Miguel González

miguelgg.com

linkedin.com/in/miguelgonzalezgonzalez

mgonzalez.contacto@gmail.com

miguel.gonzalez@icmat.es

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

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

Research interests

Differential and algebraic geometry, moduli spaces of geometric structures on Riemann surfaces, Higgs bundles, Mirror Symmetry, Langlands Duality.

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

Attended conferences

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

Talks

A criterion for wobbliness of parabolic G-Higgs bundles *Seminar talk* *Chern Institute of Mathematics, Nankai University (CIM)*	August 2025
Compact components in relative character varieties for real lie groups of Hermitian type *Geometry Workshop of the Hitchin–Ngô Laboratory* *Feishu (Shanghai)*	August 2025
$\mathbb{C}^{\times}$-actions, lagrangian submanifolds and very stable bundles *Workshop: Geometry and Topology for the Future III* *Universidad Complutense de Madrid (UCM)*	June 2025
Very stable regular G-Higgs bundles *Hitchin–Ngô Laboratory Special Activity* *Instituto de Ciencias Matemáticas (ICMAT)*	June 2025
Very stable regular G-Higgs bundles *Séminaire d'Analyse et Géométrie* *Institut de Mathématiques de Jussieu–Paris Rive Gauche (IMJ-PRG)*	May 2025
Very stable regular G-Higgs bundles *Conference: Stratifications of Higgs bundle moduli spaces and related topics* *Universidade de Santiago de Compostela (USC)*	May 2025
Hitchin map on minuscule Lagrangians *Bonn–Vienna block seminar: Equivariant cohomology, stable envelopes and big algebras* *University of Bonn*	February 2025

The decomposition theorem I: finite fields	January 2025
Reading seminar on perverse sheaves	
Universidad Complutense de Madrid (UCM)	
Very stable G-Higgs bundles with regular nilpotent Higgs field	November 2024
RTGF (Spanish Geometry and Physics Thematic Network) meeting	
Instituto de Ciencias Matemáticas (ICMAT)	
The $\mathbb{C}^\times$-action on the moduli space of Higgs bundles	November 2024
"Doc in progress" seminar	
Università degli Studi di Trento (UniTrento)	
The classification of extended 2-TQFTs	May 2024
Reading seminar on ∞-categories	
Universidad Complutense de Madrid (UCM)	
Mixed Hodge theory	April 2024
Arbeitsgemeinschaft: Geometry and Representation Theory around the P=W Conjecture	
Matematisches Forschungsinstitut Oberwolfach (MFO)	
Cyclic Higgs bundles and the Toledo invariant	January 2024
Hausel group seminar	
Institute of Science and Technology Austria (ISTA)	
Introduction to Hodge theory in complex algebraic geometry	January 2024
PhD seminar	
Universidad complutense de Madrid (UCM)	
The Hitchin Fibration and Spectral Curves	February 2023
Hitchin-Ngô Lab Working Group	
Instituto de Ciencias Matemáticas (ICMAT)	

Teaching

Pequeño Instituto de Matemáticas (PIM) / Little mathematics institute	2023-2025
Advanced mathematics problem-solving classes for high school students. https://www.icmat.es/PIM/	
Instituto de Ciencias Matemáticas (ICMAT)	

Research visits

Institut Henri Poincaré, Paris	12-23 May 2025
Higher rank geometric structures research program	
Faculty of Mathematics, University of Duisburg-Essen	7-11 April 2025
Heinloth Group	
Institute of Science and Technology Austria (ISTA)	23 February - 22 March January 2025
Hausel Group (Geometry and its Interfaces)	
Institute of Science and Technology Austria (ISTA)	15-26 January 2024
Hausel Group (Geometry and its Interfaces)	
Institute of Science and Technology Austria (ISTA)	19-28 January 2023
Hausel Group (Geometry and its Interfaces)	

Awards and prizes

Master's degree Extraordinary Award (best academic record)	2024
Awarded by Universidad Autónoma de Madrid (UAM)	
UAM Young Talent Award	2022
Awarded by Universidad Autónoma de Madrid (UAM)	
Best undergraduate academic record	2022
Awarded by Universidad Autónoma de Madrid (UAM)	
Excellence Grant	2018, 2019, 2020, 2021
Awarded by the Comunidad de Madrid	
Best academic record of first year undergraduate students	2018
Awarded by Universidad Autónoma de Madrid (UAM)	
Concurso de Primavera de Matemáticas (Mathematics contest)	2017
Winner (Top 20)	

Extraordinary Prize of Bachillerato   2017
Awarded by the Comunidad de Madrid to Top <1% high secondary school students

Extraordinary Prize of Secondary Education   2015
Awarded by the Comunidad de Madrid to Top <1% basic secondary school students

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.

Declined grants (incompatibilities)

PhD studies grant   2023
FPU Grant - Spanish Ministry of Universities
Funding for a 4 year PhD research and teaching contract

PhD studies grant   2023
ICMAT Severo Ochoa FPI Grant - Spanish Ministry of Science and Innovation
Funding for a 4 year PhD research contract

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

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