

Miguel González

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Research interests

Complex and algebraic geometry, moduli spaces of geometric structures on Riemann surfaces, Higgs bundles, mirror symmetry, Langlands duality.

Experience

PhD Research - <i>la Caixa</i> foundation InPhINIT Retaining Fellowship <i>Instituto de Ciencias Matemáticas (ICMAT)</i> Advisers: Oscar García-Prada and Tamás Hausel	2023- <i>Project: Higgs bundles, Hausel algebras and involutions</i> Grant LCF/BQ/DR23/12000030
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Research Grant

<i>Instituto de Ciencias Matemáticas (ICMAT)</i> Supervised by Oscar García-Prada	Sept. 2022 - Jun. 2023 <i>Project: Cyclic Higgs bundles and Vinberg theory</i> Grant JAEICU-21-ICMAT-01, Top 1 application score
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Research Intern

<i>Hausel Group (Geometry and its Interfaces), Institute Of Science And Technology Austria (ISTA)</i> Supervised by Tamás Hausel	Jul. 2022 - Aug. 2022 <i>Project: Very stable $U(p, q)$-Higgs bundles</i>
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Collaboration grant

<i>Department of Mathematics, Universidad Autónoma de Madrid</i> Supervised by Ernesto Girondo Sirvent	Nov. 2021 - Jul. 2022 <i>Project: Theoretical and computational research about properties of fundamental domains of Fuchsian groups</i>
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Introduction to Mathematical Research Grant Severo Ochoa

<i>Instituto de Ciencias Matemáticas (ICMAT)</i> Supervised by Oscar García-Prada	Summer 2021 <i>Project: Introduction to Moduli Spaces and Higgs Bundles</i>
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Education

PhD Student in Mathematics Research <i>Universidad Complutense de Madrid (UCM) - Instituto de Ciencias Matemáticas (ICMAT)</i> Advisers: Oscar García-Prada and Tamás Hausel	2023- <i>Project: Introduction to Moduli Spaces and Higgs Bundles</i>
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Masters Degree in Mathematics

<i>Universidad Autónoma de Madrid (UAM)</i> Dissertation: <i>Cyclic Higgs bundles and Vinberg theory</i>	2022 – 2023 Average grade: 9.94 / 10 5 courses with honours
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Double Degree in Mathematics and Computer Science

<i>Universidad Autónoma de Madrid (UAM)</i>	2017 – 2022 Average grade: 9.82 / 10 44 courses with honours
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Preprints / Publications

Very stable regular G -Higgs bundles	March 2025 <i>arXiv:2503.01289</i>
Cyclic Higgs bundles and the Toledo invariant With Oscar García-Prada	March 2024 <i>arXiv:2403.00415</i>
Hitchin map on even very stable upward flows With Tamás Hausel	April 2024 <i>International Journal of Mathematics</i> , Vol. 35, No. 9 doi:10.1142/S0129167X2441009X

Talks

Very stable G -Higgs bundles and Hecke modifications <i>MIST Conference in Mathematical Physics</i> <i>The Chinese University of Hong Kong (CUHK)</i>	November 2025
The structure of symmetry: an introduction to root systems <i>ICMAT-UAM Junior Colloquium</i> <i>Instituto de Ciencias Matemáticas (ICMAT)</i>	September 2025
A criterion for wobbliness of parabolic G -Higgs bundles <i>Seminar talk</i> <i>Chern Institute of Mathematics, Nankai University (CIM)</i>	August 2025
Compact components in relative character varieties for real lie groups of Hermitian type <i>Geometry Workshop of the Hitchin–Ngô Laboratory</i> <i>Feishu (Shanghai)</i>	August 2025
\mathbb{C}^\times -actions, lagrangian submanifolds and very stable bundles <i>Workshop: Geometry and Topology for the Future III</i> <i>Universidad Complutense de Madrid (UCM)</i>	June 2025
Very stable regular G -Higgs bundles <i>Hitchin–Ngô Laboratory Special Activity</i> <i>Instituto de Ciencias Matemáticas (ICMAT)</i>	June 2025
Very stable regular G -Higgs bundles <i>Séminaire d'Analyse et Géométrie</i> <i>Institut de Mathématiques de Jussieu–Paris Rive Gauche (IMJ-PRG)</i>	May 2025
Very stable regular G -Higgs bundles <i>Conference: Stratifications of Higgs bundle moduli spaces and related topics</i> <i>Universidade de Santiago de Compostela (USC)</i>	May 2025
Hitchin map on minuscule Lagrangians <i>Bonn–Vienna block seminar: Equivariant cohomology, stable envelopes and big algebras</i> <i>University of Bonn</i>	February 2025
The decomposition theorem I: finite fields <i>Reading seminar on perverse sheaves</i> <i>Universidad Complutense de Madrid (UCM)</i>	January 2025
Very stable G -Higgs bundles with regular nilpotent Higgs field <i>RTGF (Spanish Geometry and Physics Thematic Network) meeting</i> <i>Instituto de Ciencias Matemáticas (ICMAT)</i>	November 2024
The \mathbb{C}^\times -action on the moduli space of Higgs bundles <i>“Doc in progress” seminar</i> <i>Università degli Studi di Trento (UniTrento)</i>	November 2024
The classification of extended 2-TQFTs <i>Reading seminar on ∞-categories</i> <i>Universidad Complutense de Madrid (UCM)</i>	May 2024
Mixed Hodge theory <i>Arbeitsgemeinschaft: Geometry and Representation Theory around the P=W Conjecture</i> <i>Matematisches Forschungsinstitut Oberwolfach (MFO)</i>	April 2024
Cyclic Higgs bundles and the Toledo invariant <i>Hausel group seminar</i> <i>Institute of Science and Technology Austria (ISTA)</i>	January 2024
Introduction to Hodge theory in complex algebraic geometry <i>PhD seminar</i> <i>Universidad Complutense de Madrid (UCM)</i>	January 2024
The Hitchin Fibration and Spectral Curves <i>Hitchin–Ngô Lab Working Group</i> <i>Instituto de Ciencias Matemáticas (ICMAT)</i>	February 2023

Attended conferences

Hong Kong Laureate Forum 2025 <i>Hong Kong Science Park</i>	5-8 November 2025
MIST Conference in Mathematical Physics <i>The Chinese University of Hong Kong (CUHK)</i>	31 October-4 November 2025

Geometry Workshop of the Hitchin–Ngô Laboratory <i>Feishu (Shanghai)</i>	7-9 August 2025
Feishu China Mathematics Symposium <i>Feishu (Shanghai)</i>	4-6 August 2025
Higher rank geometric structures, Higgs bundles and physics <i>Institut Henri Poincaré (IHP)</i>	19-23 May 2025
Stratifications of Higgs bundle moduli spaces and related topics <i>Universidade de Santiago de Compostela (USC)</i>	5-9 May 2025
Geometry at Large, an ICMAT–IMSA collaboration <i>Instituto de Ciencias Matemáticas (ICMAT)</i>	21-25 April 2025
RTGF (Spanish Geometry and Physics Thematic Network) meeting <i>Instituto de Ciencias Matemáticas (ICMAT)</i>	26-29 November 2024
1st MaPhyAG Workshop: Integrability, Geometry and QFT <i>Universidad Complutense de Madrid (UCM)</i>	7-11 October 2024
Clay Research Workshop: The P=W Conjecture in Non Abelian Hodge Theory <i>Mathematical Institute (University of Oxford)</i>	30 September-4 October 2024
2nd Simons Math Summer Workshop: Moduli <i>Simons Center for Geometry and Physics (SCGP)</i>	1-19 July 2024
Arbeitsgemeinschaft: Geometry and Representation Theory around the P=W Conjecture <i>Matematisches Forschungsinstitut Oberwolfach (MFO)</i>	1-5 April 2024
The Hitchin system, Langlands duality and mirror symmetry <i>Instituto de Ciencias Matemáticas (ICMAT)</i>	24-28 April 2023
Moduli spaces and geometric structures <i>Conference in honour of Oscar García-Prada on the occasion of his 60th birthday</i> <i>Instituto de Ciencias Matemáticas (ICMAT)</i>	12-16 September 2022
ICMAT - JAE School of Mathematics <i>Instituto de Ciencias Matemáticas (ICMAT)</i>	July 2021

Poster presentations

Very stable G -Higgs bundles <i>Hong Kong Laureate Forum 2025</i> <i>Hong Kong Science Park</i>	November 2025
Very stable $U(p, q)$ -Higgs bundles <i>Summer ISTerns poster session</i> <i>Institute of Science and Technology Austria (ISTA)</i>	August 2022

Teaching

Linear algebra (Álgebra lineal) <i>Linear algebra problem sessions for first year undergraduate students in mathematics.</i> <i>Universidad Complutense de Madrid (UCM)</i>	Year 2025-2026, 1st semester
Pequeño Instituto de Matemáticas (PIM) / Little mathematics institute <i>Advanced mathematics problem-solving classes for high school students. https://www.icmat.es/PIM/</i> <i>Instituto de Ciencias Matemáticas (ICMAT)</i>	2023-Ongoing

Research visits

Institut Henri Poincaré, Paris <i>Higher rank geometric structures research program</i>	12-23 May 2025
Faculty of Mathematics, University of Duisburg-Essen <i>Heinloth Group</i>	7-11 April 2025
Institute of Science and Technology Austria (ISTA) <i>Hausel Group (Geometry and its Interfaces)</i>	23 February - 22 March 2025

Institute of Science and Technology Austria (ISTA) <i>Hausel Group (Geometry and its Interfaces)</i>	15-26 January 2024
Institute of Science and Technology Austria (ISTA) <i>Hausel Group (Geometry and its Interfaces)</i>	19-28 January 2023

Awards and prizes

Master's degree Extraordinary Award (best academic record) <i>Awarded by Universidad Autónoma de Madrid (UAM)</i>	2024
UAM Young Talent Award <i>Awarded by Universidad Autónoma de Madrid (UAM)</i>	2022
Best undergraduate academic record <i>Awarded by Universidad Autónoma de Madrid (UAM)</i>	2022
Excellence Grant <i>Awarded by the Comunidad de Madrid</i>	2018, 2019, 2020, 2021
Best academic record of first year undergraduate students <i>Awarded by Universidad Autónoma de Madrid (UAM)</i>	2018
Concurso de Primavera de Matemáticas (Mathematics contest) <i>Winner (Top 20)</i>	2017
Extraordinary Prize of Bachillerato <i>Awarded by the Comunidad de Madrid to Top <1% high secondary school students</i>	2017
Extraordinary Prize of Secondary Education <i>Awarded by the Comunidad de Madrid to Top <1% basic secondary school students</i>	2015

Miscellaneous publications

Report for Arbeitsgemeinschaft: Geometry and Representation Theory around the P=W Conjecture <i>Editor and contributor with the extended abstract for my talk on Mixed Hodge theory.</i> doi:10.14760/OWR-2024-16
Undergraduate course notes <i>LaTeX notes for every course I took during my undergraduate mathematics studies.</i> <i>Available at miguelgg.com</i>

Declined grants (incompatibilities)

PhD studies grant <i>FPU Grant - Spanish Ministry of Universities</i> <i>Funding for a 4 year PhD research and teaching contract</i>	2023
PhD studies grant <i>ICMAT Severo Ochoa FPI Grant - Spanish Ministry of Science and Innovation</i> <i>Funding for a 4 year PhD research contract</i>	2023

Masters studies grant <i>Department of Mathematics, Universidad Autónoma de Madrid (UAM)</i> <i>10000€ for masters studies and research</i>	2022-2023 <i>Top 1 application score</i>
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Skills

Spanish: Native level
English: Fluent level
French: Intermediate level
Japanese: Intermediate level (comprehension), basic level (production)
\LaTeX knowledge
Computer skills: Python, C, Java, GitHub, Databases (SQL), Machine Learning and AI (Master rank in kaggle.com), among others.