combinatorics and Combinatorial Commutative Algebra. April 2023 (talk)
16. *Homological invariants of ternary graphs*. Southern Regional Algebra Conference, Tulane university. March 2023 (online talk)
17. *Homological invariants of ternary graphs*. Combinatorial Algebra meets Algebraic Combinatorics, Waterloo University. January 2023 (poster)
18. *The log-concavity of chromatic polynomials*. Universidade Federal do Rio de Janeiro, Brazil. July 2022 (talk, in portuguese)
19. *Exploring examples with Macaulay2*. Universidade Federal do Rio de Janeiro, Brazil. July 2022 (talk, in portuguese)
20. *Hilbert functions in Combinatorics*. Universidade Federal do Rio de Janeiro, Brazil. July 2022 (talk, in portuguese)

21. *A combinatorial interpretation of the primary decomposition of edge ideals*. Universidade Federal do Rio de Janeiro undergraduate student seminar, Brazil. 2019 (talk, in portuguese)
22. *A brief dictionary between Algebra and Combinatorics*. Semana de Integração Acadêmica da Universidade Federal do Rio de Janeiro, Brazil 2018 (talk, in portuguese)

## LEADERSHIP POSITIONS

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### **Organizer of Week of Applied Mathematics and Mathematical Engineering (SEM<sup>2</sup>Ap)**

Organized virtual Week of Applied Mathematics and Mathematical Engineering (SEM<sup>2</sup>Ap) in 2020

More info on: [Webpage](#), [Youtube](#), [Instagram](#)

### **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

### **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.

## EVENTS ATTENDED

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Combinatorial Algebra meets Algebraic Combinatorics (Montreal) January, 2024

Introductory Workshop: Commutative Algebra (MSRI/SLMath) January, 2024

Connections Workshop: Commutative Algebra (MSRI/SLMath) January, 2024

Canadian Mathematics Society winter meeting (Montreal) December, 2023

10th Heidelberg Laureate Forum 2023 (Heidelberg University, Germany) September, 2023

BrianFest (University of Nebraska-Lincoln) August, 2023

34o Colóquio Brasileiro de Matemática (Instituto de Matemática Pura e Aplicada, Brazil) July, 2023

Commutative Algebra and its Interaction with Algebraic Geometry (University of Notre Dame) May, 2023

Workshop on Lefschetz Properties in Algebra, Geometry, Topology and Combinatorics. (Fields Institute) May, 2023

Workshop on Commutative Algebra and Algebraic Geometry in Prime Characteristics. (International Centre for Theoretical Physics, Italy) May, 2023

School on Commutative Algebra and Algebraic Geometry in Prime Characteristics. (International Centre for Theoretical Physics, Italy) May, 2023

Interactions Between Topological Combinatorics and Combinatorial Commutative Algebra (Banff International Research Station) April, 2023

Combinatorial Algebra meets Algebraic Combinatorics 2023. (Waterloo University) January, 2023

Combinatorial Algebra meets Algebraic Combinatorics 2020. (Dalhousie University) January, 2020

1st Joint Meeting Brazil-France in Mathematics. (Instituto de Matemática Pura e Aplicada, Brazil) 2019

32o Colóquio Brasileiro de Matemática. (Instituto de Matemática Pura e Aplicada, Brazil) 2019

SIMCARA. (Universidade São Paulo: São Carlos, Brazil) 2019

Syzygies, from Theory to Applications. (Universidade Federal da Paraíba, Brazil) 2019

XXV Escola de Álgebra. (Universidade Estadual de Campinas, Brazil) 2018

## SKILLS

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**Programming:** Macaulay2, Sage, Python, Javascript, Julia