

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

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

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

Collaboration grant Nov. 2021 - Jul. 2022
Department of Mathematics, Universidad Autónoma de Madrid Project: Theoretical and computational research about
Supervised by Ernesto Girondo Sirvent properties of fundamental domains of Fuchsian groups

Introduction to Mathematical Research Grant Severo Ochoa Summer 2021
Instituto de Ciencias Matemáticas (ICMAT) Project: Introduction to Moduli Spaces and Higgs Bundles
Supervised by Oscar García-Prada

Education

PhD Student in Mathematics Research 2023-
Universidad Complutense de Madrid (UCM) - Instituto de Ciencias Matemáticas (ICMAT)
Advisers: Oscar García-Prada and Tamás Hausel

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

Double Degree in Mathematics and Computer Science 2017 – 2022
Universidad Autónoma de Madrid (UAM) Average grade: 9.82 / 10
44 courses with honours

Preprints / Publications

Very stable regular G -Higgs bundles March 2025
arXiv:2503.01289

Cyclic Higgs bundles and the Toledo invariant March 2024
With Oscar García-Prada arXiv:2403.00415

Hitchin map on even very stable upward flows April 2024
With Tamás Hausel International Journal of Mathematics, 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>Mathematisches 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>Mathematisches 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)
Hausel Group (Geometry and its Interfaces)

15-26 January 2024

Institute of Science and Technology Austria (ISTA)
Hausel Group (Geometry and its Interfaces)

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
Editor and contributor with the extended abstract for my talk on Mixed Hodge theory.
doi:10.14760/OWR-2024-16
Undergraduate course notes
LaTeX notes for every course I took during my undergraduate mathematics studies.
Available at miguelgg.com

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>

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.