

# SERGIO CRISTANCHO

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**Languages:** Spanish (native), English (fluent), German, Italian (intermediate).

**Citizenship:** Colombian.

## PERSONAL STATEMENT

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I am a third year graduate student in Applied and Computational Mathematics at Princeton University. My interests lie in the intersection of algebra, geometry and combinatorics, and applications.

## EDUCATION

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### Princeton University

P.h.D. in Applied Mathematics.

Princeton, New Jersey

*Ongoing*

### Universidad de los Andes

M.S. in Mathematics,

B.S. in Physics,

B.S. in Mathematics.

Bogotá, Colombia

2023

2021

2020

## RESEARCH

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### Publications:

Harmonic Hierarchies for Polynomial Optimization. With Mauricio Velasco. 2024. *SIAM Journal on Optimization* 2024 34:1, 590-615. <https://doi.org/10.1137/22M1484511>

### Preprints:

Extremal Graphs for the Lights Out Problem. With Julien Codsi, Alexander Divoux and Varun Sivashankar. 2026. <https://arxiv.org/abs/2602.07241>

Tree metrics and log-concavity for matroids. With Federico Ardila, Graham Denham, Chris Eur, June Huh and Botong Wang. 2026. <https://arxiv.org/abs/2601.02547>

### Talks:

Lorentzian polynomials and triangular hyperfields. *Arbeitsgemeinschaft: Combinatorial Hodge Theory*, Mathematisches Forschungsinstitut Oberwolfach, October 2025.

Inequalities for metric trees and matroids. *Discrete Math Seminar*, University of Massachusetts Amherst, September 2025.

Three proofs of the reverse Khovanskii-Teissier Inequality. *Special Year Seminar*, Institute for Advanced Study, January 2025.

Harmonic Hierarchies for Polynomial Optimization on Homogeneous Spaces. *SIAM Conference on Applied Algebraic Geometry 2023 (SIAM AG23)*, Eindhoven University of Technology, July 2023.

Harmonic Hierarchies for Polynomial Optimization. *International Conference on Continuous Optimization (ICCOPT 2022)*, Lehigh University, July 2022.

Harmonic Hierarchies for Polynomial Optimization. *Conferencia Colombiana de Matemáticas Aplicadas e Industriales (MAPI 2)*, June 2022.

## TEACHING & COMMUNITY INVOLVEMENT

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### Teaching Assistant

Abstract Algebra,  
Honors Linear Algebra,  
Applied Algebra.

Princeton University

### Teaching Assistant

Real Analysis,  
Abstract Algebra,  
Enumerative Combinatorics,  
Linear Algebra.

Universidad de los Andes

### Mentor for the Directed Reading Program

Princeton University

## INDUSTRY EXPERIENCE

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### Research and Development

Mathematical model developer.

Melius I+D

Nov. 2020 - Jul. 2023