

Javier González Anaya

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CURRENT POSITION

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 commutative algebra and combinatorics.

PREVIOUS APPOINTMENTS

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

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

7. *Higher-dimensional Losev-Manin spaces and their geometry.* With P. Gallardo, J.L. González and E. Routis. Submitted, [arXiv:2308.07911](https://arxiv.org/abs/2308.07911), 2023.
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](https://arxiv.org/abs/2209.14978), 2022.

5. *Nonexistence of negative curves*. With J.L. González and K. Karu. International Mathematics Research Notices, 2023. <https://doi.org/10.1093/imrn/rnac355>
4. *The geography of negative curves*. With J.L. González and K. Karu. Accepted. To appear in the Michigan Mathematical Journal. arXiv:2104.03950, 2021.
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.

AWARDS AND SCHOLARSHIPS

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.

TEACHING EXPERIENCE

Lower Division Courses

Precalculus:

- Introduction to College Mathematics for Sciences II (UCR, Math 6B, Spring 2021, two sections).

Calculus:

- 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, two sections, Fall 2023).
- Linear Algebra (HMC, Math 073, two sections, Winter 2023).
- Linear Algebra (Proof-based): First course (UCR, Math 131, two sections, Winter 2021), Second course (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

Thesis advisor.

Directing a senior thesis. The project involves studying novel combinatorial aspects of algebraic-geometric objects (moduli spaces).

*August 2023 - June 2024
Harvey Mudd College*

Clinic advisor.

Faculty mentor for Clinic capstone project. In this role I advice a group of 5 juniors and 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.

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

*January - March, 2022
UC Riverside*

PROFESSIONAL SERVICE

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

The meeting will feature a diverse and inclusive roster of speakers from all career stages. Our goal is to help the participants showcase their work, strengthen and widen their professional network.

*January, 2024
San Francisco, CA*

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

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.

*November, 2022
UC Riverside*

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

Teaching workshop for incoming VAPs and graduate students.

*September, 2022
UC Riverside*

INVITED TALKS AND POSTERS

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

AFFILIATIONS

Mentor for the Math Alliance

PROGRAMMING LANGUAGES

Python, SageMath, C++