

# Javier González Anaya

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## CURRENT POSITION

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**Visiting Assistant Professor**, Harvey Mudd College

*June 2023 - present*

Duties: Teaching, mentoring a thesis student and faculty advisor for capstone clinic project. Claremont, CA, USA

Research interests: Algebraic geometry and its interactions with combinatorics and commutative algebra.

## PREVIOUS APPOINTMENTS

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**Visiting Assistant Professor**, University of California, Riverside

*July 2020 - June 2023*

Duties: Teaching 2 courses per quarter, leading reading courses and student research projects. Riverside, CA, USA

**Teaching Assistant**, University of British Columbia

*September 2015 - June 2020*

Classes: Pre-calculus, first-year calculus (differential, integral, both single and multivariate), proof-based linear algebra, proof-based number theory, mathematical logic, complex analysis. Vancouver, BC, Canada

Responsibilities: Head TA, directing discussion sessions, grading, helping students at the Mathematics Learning Center.

**Teaching Assistant**, Universidad Nacional Autónoma de México

*August 2012 - June 2015*

Classes: Linear Algebra I and II, Modern Algebra: Modules and homological algebra. Responsibilities: Designing discussion sessions and grading. CU, Mexico City, Mexico

## EDUCATION

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**Ph.D. in Mathematics**, University of British Columbia

*September 2015 - June 2020*

Thesis: *Negative curves in blowups of weighted projective planes.* Vancouver, BC, Canada

**M.Sc. in Mathematics**, Universidad Nacional Autónoma de México (UNAM)

*August 2013 - May 2015*

Thesis: *Study of the Lie algebra of vector fields that preserve the conformal structure of Minkowski spacetime.* CU, Mexico City, Mexico

**Licenciatura en Física**, Universidad Nacional Autónoma de México (UNAM)

*August 2007 - May 2013*

Thesis: *Maxwell equations, the Clifford algebra of Minkowski spacetime and the Dirac operator; with an associated generalization to the Lie algebra of the conformal transformations of a Lorentz metric.* CU, Mexico City, Mexico

**Semester abroad**, Department of Physics, UC Berkeley

*August - December 2011*

Graduate classes: Quantum Field Theory. Berkeley, CA, USA

Undergraduate classes: Particle Physics, Modern Physics and Advanced Electrical Laboratory.

## PUBLICATIONS AND PREPRINTS

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10. *Polymatroids and moduli of points in flags*. With P. Gallardo and J.L. González. Submitted. [arXiv:2411.06811](#), 2024.
9. *P-nestohedra and toric compactifications of the moduli space of points in projective space*. With M. Bit (undergraduate coauthor), D. Karp, and J. Luo (undergraduate coauthor). In preparation, 2024.
8. *Hypergraph associahedra and compactifications of moduli spaces of points*. With J. Bown (undergraduate thesis student). Submitted. [arXiv:2409.08611](#), 2024.
7. *Higher-dimensional Losev-Manin spaces and their geometry*. With P. Gallardo, J.L. González and E. Routis. Submitted, working on first round of revisions for IMRN, [arXiv:2308.07911](#).
6. *Enumeration of max-pooling responses with generalized permutohedra*. With L. Escobar, P. Gallardo, J.L. González, G. Montúfar and A.H. Morales. Submitted, [arXiv:2209.14978](#), 2022.
5. *Nonexistence of negative curves*. With J.L. González and K. Karu. International Mathematics Research Notices (IMRN), Volume 2023, Issue 16, pp. 14368–14400, 2023.
4. *The geography of negative curves*. With J.L. González and K. Karu. Michigan Mathematical Journal, Volume 1, Issue 1, 2023, pp. 1–30.
3. *Curves generating extremal rays in blowups of weighted projective planes*. With J.L. González and K. Karu. Journal of the London Mathematical Society, Volume 104, Issue 3, 2021, pp. 1342–1362.
2. *Constructing non-Mori Dream Spaces from negative curves*. With J.L. González and K. Karu. Journal of Algebra, Volume 539, 2019, pp. 118–137.
1. *On a family of negative curves*. With J.L. González and K. Karu. Journal of Pure and Applied Algebra, Volume 223, Issue 11, 2019, pp. 4871–4887.

## TEACHING EXPERIENCE AS INSTRUCTOR OF RECORD

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### Lower Division Courses

Calculus and precalculus:

- Multivariable Calculus (**HMC**, Math 19, two sections, Fall 2024).
- Introduction to College Mathematics for Sciences II (Precalculus) (**UCR**, Math 6B, Spring 2021, two sections).
- First-year Calculus I (**UCR**, Math 9A, two sections in Fall 2021, two sections in Fall 2022).
- First-year Calculus III (**UCR**, Math 9C, two sections in Fall 2020).
- First-year Calculus I (**UBC**, Math 100, Fall 2018).

### Upper Division Courses

- Ordinary Differential Equations (**HMC**, Math 82, Fall 2024).
- Ordinary Differential Equations (**HMC**, Math 82, two sections, Fall 2023).
- Linear Algebra (**HMC**, Math 073, two sections, Spring 2023).
- Linear Algebra I (**UCR**, Math 131, two sections, Winter 2021).
- Linear Algebra II (**UCR**, Math 132, Winter 2022).
- Topology: Introduction to Topology (**UCR**, Math 145, Winter 2022).

### Teacher Preparation Courses

- History of Mathematics (**UCR**, Math 153, Spring 2022).

- Polynomials and number systems (UCR, Math 140, Spring 2022).

## Graduate Level Courses

- Toric Geometry: Problem and discussion sessions for week-long mini-course in the 2022 Pan-American School in Commutative Algebra (CIMAT, Guanajuato, Mexico, June 2022).
- Sheaf theory: Reading course on sheaf theory (UCR, Math 194, Winter 2021).

## Training

- MAA OPEN Math course “Team-based Inquiry Learning,” 2023.
- UCR Mathematics Teaching Workshop, UCR, 2021
- UCR Mathematics Teaching Workshop, UCR, 2020
- Instructional Skills Workshop, UBC, 2018.
- Semester-long course: Mathematics Teaching Techniques, UBC, Fall 2015

## MENTORSHIP

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### 2024 Summer REU.

10 week long project with two students studying novel combinatorial aspects of moduli spaces in algebraic geometry.

*June - July 2024  
Harvey Mudd College*

### Thesis advisor.

Directing a senior thesis. The project involved studying novel combinatorial aspects of algebraic-geometric objects (moduli spaces). Outcomes include a research paper submitted for publication at the Journal of Algebraic Combinatorics.

*August 2023 - June 2024  
Harvey Mudd College*

### Clinic advisor.

Faculty mentor for Clinic capstone project. In this role I advise a group of five seniors in solving real-world, technical problems for a company.

*August 2023 - June 2024  
Harvey Mudd College*

### Faculty Mentor for the National Science Foundation funded California Alliance for Minority Participation (CAMP) Summer Scholars program.

The program provided the student a \$5,000 stipend to work full time throughout a 10-week program on a research project supervised by me. I am still working with this student. The student was invited to attend the Math Alliance’s Fields of Dreams Conference 2022. Outputs of the mentorship are:

*June - August, 2022  
UC Riverside*

- Poster presentation at the Summer Research in Science and Engineering (RISE) Undergraduate Research Symposium at UC Riverside 2022.
- Poster presentation at the Annual Biomedical Research Conference for Minoritized Scientists (ABRCMS) 2022.

### Research Mentor - Summer REU (3 students).

Co-organized with Patricio Gallardo. The project is about the mathematics of machine learning, stemming from our paper “Enumeration of max-pooling responses with generalized permutohedra”. A research paper is under preparation.

*June - December, 2022  
UC Riverside*

### Research Mentor - Reading course.

*January - March, 2022*

Supervised one undergraduate student on a reading course about graduate-level sheaf theory.

*UC Riverside*

## AWARDS AND SCHOLARSHIPS

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**Excellence in Teaching: Outstanding Visiting Assistant Professor Award**, Mathematics Department, UC Riverside.

*June 2023*

Yearly recognition to 2 or 3 VAPs for their teaching performance. Award includes a \$500 prize.

**Candidato al Sistema Nacional de Investigadores (SNI)**, Consejo Nacional de Ciencia y Tecnología (CONACyT).

*November 2022*

**Excellence in Teaching: Outstanding Visiting Assistant Professor Award**, Mathematics Department, UC Riverside.

*June 2022*

Yearly recognition to 2 or 3 VAPs for their teaching performance. Award includes a \$500 prize.

**Structured Quartet Research Ensembles (SQuaRE) grant**.

*December 2021*

The American Institute of Mathematics (AIM) provides both the research facilities and the financial support for our research group to spend a week at AIM in San Jose, California. The project originated in the Latinx Mathematicians Research Community (LMRC) Research Workshop and is a collaboration with L. Escobar, P. Gallardo, J.L. González, G. Montúfar, A.H. Morales with name “Neural network polytopes.”

**Latinx Mathematicians Research Community (LMRC) Research Workshop**.

*June 2021*

The LMRC, sponsored by AIM and the NSF, is a year long program for early-career Latinx mathematicians which provides tiered mentoring research opportunities, professional development opportunities, and establishes a large research network of Latinx mathematicians.

**International Doctoral Scholarship**, Consejo Nacional de Ciencia y Tecnología (CONACyT)

*September 2015 - August 2019*

Full tuition, medical insurance and a 1,000 CAD monthly stipend.

**National Masters Scholarship**, Consejo Nacional de Ciencia y Tecnología (CONACyT)

*August 2013 - May 2015*

**UNAM - UC Semester Abroad Scholarship**

*August - December 2011*

Full scholarship to study a semester abroad at the Department of Physics at UC Berkeley as part of an exchange program between the University of California and UNAM.

## PROFESSIONAL SERVICE

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**Organizer of a special session at the 2024 Joint Mathematics Meetings: “Combinatorial Insights into Algebraic Geometry.”**

*January, 2024  
San Francisco, CA*

The meeting featured a roster of 16 speakers from all career stages and diverse backgrounds. Our goal was to help the participants showcase their work, strengthen and widen their professional network.

**Co-organizer of the Western Algebraic Geometry Symposium (WAGS)**

*November, 2022  
UC Riverside*

Largest algebraic geometry conference in the Western United States and Canada. Raised a total of \$14,000 from different UCR offices in addition to the base \$30,000 allocated by the conference's NSF grant. Other duties included inviting speakers, organizing a poster session, publicity, hiring catering services, creating and moderating a Discord channel, etc.

**Co-organizer of the Teaching Workshop of UCR's Department of Mathematics**

*September, 2022*  
*UC Riverside*

Teaching workshop for incoming VAPs and graduate students.

**INVITED TALKS AND POSTERS**

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<i>What is a moduli space.</i> Mathematical Pathways to an Excellent Future Conference at UC Riverside	<i>March 2025</i> Riverside, CA, USA
<i>Moduli spaces of points in flags of affine spaces and polymatroids.</i> IPAM's LatMath 2025 Conference	<i>March 2025</i> Los Angeles, CA, USA
<i>What is a moduli space?</i> Amherst College Mathematics Colloquium	<i>December 2024</i> Amherst, MA
<i>Moduli spaces of points in flags of affine spaces and polymatroids.</i> Birational Geometry Seminar (BGS), organized by Joaquín Moraga	<i>December 2024</i> Online
<i>The hidden structure of negative curves</i> , poster presentation. Western Algebraic Geometry Symposium (WAGS), University of Arizona	<i>November 2024</i> Tucson, AZ, USA
<i>Moduli spaces of points in flags of affine spaces and polymatroids.</i> 2024 Fall Western Sectional Meeting at University of California, Riverside	<i>October 2024</i> Riverside, CA, USA
<i>Moduli spaces of points in flags of affine spaces and polymatroids.</i> 2024 Fall Central Sectional Meeting at University of Texas, San Antonio	<i>September 2024</i> San Antonio, TX, USA
<i>Moduli spaces through a combinatorial lens.</i> Mathematics Colloquium of the Claremont Colleges	<i>September 2024</i> Claremont, CA, USA
<i>Blow-ups of weighted projective planes at a point: Exploring the parameter space of triangles and the MDS property.</i> Commutative Algebra and Algebraic Geometry in TUcSon (CAAGTUS), University of Arizona	<i>April 2024</i> Tucson, AZ, USA
<i>Higher-dimensional Losev-Manin spaces and their geometry.</i> AG@PUI Online Seminar	<i>March 2024</i> Online
<i>What is a moduli space?</i> Algebraic Geometry Seminar, UC Riverside	<i>March 2024</i> Online
<i>Enumerating linearity regions of max-pooling layers in convolutional neural networks.</i> Pomona College Applied Math Seminar	<i>February 2024</i> Claremont, CA
<i>Exploring combinatorial aspects of max-pooling layers with undergraduates.</i> Joint Mathematics Meetings 2024	<i>January 2024</i> San Francisco, CA
<i>Higher-dimensional Losev-Manin spaces and their geometry.</i>	<i>January 2024</i>

Joint Mathematics Meetings 2024	San Francisco, CA
<i>What is a moduli space?</i> Mathematics Colloquium of the Claremont Colleges	October 2023 Claremont, CA, USA
<i>The hidden structure of negative curves.</i> Algebra/Number Theory/Combinatorics Seminar of the Claremont Colleges	November 2023 Claremont, CA, USA
<i>Blow-ups of weighted projective planes at a point: Exploring the parameter space of triangles and the MDS property.</i> Algebraic Geometry Seminar, University of Utah	February 2023 Salt Lake City, UT, USA
<i>The hidden structure of negative curves</i> , poster presentation. Western Algebraic Geometry Symposium (WAGS), UC Riverside	November 2022 Riverside, CA, USA
<i>The geography of negative curves</i> , poster presentation. Texas Algebraic Geometry Symposium (TAGS), Texas A&M	October 2022 College Station, TX, USA
<i>Symbolic Rees algebras and negative curves.</i> Commutative algebra seminar, UN–Lincoln	September 2022 Lincoln, NE, USA
<i>Una breve historia sobre la notación matemática.</i> Matemáticas en español seminar, UN–Lincoln	September 2022 Lincoln, NE, USA
<i>Introduction to divisors.</i> Algebraic Geometry Seminar, UC Riverside	January 2022 Online
<i>Negative curves in blowups of weighted projective planes.</i> Algebraic Geometry Seminar, UC Riverside	December 2021 Online
<i>Curvas negativas en blowups de espacios proyectivos ponderados.</i> Seminario de Álgebra Conmutativa y Geometría Algebraica, CIMAT	September 2021 Online
<i>The geography of negative curves.</i> Western Algebraic Geometry Symposium (WAGS)	April 2021 Online
<i>A review of the theory of varieties.</i> Algebraic Geometry Seminar, UC Riverside	April 2021 Online
<i>Finite generation of symbolic Rees algebras from a geometric perspective.</i> Commutative Algebra Seminar, UC Riverside	March 2021 Online
<i>Estudiando anillos de Cox mediante una reducción a característica prima.</i> Seminario Guillermo Torres. Institute of Mathematics, UNAM	August 2019 CU, Mexico City, Mexico
<i>Constructing examples and non-examples of Mori Dream spaces via a prime characteristic method.</i> Algebraic Geometry Seminar, UC Riverside	June 2019 Riverside, CA, USA
<i>Constructing Mori dream spaces and non-Mori dream spaces via prime characteristic methods.</i> AG session of the Winter Meeting of the Canadian Math. Soc.	December 2018 Vancouver, BC, Canada

## AFFILIATIONS

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## PROGRAMMING LANGUAGES

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Python, SageMath, C++