

# THIAGO HOLLEBEN

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## 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. *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.
2. *The weak Lefschetz property and mixed multiplicities of monomial ideals*. (2023) [arxiv:2306.13274](#). (Submitted)
3. *Computing homotopy type and homological invariants of independence complexes of ternary graphs*. (2023) With Sara Faridi. [arXiv:2311.07727](#) (Submitted)
4. *Lefschetz properties of squarefree monomial ideals via Rees algebras*. (2024) [arxiv:2404.12471](#). (Submitted)

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

20. *Exploring examples with Macaulay2*. Universidade Federal do Rio de Janeiro, Brazil. July 2022 (talk, in portuguese)
21. *Hilbert functions in Combinatorics*. Universidade Federal do Rio de Janeiro, Brazil. July 2022 (talk, in portuguese)
22. *A combinatorial interpretation of the primary decomposition of edge ideals*. Universidade Federal do Rio de Janeiro undergraduate student seminar, Brazil. 2019 (talk, in portuguese)
23. *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.

## SKILLS

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