

## Tristram Bogart

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### Basic Information

**Birthdate:** February 2, 1980

**Citizenship:** United States

**Languages:** English (native), Spanish (fluent)

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### Education

Ph.D in Mathematics, University of Washington, September 2001–June 2007. Adviser: Rekha R. Thomas,

B.A. in Mathematics, August 1997–June 2001; graduated with high honors.

Budapest Semesters in Mathematics. Budapest, Hungary, January–May 2000.

### Professional Experience

**Associate Professor**, Departamento de Matemáticas, Universidad de los Andes, February 2015–present.

**Visiting Researcher**, Mathematics Department, San Francisco State University, August–December 2017.

**Assistant Professor**, Departamento de Matemáticas, Universidad de los Andes, August 2011–January 2015.

**NSF/MSRI Postdoctoral Fellow**, Mathematics Department, San Francisco State University, August 2010–May 2011.

**Coleman Postdoctoral Fellow**, Department of Mathematics and Statistics, Queen's University, Kingston, Ontario, Canada, July 2007–June 2010.

**Postdoctoral Fellow**, Mathematical Sciences Research Institute, August–December 2009.

**Research assistant** at San Francisco State, 1 May – 20 June 2008.

**Long-term Visitor**, Institute for Mathematics and its Applications, Minneapolis, January–March 2007.

## Refereed Publications and Preprints

1. A differential characterization of volume polynomials of permutohedra (with Federico Castillo, Damián de la Fuente and David Plaza.) Submitted.
2. Counting with two-level polynomials (with Kevin Woods.) Submitted.
3. Improved upper bounds on key invariants of Erdős-Rényi numerical semigroups (with Santiago Morales.) Submitted.
4. Bounds on determinantal complexity of two types of generalised permanents (with Juan Andrés Valero.) *Theoretical Computer Science*, v. 1071, 2026, paper # 115862.
5. Unboundedness of irreducible decompositions of numerical semigroups (with Seyed Amin Seyed Fakhari.) *Communications in Algebra* v. 53, 2025, pp. 1361–1364.
6. An Ehrhart theoretic approach to generalized Golomb rulers (with Daniel Felipe Cuéllar.) *Contributions to Discrete Mathematics* v. 20 (2), 2025, pp. 481–496.
7. Numerical semigroups via projections and via quotients (with Christopher O’Neill and Kevin Woods.) *Discrete and Computational Geometry*, v. 74 (1), 2024, pp. 114–134.
8. When is a numerical semigroup a quotient? (with Christopher O’Neill and Kevin Woods.) *Bulletin of the Australian Mathematical Society*, v.109 (1), 2024, pp. 67–76.
9. Complex psd-minimal polytopes in dimensions two and three (with João Gouveia and Juan Camilo Torres.) *Journal of Algebra and its Applications* v. 23 (2), 2024, article 2450025.
10. A plethora of polynomials: a toolbox for counting problems (with Kevin Woods.) *The American Mathematical Monthly* v. 129 (3), 2022, pp. 203–222.
11. An algebraic approach to projective uniqueness with an application to order polytopes (with João Gouveia and Juan Camilo Torres.) *Discrete and Computational Geometry* v. 67 (2), 2021, pp. 462–491.
12. Constructing partial MDS codes from reducible curves (with Anna-Lena Horlemann-Trautmann, David Karpuk, Alessandro Neri, and Mauricio Velasco.) *SIAM Journal on Discrete Mathematics* v. 35 (4), 2021, pp. 2946–2970.
13. Periodic behavior in families of numerical and affine semigroups via parametric Presburger arithmetic (with John Goodrick and Kevin Woods.) *Semigroup Forum* v. 102 (2), 2021, pp. 340–356..
14. The Parametric shortest and closest vector problems (with John Goodrick and Kevin Woods.) *SIAM Journal on Discrete Mathematics* v. 34 (4), 2020, pp. 2363–2387.
15. Parametric Presburger arithmetic: complexity of counting and quantifier elimination (with John Goodrick, Danny Nguyen, and Kevin Woods.) *Mathematical Logic Quarterly*, v. 65 (2), 2019, pp. 237–250.
16. An l-p switch trick to obtain a new elementary proof of a criterion for arithmetic equivalence (with Guillermo Mantilla-Soler.) *Research in Number Theory*, v. 5 (1), 2019, article 1.
17. Superlinear subset partition graphs with dimension reduction, strong adjacency, and endpoint-count (with Edward D. Kim.) *Combinatorica*, v. 38 (1), 2018, pp. 75–114.
18. Parametric Presburger arithmetic: logic, combinatorics, and quasi-polynomial behavior (with John Goodrick and Kevin Woods.) *Discrete Analysis*, 2017, #4.

19. A lower bound for the determinantal complexity of a hypersurface (with Jarod Alper and Mauricio Velasco.) *Foundations of Computational Mathematics*, v. 17 (3), 2017, pp. 829–836.
20. Finitely many smooth  $d$ -polytopes with  $n$  lattice points (with C. Haase, M. Hering, B. Lorenz, B. Nill, A. Paffenholz, G. Rote, F. Santos, and H. Schenck.) *Israel Journal of Mathematics*, v. 207 (1), 2015, pp. 301–329.
21. Hom-polytopes (with Mark Contois and Joseph Gubeladze.) *Mathematische Zeitschrift*, v. 272 (3–4), 2013, pp. 1267–1296.
22. Enumeration of Golomb Rulers and Acyclic Orientations of Mixed Graphs (with Matthias Beck and Tu Pham.) *Electronic Journal of Combinatorics* v. 19 (3), 2012, P42.
23. Universal Gröbner bases of colored partition identities (with Raymond Hemmecke and Sonja Petrović.) *Experimental Mathematics* v. 21 (4), 2012, pp. 395–401.
24. Obstructions to lifting tropical curves in surfaces in 3-space (with Eric Katz.) *Siam Journal on Discrete Mathematics*, v. 26 (3), 2012, pp. 1050–1067.
25. Riffs on the infinite ping-pong ball conundrum (with Ami Mamolo.) *International Journal of Mathematical Education in Science and Technology* v. 42 (5), 2011, pp. 615–623.
26. Small Chvátal rank (with Annie Raymond and Rekha Thomas.) *Mathematical Programming, Series B* v. 124 (1-2), 2010, pp. 45–68.
27. The circuit ideal of a vector configuration (with Anders Jensen and Rekha Thomas) *Journal of Algebra* v. 309 (2), 2007, pp. 518–542.
28. Computing tropical varieties (with Anders Jensen, David Speyer, Bernd Sturmfels, and Rekha Thomas.) *Journal of Symbolic Computation* v. 42, 2007, no. 1-2, pp. 54–73.

### Grants, Scholarships, and Awards

Faculty of Science internal grant: *Two-level counting polynomials and irreducible decompositions of numerical semigroups*, Los Andes, 2025–2027.

MATH AMSUD grant: *Bruhat intervals* (funded by CNRS France, ANID Chile and Minciencias Colombia, coPI along with Daniel Juteau and Nicolás Libedinsky), 2025–2026.

Paul R. Halmos - Lester R. Ford Award for expository excellence (joint with Kevin Woods), 2023.

Faculty of Science internal grant: *Parametric Approaches to Affine Semigroups and Chvatal Rank*, Los Andes, 2021–2023.

Faculty of Science internal grant: *Morfismos de Polítopos*, Los Andes, 2018–2019.

Open Arms Travel Grant to attend the International Congress of Mathematicians, 2018.

Fondo de Apoyo para Profesores Asistentes (startup fund), Los Andes, 2012–2015.

AMS Math. Research Community: *Computational Algebra and Convexity*, 2008–2009.

University of Washington VIGRE fellowship, 2001–02 and 2004–05.

University of Washington Graduate School Merit Award, 2001.

Oberlin Rebecca Cary Orr Memorial Prize in Mathematics, 2001.

### Invited Talks

| Event                                    | Location                         | Date              |
|------------------------------------------|----------------------------------|-------------------|
| Coloquio Latinoamericano de Álgebra      | Pontificia U. Católica del Perú  | 10–14 agosto 2026 |
| Minicourse at Cong. Colomb. Mat.         | U. Tec. Pereira, Colombia        | 4–6 June 2025     |
| Math Colloquium                          | U. de los Andes                  | 13 February 2025  |
| Reunión Cyted (New Crypto Tools)         | U. de los Andes                  | 3 October 2024    |
| Discrete Math Seminar                    | Tech. U. Berlin                  | 5 June 2024       |
| Congreso Colombiano de Matemáticas       | UPTC, Tunja, Colombia            | 6 June 2023       |
| Math Colloquium                          | U. de los Andes                  | 10 April 2023     |
| Math Colloquium                          | U. de los Andes                  | 10 February 2022  |
| Math. Congress of the Americas           | virtual                          | 13 July 2021      |
| Algebra Seminar                          | U. Coimbra, Portugal             | 12 June 2019      |
| Math Colloquium                          | U. de los Andes                  | 24 January 2019   |
| Encuentro Soc. Mat. Colombia–México      | U. del Norte, Colombia           | 2 June 2018       |
| Encuentro Soc. Mat. Colombia–México      | U. del Norte, Colombia           | 1 June 2018       |
| Einstein Workshop                        | Freie U. Berlin, Germany         | 13 March 2018     |
| Lenora Lecture                           | Oberlin College                  | 8 January 2018    |
| Faculty Seminar                          | Oberlin College                  | 5 January 2018    |
| Math Colloquium                          | Seattle U.                       | 5 October 2017    |
| Math Colloquium                          | U. de los Andes                  | 20 April 2017     |
| Research Day                             | Fond. U. Konrad Lorenz, Colombia | 23 March 2017     |
| Minicourse on Algebraic Complexity       | U. Andrés Bello, Chile           | February 2017     |
| Escuela de Física Matemática             | U. de los Andes                  | 24 May 2016       |
| Joint Math. Meetings                     | Seattle                          | 9 January 2016    |
| Math Colloquium                          | U. del Cauca, Colombia           | 14 October 2015   |
| Math Colloquium                          | U. de los Andes                  | 10 September 2015 |
| Math Colloquium                          | U. Javeriana                     | 18 November 2014  |
| ALTENCOA-6                               | Pasto, Colombia                  | 12 August 2014    |
| Combinatorics Seminar                    | U. Washington                    | 15 January 2014   |
| Algebra-Geometry-Combinatorics Seminar   | San Francisco State              | 11 December 2013  |
| XIX Congreso Colombiano de Matemáticas   | Barranquilla, Colombia           | July 2013         |
| Optimization Seminar                     | Aarhus U., Denmark               | 21 June 2013      |
| Escuela de Física Matemática             | U. de los Andes                  | 31 May 2013       |
| Joint Mathematics Meetings               | San Diego                        | 21 January 2013   |
| SIAM Annual Meeting                      | Minneapolis                      | 10 July 2012      |
| Math Colloquium                          | U. de los Andes                  | 6 October 2011    |
| Canadian Math. Soc. Summer Meeting       | Edmonton                         | June 2011         |
| SIAM Conference on Optimization          | Darmstadt, Germany               | 19 May 2011       |
| Algebraic Geometry Seminar               | Saarbrücken, Germany             | 12 May 2011       |
| Algebra and Discrete Mathematics Seminar | UC Davis                         | 14 April 2011     |
| Math Colloquium                          | Sonoma State                     | 9 February 2011   |
| Bay Area Discrete Math Day               | UC Berkeley                      | 16 October 2010   |
| Gröbner Bases and the Industrial Society | Osaka, Japan                     | June 2010         |
| Algebraic Geometry Seminar               | Queen's U.                       | 20 January 2010   |
| Postdoctoral Seminar                     | MSRI                             | 6 November 2009   |
| Algebra & Number Theory Seminar          | Heidelberg University            | 29 May 2009       |
| Algebraic Geometry Seminar               | Ohio State                       | 17 February 2009  |
| Joint Mathematics Meetings               | Washington D.C.                  | 7 January 2009    |

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|----------------------------------------|---------------------|-------------------|
| CMS Winter Meeting                     | Ottawa              | 7 December 2008   |
| Route 81 Conference                    | Kingston, ON        | 18 October 2008   |
| Algebraic Geometry Seminar             | Queen's U.          | 6 October 2008    |
| Computational Algebra and Convexity    | Snowbird, Utah      | 22 June 2008      |
| Algebra-Geometry-Combinatorics Seminar | San Francisco State | 9 May 2008        |
| Algebra Seminar                        | Univ. of Washington | 8 April 2008      |
| Algebraic Geometry Seminar             | Queen's U.          | 24 September 2007 |
| IMA Postdoc Seminar                    | U. Minnesota        | 13 February 2007  |
| Combinatorics Seminar                  | UC Berkeley         | 13 November 2006  |
| Combinatorics and Geometry Seminar     | U. Washington       | 18 January 2006   |
| Algebra-Geometry-Combinatorics Seminar | San Francisco State | 21 October 2005   |
| Current Problems Seminar               | U. Washington       | 12 May 2005       |

## Posters

| Date            | Location                 | Event                                              |
|-----------------|--------------------------|----------------------------------------------------|
| January 2025    | Santander, Spain         | Santander Workshop on Geom. and Alg. Combinatorics |
| June 2022       | Seattle, WA, USA         | Combin., Comput., and Appl. Alg. Geom.             |
| June 2015       | Trento, Italy            | MEGA 2015                                          |
| 9-11 April 2010 | Amherst, MA              | Algebraic Geometry Northeastern Series             |
| September 2006  | Alcalá de Henares, Spain | Workshop on Geom. and Top. Combinatorics           |

## Theses supervised

| Name                 | Type          | Defense Date  | Topic                       |
|----------------------|---------------|---------------|-----------------------------|
| Juan Camilo Torres   | Ph.D          | December 2020 | polytopes and algebra       |
| Julián Pulido        | masters       | June 2020     | polytopes                   |
| Juan Andrés Valero   | masters       | June 2019     | algebraic complexity        |
| Daniela Álvarez      | undergraduate | December 2024 | probabilistic combinatorics |
| Juan Sebastián Guio  | undergraduate | December 2024 | computational algebra       |
| Santiago Morales     | undergraduate | December 2023 | probabilistic combinatorics |
| Tatiana Aguirre      | undergraduate | May 2023      | polytopes                   |
| Daniel Alonso        | undergraduate | May 2023      | probabilistic combinatorics |
| Nicolás Maldonado    | undergraduate | December 2022 | polytopes                   |
| Daniel Cuéllar       | undergraduate | December 2021 | discrete geometry           |
| Esteban Gutiérrez    | undergraduate | July 2020     | computational algebra       |
| Camilo Escobar       | undergraduate | June 2020     | computational number theory |
| Julián Chitiva       | undergraduate | December 2017 | tropical geometry           |
| Juan Camilo Azuero   | undergraduate | June 2017     | polytopes                   |
| Daniel Tamayo        | undergraduate | June 2017     | polytopes                   |
| Juan Pablo Henao     | undergraduate | December 2015 | algorithms                  |
| Daniel Ávila         | undergraduate | June 2014     | computational algebra       |
| Jorge Alberto Olarte | undergraduate | June 2014     | matroids                    |
| Federico Castillo    | undergraduate | June 2012     | tropical geometry           |

## Courses Taught

| Course | University | Last Offered |
|--------|------------|--------------|
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|----------------------------------------|---------------------|-------------|
| Commutative algebra                    | Los Andes           | spring 2026 |
| Linear algebra                         | Los Andes           | spring 2026 |
| Enumerative combinatorics              | Los Andes           | fall 2025   |
| Foundations of mathematics             | Los Andes           | spring 2025 |
| Honors probability                     | Los Andes           | fall 2024   |
| Discrete Algorithms                    | Los Andes           | spring 2024 |
| Integral calculus                      | Los Andes           | fall 2023   |
| Number theory                          | Los Andes           | fall 2023   |
| Linear algebra (honors)                | Los Andes           | spring 2023 |
| Probabilistic methods in combinatorics | Los Andes           | fall 2022   |
| Differential calculus                  | Los Andes           | fall 2022   |
| Abstract algebra II                    | Los Andes           | fall 2020   |
| Abstract Algebra 1                     | Los Andes           | spring 2019 |
| Computational complexity               | Los Andes           | autumn 2015 |
| Differential equations                 | Los Andes           | spring 2015 |
| Permutation groups                     | Los Andes           | autumn 2014 |
| Algebraic combinatorics                | Los Andes           | spring 2014 |
| Introduction to combinatorics          | Los Andes           | spring 2012 |
| Calculus I                             | San Francisco State | autumn 2010 |
| Linear algebra                         | Queen's             | winter 2010 |
| Linear algebra II                      | Queen's             | winter 2009 |
| Calculus I                             | Queen's             | autumn 2008 |
| Calculus for economics                 | Queen's             | winter 2008 |
| Linear algebra                         | Washington          | spring 2007 |
| Calculus III                           | Washington          | spring 2006 |
| Calculus I                             | Washington          | summer 2003 |
| Precalculus                            | Washington          | spring 2003 |

## Coordination

Graduate program coordinator, August 2023-present

Linear algebra course coordinator, August 2015–June 2016.

Mathematics colloquium coordinator, January 2013–December 2014.

Organizer of U. of Washington VIGRE examples seminar, winter and spring 2005.

Organizer of U. of Washington math department's current problems seminar, 2003–2004.

## Committee membership

University Ph.D committee, Los Andes, August 2023–present

Faculty of Science research committee, Los Andes, August 2023–present.

Applied mathematics committee, Los Andes, March 2018–present.

Mathematics postgraduate committee, Los Andes, March 2018–December 2020 and June 2021–present.

Mathematics hiring committees, Los Andes, August 2016–June 2017, August 2018–June 2019, and August 2021–February 2022

## Conference Organization

Session organizer for *XXIV Coloquio Latinoamericano de Álgebra*, Pontificia Universidad Católica de Chile, July 2024.

Program committee for *48th International Symposium on Symbolic and Algebraic Computation (ISSAC) 2023*, Tromsø, Norway, July 2023.

Local organizing committee for *7. Encuentro Colombiano de Combinatoria*, Universidad de los Andes and Universidad Sergio Arboleda, June 2022.

Scientific committee for *5. Encuentro Colombiano de Combinatoria*, Universidad Nacional de Colombia (Medellín), June 2016.

Lead local organizer for *4. Encuentro Colombiano de Combinatoria*, Los Andes, June 2014.

Scientific and local committees for *3. Encuentro Colombiano de Combinatoria*, Los Andes, June 2012.

Lead local organizer for *22nd Bay Area Discrete Math Day*. San Francisco State, 30 April 2010.

Local organizing committee for *Formal Power Series & Algebraic Combinatorics 2010*. San Francisco State, 2–6 August 2010.

## Refereeing and Reviewing

External tenure reviewer for the University of Nevada, Las Vegas

Grant reviewer for Colciencias (Colombia), the National Security Agency (United States), and the Nueva Granada Military University (Colombia)

Referee for the book collection *Proceedings of Symposia in Applied Mathematics*

Referee for the conference 50th International Symposium on Symbolic and Algebraic Computation (ISSAC) 2025

Referee for the journals *Algebraic Colloquium*, *Algebraic Combinatorics*, *The American Mathematical Monthly*, *Combinatorial Theory*, *Combinatorica*, *Communications in Algebra*, *Discrete and Computational Geometry*, *Discrete Mathematics Letters*, *Electronic Journal of Combinatorics*, *European Journal of Combinatorics*, *Forum of Mathematics*, *Sigma*, *Integers*, *International Journal of Algebra and Computation*, *International Transactions in Operational Research*, *Journal of Algebraic Combinatorics*, *Journal of Combinatorial Theory, Ser. A*, *Journal of Pure and Applied Algebra*, *Journal of Symbolic Computation*, *Lecturas Matemáticas*, *Mathematical Programming*, *Mathematics of Operations Research*, *The PUMP Journal of Undergraduate Research*, *Revista Integración*, and *SIAM Journal on Discrete Mathematics*.

## Other Professional Activities

Guest lecturer in the course *Computational Algebra and Algebraic Geometry*, taught by Susan Colley at Oberlin College, 1–3 December 2008.

Assistant at the tutorial *Algebraic Algorithms in Optimization*, Institute for Mathematics and its Applications, Minneapolis, 12–13 January 2007.

Summer REU supervised by Vic Reiner. U. of Minnesota, June–July 2000.