



Ángel González-Prieto

Curriculum Vitae

General information

Education

- 2015–2018 **PhD. in Mathematics**, *Topological Quantum Field Theories for Character Varieties*.
Universidad Complutense de Madrid, Madrid,
Sobresaliente *cum laude* (Highest mark)
Advisors: Marina Logares and Vicente Muñoz.
- 2014–2015 **MSc. in Mathematics and Applications**,
Universidad Autónoma de Madrid, Madrid.
- 2009–2014 **Dual BSc. in Mathematics and Computer Sciences**,
Universidad Autónoma de Madrid, Madrid

Positions

- 2026–Present **Profesor Permanente Laboral (Associate Professor)**,
Departamento de Álgebra, Geometría y Topología. Facultad de Ciencias Matemáticas.
Universidad Complutense de Madrid, Madrid
- 2021–2026 **Profesor Ayudante Doctor (Assistant Professor)**,
Departamento de Álgebra, Geometría y Topología. Facultad de Ciencias Matemáticas.
Universidad Complutense de Madrid, Madrid
- 2021 **Profesor Ayudante Doctor (Assistant Professor)**,
Departamento de Matemáticas. Facultad de Ciencias.
Universidad Autónoma de Madrid, Madrid
- 2018–2021 **Ayudante (Research Assistant)**,
ETSI de Sistemas Informáticos (School of Engineering of Computer Systems).
Universidad Politécnica de Madrid, Madrid
- 2019 **Postdoctoral Research Associate**,
Instituto de Ciencias Matemáticas. Severo Ochoa Research Fellow.
Consejo Superior de Investigaciones Científicas, Madrid
June – December.
- 2015–2018 **Personal Investigador en Formación (Predoctoral Fellow)**,
Facultad de Ciencias Matemáticas
Universidad Complutense de Madrid, Madrid

External Memberships

- 2021–Present **Member of the Instituto de Ciencias Matemáticas, (CSIC-UAM-UCM-UC3M)**

Departamento de Álgebra, Geometría y Topología. Facultad de Ciencias Matemáticas.
Universidad Complutense de Madrid and Instituto de Ciencias Matemáticas.

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Awards

- 2021 **Premio Vicent Caselles de Investigación Matemática (Vicent Caselles Award)**. Real Sociedad Matemática Española and BBVA Foundation.
- 2021 **Premio Extraordinario de Doctorado (Extraordinary PhD Award)**. Facultad de Ciencias Matemáticas. Universidad Complutense de Madrid.
- 2018 **Winner of the I and II PhDay Mathematics**. Universidad Complutense de Madrid.
- 2009 **Premio Extraordinario de Bachillerato de la Comunidad de Madrid** (Extraordinary Undergraduate Award of the Region of Madrid). Speciality: Health Sciences.

Habilitations

- 2024 **Professor (Acreditación de Profesor Titular de Universidad)**
- 2021 **Associate Professor (Acreditación de Profesor Contratado Doctor)**
- 2021 **Private University Professor (Acreditación de Profesor de Universidad Privada)**
- 2020 **Assistant Professor (Acreditación de Profesor Ayudante Doctor)**

Academic Management

- 2022-Present **Vicedean of International and Institutional Affairs**,
Facultad de CC. Matemáticas. Universidad Complutense de Madrid
- 2024-Present **Una Europa - Self Steering Committee Member (AI and Data Science)**,
European universities alliance
- 2023 **Coordinator of the EvAU exam - Mathematics II**,
Universidad Complutense de Madrid

Administrative recognitions

- 2016-2021 **Sexenio de investigación**,
ANECA (Universidad Complutense de Madrid)
- 2016-2022 **Quinquenio de docencia**,
Universidad Complutense de Madrid

Research activity

Research Interest

My research lies in the interface between Complex Geometry, Algebraic Geometry and Theoretical Physics. I am especially focused on Topological Quantum Field Theories, Geometric Invariant Theory, representation theory and Hodge theory. Moreover, I am interested in Algebraic Topology, especially in higher category theory, functor calculus and knot theory. As a byproduct, I am interested in moduli spaces, mainly moduli spaces of Higgs bundles and flat connections, and their relation with character varieties, gauge theory and mirror symmetry. Additionally, I also work on theoretical Machine Learning, with special attention to the application of mathematical techniques. In particular, I research in Recommender Systems, as well as Deep Learning, Generative Adversarial Networks and Manifold Learning through geometric flows.

Publications

- [49] **Á. González-Prieto, M. Hablicsek, J. Vogel**, *Arithmetic-Geometric Correspondence of Character Stacks via Topological Quantum Field Theory*, 2026, [arXiv:2309.15331](#)
To appear in *Advances in Theoretical and Mathematical Physics*.
- [48] **Á. González-Prieto, E. Miranda, D. Peralta-Salas**, *Universality in computable dynamical systems: Old and new*, 2025, [doi:10.1088/2632-072X/ae00b5](#)[arXiv:2503.16100](#).
Journal of Physics: Complexity, 6 035014
- [47] **Á. González-Prieto, M. Hablicsek and J. Vogel**, *Virtual Classes of Character Stacks*, 2025, [doi:10.1016/j.geomphys.2025.105450](#)[arXiv:2201.08699](#)
Journal of Geometry and Physics, 211, 105450.
- [46] **Á. González-Prieto**, *Pseudo-quotients and their application to character varieties*, 2024, [doi:10.1142/S0219199723500098](#), [arXiv:1807.08540v3](#)
Communications in Contemporary Mathematics, 2350009.
- [45] **D. Pérez-López, F. Ortega, Á. González-Prieto and J. Dueñas-Lerín**, *Incorporating Recklessness to Collaborative Filtering based Recommender Systems*, 2024, [arXiv:2308.02058](#).
Information Sciences Volume 679 (2024).
- [44] **Á. González-Prieto and M. Logares**, *Character varieties over singular manifolds*, 2023, [doi:10.1007/s40687-023-00394-y](#), [arXiv:1807.08540v3](#)
Research in the Mathematical Sciences 10, 32 (2023).
- [43] **Á. González-Prieto, J. Martínez and V. Muñoz**, *Geometry of $SU(3)$ -character varieties of torus knots*, 2023, [doi:10.1016/j.topol.2023.108586](#), [arXiv:2207.09170](#)
Topology and its Applications.
- [42] **Á. González-Prieto**, *Quantization of algebraic invariants through Topological Quantum Field Theories*, 2023, [doi:10.1016/j.geomphys.2023.104849](#), [arXiv:2206.00709](#)
Journal of Geometry and Physics 189, 104849.
- [41] **E. Talavera, G. Iglesias, Á. González-Prieto, A. Mozo, S. Gómez-Canaval**, *Data Augmentation techniques in time series domain: A survey and taxonomy*, 2023, [doi:10.1007/s00521-023-08459-3](#), [arXiv:2206.13508](#)
Neural Computing and Applications 35, 10123–10145.
- [40] **J. Díaz, J. Pérez, C. Gallardo and Á. González-Prieto**, *Applying Inter-rater Reliability and Agreement in Grounded Theory Studies in Software Engineering*, 2023, [10.5281/zenodo.5034244](#)
Journal of Systems and Software 195 (2023) 111520
- [39] **Á. González-Prieto and V. Muñoz**, *Motive of the SL_4 -character variety of torus knots*, 2022, [arXiv:2006.01810](#), [doi:10.1016/j.jalgebra.2022.06.008](#)
Journal of Algebra 2022.
- [38] **Á. González-Prieto and V. Muñoz**, *Representation Varieties of Twisted Hopf Links*, 2022, [arXiv:2202.07090](#)[doi:10.1007/s00009-023-02300-w](#)
Mediterranean Journal of Mathematics 20, 89.

- [37] **Á. González-Prieto and V. Muñoz**, *The point counting problem in representation varieties of torus knots*, 2022, [arXiv:2105.08945](https://arxiv.org/abs/2105.08945)
Montes Taurus J. Pure Appl. Math. 4 (3), 114–130, 2022.
- [36] **Á. González-Prieto, A. Brú, J. C. Nuño and J. L. González**, *Hybrid machine learning methods for risk assessment in gender-based crime*, 2022, [doi:10.1016/j.knosys.2022.110130](https://doi.org/10.1016/j.knosys.2022.110130)
Knowledge-Based Systems Volume 260, 2022.
- [35] **Á. González-Prieto, A. Mozo, S. Gómez-Canaval and E. Talavera**, *Improving the quality of generative models through Smirnov transformation*, 2022, [doi:10.1016/j.ins.2022.07.066](https://doi.org/10.1016/j.ins.2022.07.066), [arXiv:2110.15914](https://arxiv.org/abs/2110.15914)
Information Sciences 609 (2022), 1539-1566.
- [34] **A. Mozo, J. Morón-López, S. Vakaruk, Á. G. Pompa-Pernía, Á. González-Prieto, J. A. Pascual Aguilar, S. Gómez-Canaval and J. Manuel Ortiz**, *Chlorophyll soft-sensor: machine learning models for algae bloom predictions*, 2022, [doi:10.1038/s41598-022-17299-5](https://doi.org/10.1038/s41598-022-17299-5)
Scientific Reports 12.1 (2022): 1-23.
- [33] **A. Mozo, Á. González-Prieto, A. Pastor, S. Gómez-Canaval and E. Talavera**, *Synthetic flow-based cryptomining attack generation through Generative Adversarial Networks*, 2022, [doi:10.1038/s41598-022-06057-2](https://doi.org/10.1038/s41598-022-06057-2)
Scientific Reports 2022, 12, 2091.
- [32] **R. Lara-Cabrera, A. González, F. Ortega and Á. González-Prieto**, *Dirichlet Matrix Factorization: A Reliable Classification-based Recommender System*, 2022, [doi:12031223](https://doi.org/10.12031223)
Appl. Sci. 2022, 12(3).
- [31] **J. Bobadilla, F. Ortega, A. Gutiérrez and Á. González-Prieto**, *Deep Variational Models for Collaborative Filtering-based Recommender Systems*, 2022, [doi:10.1007/s00521-022-08088-2](https://doi.org/10.1007/s00521-022-08088-2)
Neural Computing and Applications.
- [30] **J. Bobadilla, A. Gutiérrez, S. Alonso, Á. González-Prieto**, *Neural Collaborative Filtering Classification Model to Obtain Prediction Reliabilities*, 2022, [doi:10.9781/ijimai.2021.08.010](https://doi.org/10.9781/ijimai.2021.08.010)
International Journal of Interactive Multimedia and Artificial Intelligence 7 (4), 2022.
- [29] **J. Pérez, J. Díaz, J. Berrocal, R. López-Viana and Á. González-Prieto**, *Edge Computing – A Grounded Theory Study*, 2022, [doi:10.1007/s00607-022-01104-2](https://doi.org/10.1007/s00607-022-01104-2)
Computing, 1-37
- [28] **F. Ortega, R. Lara-Cabrera, Á. González-Prieto and J. Bobadilla**, *Providing reliability in recommender systems through Bernoulli matrix factorization*, 2021, [doi:10.1016/j.ins.2020.12.001](https://doi.org/10.1016/j.ins.2020.12.001)
Information Sciences, 553 110–128.
- [27] **J. Bobadilla, Á. González-Prieto, F. Ortega and R. Lara-Cabrera**, *Deep Learning Approach to Obtain Collaborative Filtering Neighborhoods*, 2021, [doi:10.1007/s00521-021-06493-7](https://doi.org/10.1007/s00521-021-06493-7)
Neural Computing and Applications 2021.

- [26] **J. Bobadilla, R. Lara-Cabrera, Á. González-Prieto and F. Ortega**, *Deep-Fair: Deep learning for improving fairness in recommender systems*, 2021, [doi:10.9781/ijimai.2020.11.001](https://doi.org/10.9781/ijimai.2020.11.001)
International Journal of Interactive Multimedia and Artificial Intelligence 2021.
- [25] **D. López-Fernández, J. Díaz, J. García, J. Pérez and Á. González-Prieto**, *DevOps Team Structures: Characterization and Implications*, 2021, [doi:10.1109/TSE.2021.3102982arXiv:2101.02361](https://doi.org/10.1109/TSE.2021.3102982arXiv:2101.02361)
IEEE Transactions on Software Engineering 48 (10), 01.
- [24] **J. Pérez, Á. González-Prieto, D. López-Fernández, J. Díaz, J. García and A. Yagüe**, *DevOps Research-based Teaching Using Qualitative Research and Inter-Coder Agreement*, 2021, [doi:10.1109/TSE.2021.3092705](https://doi.org/10.1109/TSE.2021.3092705)
IEEE Transactions on Software Engineering 48.9 (2021): 3378-3393.
- [23] **Á. González-Prieto**, *Virtual classes of parabolic $SL_2(\mathbb{C})$ -character varieties*, 2020, [doi:10.1016/j.aim.2020.107148](https://doi.org/10.1016/j.aim.2020.107148). [arXiv:1906.05222](https://arxiv.org/abs/1906.05222)
Advances in Mathematics, 368, 107148.
- [22] **Á. González-Prieto, M. Logares and V. Muñoz**, *A lax monoidal Topological Quantum Field Theory for representation varieties*, 2020, [doi:10.1016/j.bulsci.2020.102871](https://doi.org/10.1016/j.bulsci.2020.102871), [arXiv:1709.05724](https://arxiv.org/abs/1709.05724)
Bulletin des Sciences Mathématiques 2020, Vol. 161, 102871.
- [21] **J. Bobadilla, Á. González-Prieto, F. Ortega and R. Lara-Cabrera**, *Deep learning feature selection to unhide demographic recommender systems factors*, 2020, [arXiv:2006.12379](https://arxiv.org/abs/2006.12379). [doi:10.1007/s00521-020-05494-2](https://doi.org/10.1007/s00521-020-05494-2)
Neural Computing and Applications, 1-18.
- [20] **R. Lara-Cabrera, Á. González-Prieto, F. Ortega**, *Deep Matrix Factorization approach for Collaborative Filtering Recommender Systems*, 2020, [doi:10.3390/app10144926](https://doi.org/10.3390/app10144926)
Appl. Sci. 2020, 10(14), 4926.
- [19] **F. Ortega, Á. González-Prieto, J. Bobadilla and A. Gutiérrez**, *Collaborative filtering to predict sensor array values in large IoT networks*, 2020, [doi:10.3390/s20164628](https://doi.org/10.3390/s20164628)
Sensors 2020, 20(16), 4628.
- [18] **R. Lara-Cabrera, Á. González-Prieto, F. Ortega and J. Bobadilla**, *Evolving matrix factorization based collaborative filtering using genetic programming*, 2020, [doi:10.3390/app10020675](https://doi.org/10.3390/app10020675)
Appl. Sci. 2020, 10(2), 675.
- [17] **Á. González-Prieto, J. Pérez, J. Díaz and D. López-Fernández**, *Inter-Coder Agreement for Improving Reliability in Software Engineering Qualitative Research*, 2020, [arXiv:2008.00977](https://arxiv.org/abs/2008.00977)[doi:10.1016/j.jss.2023.111707](https://doi.org/10.1016/j.jss.2023.111707)
Journal of Systems and Software 202.
- [16] **J. Díaz, D. López-Fernández, J. Perez, Á. González-Prieto**, *Why are many businesses instilling a DevOps culture into their organization?*, 2020, [doi:10.1007/s10664-020-09919-3](https://doi.org/10.1007/s10664-020-09919-3). [arXiv:2005.10388](https://arxiv.org/abs/2005.10388)
Empirical Software Engineering 26(2), 1-50.

Books

- [15] **V. Muñoz, Á. González-Prieto and J. Rojo**, *Geometry and Topology of Manifolds: Surfaces and Beyond*, 2020, ISBN: 978-1-4704-6132-4
American Mathematical Society (Graduate Studies in Mathematics)
[Book chapters \(with peer-review\)](#)
- [14] **Á. González-Prieto, M. Logares, J. Martínez and V. Muñoz**, *Stratification of $SU(r)$ -character varieties of twisted Hopf links*, 2024, [arXiv:2303.06218](#)
Moduli Spaces and Vector Bundles — New Trends. Contemporary Mathematics of the American Mathematical Society.
- [13] **Á. González-Prieto, M. Logares and V. Muñoz**, *Motive of the representation varieties of torus knots for low rank affine groups*, 2021, [arXiv:2104.13651](#)
Analysis, Geometry, Nonlinear optimization and Applications (Th.M. Rassias, P. Pardalos eds.), World Scientific (Accepted).
- [12] **Á. González-Prieto, M. Logares and V. Muñoz**, *Representation variety for the rank one affine group*, 2021, [arXiv:2005.01841](#)
Mathematical Analysis in Interdisciplinary Research (I.N. Parasidis, E. Providas and Th.M. Rassias, eds.), Springer.
- [Conference proceedings](#)
- [11] **Á. González-Prieto and V. Muñoz**, *Character varieties of torus knots*, 2021
In: TEMatmonográficos, 2 (2021): Proceedings of the 3rd BYMAT Conference, pp. 39-42.
- [Preprints](#)
- [10] **S. Dyhr, Á. González-Prieto, E. Miranda and D. Peralta-Salas**, *Turing complete Navier-Stokes steady states via cosymplectic geometry*, 2025
Preprint [arXiv:2505.10379](#).
- [9] **S. Dyhr, Á. González-Prieto, E. Miranda and D. Peralta-Salas**, *Cosymplectic Chern-Hamilton conjecture*, 2025
Preprint [arXiv:2505.10379](#).
- [8] **Á. González-Prieto, J. Martínez, V. Muñoz**, *Representations of knot groups in $AGL_1(\mathbb{C})$ and Alexander invariants*, 2025
Preprint [arXiv:2503.23364](#).
- [7] **Á. González-Prieto, E. Miranda, D. Peralta-Salas**, *Topological Kleene Field Theories as a model of computation*, 2025
Preprint [arXiv:2503.16100](#).
- [6] **J. Pérez, J. Díaz, Á. González-Prieto, S. Gil-Borrás**, *Theory building for empirical software engineering in qualitative research: Operationalization*, 2024
Preprint [arXiv:2412.02384](#).
- [5] **Á. González-Prieto, A. Zamora**, *Root data in character varieties*, 2024
Preprint [arXiv:2408.03111](#).
- [4] **Á. González-Prieto, J. Martínez and V. Muñoz**, *Character varieties of torus links*, 2024
Preprint [arXiv:2402.12286](#).

- [3] **R. Lara-Cabrera, Á. González-Prieto, D. Pérez-López, D. Trujillo, F. Ortega**, *Manifoldy: An evaluation framework for dimensionality reduction through sectional curvature*, 2023
Preprint [arXiv:2303.09909](https://arxiv.org/abs/2303.09909).
- [2] **Á. González-Prieto, A. Gutiérrez, F. Ortega and R. Lara-Cabrera**, *ResBeMF: Improving Prediction Coverage of Classification based Collaborative Filtering*, 2022
Preprint [arXiv:2210.10619](https://arxiv.org/abs/2210.10619).
- [1] **Á. González-Prieto**, *Motivic theory of character varieties via Topological Quantum Field Theories*, 2018
Preprint [arXiv:1810.09714](https://arxiv.org/abs/1810.09714).

Research Grants

Principal Investigator

2022-2024 **Topological recursion in character varieties and knot theory**, *Comunidad de Madrid R+D Project PR27/21-029*,
Principal Researcher: Ángel González-Prieto,
Universidad Complutense de Madrid

Participation as Researcher

2024-Present **Geometric structures on manifolds, symmetry and field theories**, *PID2024-156578NB-I00*,
Principal Researchers: Marco Castrillón and Vicente Muñoz,
Agencia Estatal de Investigación (Universidad Complutense de Madrid)

2024-Present **Bilateral AEI-DFG project: Celestial Mechanics, Hydrodynamics, and Turing Machines - AEI-DFG: Himmelsmechanik, Hydrodynamik und Turing-Maschinen**, *AQUACELL*,
Principal Researchers: Kai Cieliebak and Urs Frauenfelder (German team), Eva Miranda and Daniel Peralta Salas (Spanish team),
German Research Foundation and Agencia Estatal de Investigación (Instituto de Ciencias Matemáticas)

2024-Present **Aplicación de modelos del LENGuaje a gran escala para la prevención sociosaniTaria de problemas de salud mental y Riesgo de suicidio en Jóvenes**, *ALENTAR-J-CM*,
Principal Researcher: Alejandro de la Torre Luque,
Comunidad de Madrid (Universidad Complutense de Madrid)

2022-Present **Computational, dynamical and geometrical complexity in fluid dynamics**, *COMPLEXFLUIDS*,
Principal Researcher: Eva Miranda,
BBVA Foundation

2022-Present **Algebraic geometry and applications to mathematical physics**, *PID2021-124440NB-I00*,
Principal Researchers: Enrique Arrondo and Marina Logares,
Agencia Estatal de Investigación (Universidad Complutense de Madrid)

- 2021 **H2020 SPIDER: a cyber security platform for virtualized 5G cyber range services**, *H2020 833685*,
Principal Researcher: Alberto Mozo,
Universidad Politécnica de Madrid
- 2021 **H2020 BOOST 4.0: Big data value spaces for competitiveness of European connected smart factories**,
Principal Researcher: Alberto Mozo,
European Research Council (Universidad Politécnica de Madrid)
- 2021 **H2020 Deep-Augur 2019**,
Principal Researcher: Alberto Mozo,
European Research Council (Universidad Politécnica de Madrid)
- 2015–2019 **“Severo Ochoa” Excellence Programme**, *SEV-2015-0554*,
Principal Researcher: Diego Córdoba Gazolaz,
Instituto de Ciencias Matemáticas
- 2015–2018 **Topology of Manifolds, Combinatorial Topology and Topological Dynamic**, *MTM2015-63612-P*, Principal Researchers: Vicente Muñoz and Francisco Romero,
Ministerio de Economía y Competitividad (Universidad Complutense de Madrid)
- 2015 **“Severo Ochoa” Excellence Programme**, *SEV-2011-0087*,
Principal Researcher: Diego Córdoba Gazolaz,
Instituto de Ciencias Matemáticas
- [R&D projects with companies](#)
- 2020 **Detection of hidden relations in black box testing**, *Coordinator: Raúl Lara-Cabrera*,
Universidad Politécnica de Madrid - Netzima

Selected Conferences and Talks

Talks at conferences and seminars in the last six years (2019 – 2024). All the talks were delivered in English unless otherwise stated. Except for online or local activities, all the talks included a short research stay at the host institution.

Invited speaker

- 2025 **Oberseminar Differentialgeometrie - Seminar on Differential Geometry**, University of Augsburg,
Recursive functions through dynamical systems
20th January 2025
- 2024 **PhD Seminar at School of Computer Systems**, Universidad Politécnica de Madrid,
A beautiful mathematical mind (In Spanish)
25st November 2024
- 2024 **Research Seminar of the Department of Applied Mathematics**, Universidad Politécnica de Madrid,
Math against the machine: Opportunities and challenges of artificial intelligence in mathematics (In Spanish)
22nd November 2024

- 2024 **BACH Seminar - Seminar on Symplectic and Contact Topology**, University of Bochum,
Dynamics of computable functions
8th November 2024
- 2024 **Arbeitsgemeinschaft Symplektische Topologie Seminar (Symplectic geometry working group seminar)**, University of Cologne,
Quantization of Character Varieties
6th November 2024
- 2024 **Young Researchers Topology Meeting**, Universidad de Salamanca,
Quantization of knot invariants
24th October 2024
- 2024 **Geometry and Physics Seminar**, Universidade de Lisboa,
Character varieties of knots
18th June 2024
- 2023 **V BYMAT Conference - Plenary speaker**, Instituto de Ciencias Matemáticas,
Quantum field theories in algebraic geometry
13th November 2023
- 2023 **XIV Ukraine Algebra Conference**, Institute of Mathematics of National Academy of Ukraine (online),
Interference phenomena in Topological Quantum Field Theories for character varieties
6th July 2023
- 2023 **Algebra, Geometry and Number Theory seminar**, Leiden University,
Knotting bordisms: Topological Quantum Field Theories for character varieties of knots
19th April 2023
- 2023 **Special day on representation theory in Geometry and Physics**, Universitat Politècnica de Catalunya,
Character varieties of knots made easy
21st February 2023
- 2023 **Congreso de Jóvenes Investigadores RSME 2023**, Universidad de León,
Quantizability of manifold invariants
8th February 2023
- 2022 **IV BYMAT Conference**, Universitat de València,
Knots and Topological Quantum Field Theories
10th November 2022
- 2022 **Geometry Seminar**, Centre de Recerca Matemàtica,
Quantum sledgehammers to crack character nuts
18th May 2022
- 2022 **TQFT Club Seminar**, University of Lisbon,
Topological Quantum Field Theories for Character Stacks
13rd April 2022

- 2022 **ALPE Seminar**, University of Montpellier,
Quantization of parabolic character varieties and interference phenomena
16th March 2022
- 2021 **b-Lab Seminar**, Universitat Politècnica de Catalunya,
Course: Topological Quantum Field Theories for Dummies
15 November 2021, 10 December 2021, 22 December 2021 and 28 January 2022
- 2021 **New Bridges between Mathematics and Data Science**, Universidad de Valladolid,
Recommender systems in action
10 November 2021
- 2021 **New Bridges between Mathematics and Data Science**, Universidad de Valladolid,
Generative Adversarial Networks for Mathematicians
9 November 2021
- 2021 **Antonio Giraldo and Sonia Sastre Seminar**, ETSI Ingenieros Informáticos, Universidad Politécnica de Madrid,
Motives of character varieties of torus knots (In Spanish)
28 October 2021
- 2021 **Workshop of Young Researchers in Mathematics**, Faculty of Mathematical Sciences, Universidad Complutense de Madrid,
Quantizing representation theory
20 September 2021
- 2021 **Machine Learning Seminar**, Universidad Autónoma de Madrid and Instituto de Ciencias Matemáticas,
Dynamics of Generative Adversarial Networks (In Spanish)
23 June 2021
- 2021 **Geometry Seminar**, Universidad Autónoma de Madrid and Instituto de Ciencias Matemáticas,
Interference phenomena in parabolic character varieties
17 February 2021
- 2020 **III BYMAT Conference**, Universitat de València,
Character varieties of torus knots
1-3 December 2020
- 2020 **JAЕ School of Mathematics**, Instituto de Ciencias Matemáticas,
Homotopy of spaces of embeddings
7 - 8th September 2020 (3 hours)
- 2020 **Research Seminar**, ETSI de Sistemas Informáticos, Universidad Politécnica de Madrid,
The discrete logarithm problem and elliptic curves cryptography (In Spanish)
16th June 2020
- 2020 **III Jíbiri Seminar (Algebraic Geometry Workshop)**, Universidad de Málaga,
Course: Character varieties. 2,5 hours
5th - 7th February 2020

- 2020 **V Meeting of Young Researchers**, *Real Sociedad Matemática Española*, Universitat Jaume I,
Interference phenomena in the moduli space of parabolic representations
30th January 2020
- 2019 **Workshop on Geometric Methods in Symplectic Topology**, Instituto de Ciencias Matemáticas,
Homotopy groups of spaces of knots with bow, arrows and bordisms
16th December 2019
- 2019 **Seminar of Topological Quantum Field Theories**, University of Lisbon. Instituto Técnico Superior,
Topological recursion in the motivic theory of character varieties
27th November 2019
- 2019 **Seminar of Geometry and Topology**, Universidad de Málaga,
Bordisms as homotopy groups of knots (In Spanish)
13th November 2019
- 2019 **Algebraic Geometry and Number Theory Seminar**, Institute of Science and Technology, Vienna, Austria,
Hodge theory of character varieties via Topological Quantum Field Theories
7th March 2019
- 2019 **Biennial Congress of the Real Sociedad Matemática Española**, Universidad de Cantabria,
Hodge theory via Topological Quantum Field Theories
4th February 2019

[Conference organizer](#)

- 2025 **Vice-president of the Scientific Committee**, *VII Congreso de Jóvenes Investigadores de la Real Sociedad Matemática Española*, Universidad del País Vasco UPV/EHU
13-17 January 2025
- 2024 **Co-organizer of conference**, *1st MAPHYAG Conference: Integrability, Geometry and QFTs*, Universidad Complutense de Madrid
7-11 October 2024
- 2024 **Co-organizer of conference**, *Fluid Dynamics, Geometry and Computer Science in interaction*, Centre de Recerca Matemàtica (CRM)
16-20 September 2024
- 2019 **Head of the Scientific Committee**, *II BYMAT Conference*, Instituto de Ciencias Matemáticas
20-24 May 2019
- 2015 **Organizer of IV Workshop on Topological Groups**, Universidad Complutense de Madrid
3-4 December 2015

[Seminar organizer](#)

2021–Present **Organizer of Geometry Seminar**, Instituto de Ciencias Matemáticas

- 2021–2024 **Organizer of Mathematical Physics and Algebraic Geometry Seminar (MA-PHYAG)**, Universidad Complutense de Madrid
- 2016–2018 **Organizer of the Network of PhD Students in Mathematics (ReDM)**, *Mathematics PhD seminar*, Universidad Complutense de Madrid
Course 2016/2017 and 2017/2018
- 2014 **Organizer of the I Young Seminar**, Instituto de Ciencias Matemáticas
23–27 June 2014

Teaching and Supervision Activity

Regular teaching

Five and a half years of postdoctoral teaching activity. More than 30 successfully defended Bachelor's Thesis students. I have delivered 18 different courses at three universities, adding up more than 900 hours, distributed as follows.

- 2021–Present **Profesor Ayudante Doctor at Universidad Complutense de Madrid**, 315 hours
- 2021 **Profesor Ayudante Doctor at Universidad Autónoma de Madrid**, 54 hours
- 2018–2021 **Ayudante at Universidad Politécnica de Madrid**, 406 hours
- 2015–2018 **PhD student at Universidad Complutense de Madrid**, 180 hours
- 2017–2018 **MSc fellow at Universidad Autónoma de Madrid**, 60 hours

PhD students under supervision

- 2025–present **Miguel Laredo Barbadillo**, *Artificial Intelligence for automatic formal software verification*
ETSI de Sistemas Informáticos (Universidad Politécnica de Madrid).
- 2024–present **Enrique Aycart Maldonado**, *Extended Topological Quantum Field Theories for character stacks*
Facultad de Ciencias Matemáticas (Universidad Complutense de Madrid).
- 2022–present **Alejandro Calleja Arroyo**, *Geometry of character varieties of knots*, Supported by a FPI grant from Instituto de Ciencias Matemáticas (ICMAT)
Facultad de Ciencias Matemáticas (Universidad Complutense de Madrid).
- 2022–present **Soren Dyhr**, *Geometric fluid dynamics*, Joint advisory with Eva Miranda (UPC) and Daniel Peralta-Salas (ICMAT), Supported by a “La Caixa” Foundation INPhINIT grant
Universitat Politècnica de Catalunya.

Master's theses supervised

- 2023–2024 **2D Topological Quantum Field Theories, Frobenius Structures, and Higher Algebra**, *Master's Thesis*, Santiago Pareja Pérez
Universidad Complutense de Madrid.
- 2021–2022 **Dynamical police protection for gender-crime victims through machine learning**, *Master's Thesis*, Co-supervised María José Navas Ara, Gonzalo Campos Delgado
Universidad Nacional de Educación a Distancia.

2020–2021 **The geometry of the Fourier-Mukai transformation**, *Master's Thesis*, Sergio Cuesta Martínez
Universidad Complutense de Madrid.

2020–2021 **Dependently-typed Lambda calculus and category theory**, *Master's Thesis*, Pedro Bonilla Nadal
Universidad Autónoma de Madrid.

2020–2021 **Deep Web. Fundamentals, Cryptographic Methods and Crime Prosecution**, *Master's Thesis*, Jonathan Martín Aparicio
Universidad de Salamanca y Escuela Nacional de Policía.

Other supervised students

2023 **Quantum groups for knot invariants**, *Severo Ochoa Programme - Introduction to Research*, Brais Gerpe Vilas y Álvaro Díaz Martín
Instituto de Ciencias Matemáticas.

2022 **Topological Quantum Field Theories and the geometry of character varieties**, *Severo Ochoa Programme - Introduction to Research*, Raquel Izquierdo García y Júlía Martínez Marín
Instituto de Ciencias Matemáticas.

Publications about mathematical education

2020 **Inés María Gómez-Chacón et al.**, *Multimedia learning scenarios in professional development of the novice university mathematics lecturers (ESCEMMAT-Univ) (2nd Phase)*, E-Prints Complutense

2019 **Inés María Gómez-Chacón et al.**, *Multimedia learning scenarios in professional development of the novice university mathematics lecturers (ESCEMMAT-Univ)*, E-Prints Complutense

Innovative teaching projects

2019–2020 **Training of Young University Professors in Mathematics. 2nd phase**, *Principal Researcher: Inés M^a Gómez Chacón*,
Universidad Complutense de Madrid

2018–2019 **Multidisciplinary problem-based teaching through the design, building, programming and automatic control of a drone**, *Principal Researcher: Jesús Bobadilla Sancho*,
Universidad Politécnica de Madrid

2018–2019 **Training of Young University Professors in Mathematics**, *Principal Researcher: Inés M^a Gómez Chacón*,
Universidad Complutense de Madrid

Outreach

2024 **Outreach talk**, *Congreso Universitario Internacional de Comunicación, Innovación, Investigación y Docencia (CUICIID)*, Universidad Complutense de Madrid,
What can Artificial Intelligence do for you? (In Spanish)
17th October 2024

- 2024 **Outreach talk**, *Interdisciplinary School – Society for Multidisciplinary and Fundamental Research (SEMF)*, Universidad de Valencia,
What can Artificial Intelligence do for you?
 24th July 2024
- Radio interviews**, Onda Cero (Por Fin no es Lunes), Radio 5 (Raíz de 5), RNE (Interview with Santi García Cremades), Radio 3 (Generación Ya), SER (La Ventana), COPE (La Tarde de COPE)
- Newspapers**, El Español, ABC, El País, Tribuna Complutense
- 2019 **Semana de la Ciencia y la Innovación de la Comunidad de Madrid**, (*Science week of the region of Madrid*), Ciencia es... ¡la suma de todos! (Science is... the sum of everybody!, Universidad Complutense de Madrid
 Co-coordinated with Marina Logares. 9 hours.
- 2018 **Organizer of I meeting between politicians and scientists: Policies for Science**, Faculty of Mathematical Sciences, Universidad Complutense de Madrid
 10 April 2018