



# Ángel González-Prieto

## Curriculum Vitae

### Personal Information

Full Name José Ángel González Prieto

Birth Date 23rd October 1991

### 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, *GPA*: 9.67/10.

2009–2014 **Double Degree in Mathematics and Computer Sciences**,  
*Universidad Autónoma de Madrid*, Madrid, *GPA*: 9.45/10 (*First-class*).  
Major in Pure Mathematics and Computer Sciences

### Positions

2021–Present **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.

*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 II PhDay Mathematics**. Universidad Complutense de Madrid.
- 2018 **Winner of the I 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.

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## Grants and Scholarships

- 2019 **"Severo Ochoa" Postdoctoral Research Fellowship**, *Instituto de Ciencias Matemáticas*. Consejo Superior de Investigaciones Científicas.
- 2015–2018 **International "La Caixa" Fellowship for PhD. Studies at Spanish Universities**, *Universidad Complutense de Madrid*. Department of Algebra, Geometry and Topology, Advisors: Marina Logares and Vicente Muñoz.  
"La Caixa" Foundation
- 2014–2015 **Fellowship for the pursuit of Master's Degree Program in Mathematics and Applications**, *Department of Mathematics*, Universidad Autónoma de Madrid.
- 2013–2014 **Collaboration Grant**, *Department of Mathematics*, Universidad Autónoma de Madrid, *Homological algebra with applications to the toral rank conjecture*.
- 2013 **JAE Intro CP 2013**, Instituto de Ciencias Matemáticas, *Studies on the toral rank conjecture*. Supervisor: Marina Logares.
- 2009–2014 **Excellence Scholarship**, Universidad Autónoma de Madrid, Obtained every year..

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## External Habilitations

- 2021 **Associate Professor (Acreditación de Profesor Contratado Doctor)**.
- 2020 **Assistant Professor (Acreditación de Profesor Ayudante Doctor)**.

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## Research

### 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, particularly in beyond-accuracy models, as well as Deep Learning, Generative Adversarial Networks and Manifold Learning through geometric flows.

## Publications

- 2021 [14] **J. Bobadilla, Á. González-Prieto, F. Ortega and R. Lara-Cabrera**, *Deep Learning Approach to Obtain Collaborative Filtering Neighborhoods*, To appear in *Neural Computing and Applications*.
- 2021 [13] **D. López-Fernández, J. Díaz, J. García, J. Pérez and Á. González-Prieto**, *DevOps Team Structures: Characterization and Implications*, To appear in *IEEE Transactions on Software Engineering*, [arXiv:2101.02361](https://arxiv.org/abs/2101.02361).
- 2021 [12] **Á. González-Prieto, A. Mozo, E. Talavera and S. Gómez-Canaval**, *Dynamics of Fourier Modes in Torus Generative Adversarial Networks*, *Mathematics* 2021, 9, 325, [doi:10.3390/math9040325](https://doi.org/10.3390/math9040325).
- 2021 [11] **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*, To appear in *IEEE Transactions on Software Engineering*.
- 2021 [10] **F. Ortega, R. Lara-Cabrera, Á. González-Prieto and J. Bobadilla**, *Providing reliability in recommender systems through Bernoulli matrix factorization*, *Information Sciences*, 553 110–128, [doi:10.1016/j.ins.2020.12.001](https://doi.org/10.1016/j.ins.2020.12.001).
- 2020 [9] **J. Bobadilla, Á. González-Prieto, F. Ortega and R. Lara-Cabrera**, *Deep learning feature selection to unhide demographic recommender systems factors*, *Neural Computing and Applications*, 1-18, [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).
- 2020 [8] **J. Bobadilla, R. Lara-Cabrera, Á. González-Prieto and F. Ortega**, *DeepFair: Deep learning for improving fairness in recommender systems*, *International Journal of Interactive Multimedia and Artificial Intelligence*, [doi:10.9781/ijimai.2020.11.001](https://doi.org/10.9781/ijimai.2020.11.001).
- 2020 [7] **J. Diaz, D. López-Fernández, J. Perez, Á. González-Prieto**, *Why are many businesses instilling a DevOps culture into their organization?*, *Empir. Softw. Eng.* 26, 25 (2021), [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).
- 2020 [6] **F. Ortega, Á. González-Prieto**, *Recommender Systems and Collaborative Filtering*, *Appl. Sci.* 2020, 10(20), 7050, [doi:10.3390/app10207050](https://doi.org/10.3390/app10207050).
- 2020 [5] **F. Ortega, Á. González-Prieto, J. Bobadilla and A. Gutiérrez**, *Collaborative filtering to predict sensor array values in large IoT networks*, *Sensors* 2020, 20(16), 4628, [doi:10.3390/s20164628](https://doi.org/10.3390/s20164628).
- 2020 [4] **R. Lara-Cabrera, Á. González-Prieto, F. Ortega**, *Deep Matrix Factorization approach for Collaborative Filtering Recommender Systems*, *Appl. Sci.* 2020, 10(14), 4926, [doi:10.3390/app10144926](https://doi.org/10.3390/app10144926).
- 2020 [3] **Á. González-Prieto, M. Logares and V. Muñoz**, *A lax monoidal Topological Quantum Field Theory for representation varieties*, *Bull. Sci. Math.* 2020, Vol. 161, 102871, [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).
- 2020 [2] **Á. González-Prieto**, *Virtual classes of parabolic  $SL_2(\mathbb{C})$ -character varieties*, *Advances in Mathematics*, 368, 107148, [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).

- 2020 [1] **R. Lara-Cabrera, Á. González-Prieto, F. Ortega and J. Bobadilla**, *Evolving matrix factorization based collaborative filtering using genetic programming*, Appl. Sci. 2020, 10(2), 675, doi:10.3390/app10020675.

#### Monographs

- 2020 [1] **V. Muñoz, Á. González-Prieto and J. Rojo**, *Geometry and Topology of Manifolds: Surfaces and Beyond*, ISBN: 978-1-4704-6132-4, To appear in *Graduate Studies in Mathematics (American Mathematical Society)*.

#### Book chapters

- 2021 [4] **Á. González-Prieto and V. Muñoz**, *The point counting problem in representation varieties of torus knots*, To appear in *Montes Taurus Journal of Pure and Applied Mathematics*, arXiv:2105.08945.
- 2021 [3] **Á. González-Prieto, M. Logares and V. Muñoz**, *Motive of the representation varieties of torus knots for low rank affine groups*, To appear in *Analysis, Geometry, Nonlinear optimization and Applications (Th.M. Rassias, P. Pardalos eds.)*, World Scientific, arXiv:2104.13651.
- 2020 [2] **Á. González-Prieto, M. Logares and V. Muñoz**, *Representation variety for the rank one affine group*, To appear in *Mathematical Analysis in Interdisciplinary Research (I.N. Parasidis, E. Providas and Th.M. Rassias, eds.)*, Springer, arXiv:2005.01841.
- 2016 [1] **Á. González-Prieto**, *'Deligne-Hodge polynomials of character varieties of doubly periodic instantons'*, Ediciones UAM, ISBN: 978-84-8344-525-9.  
Master's thesis. Advisors: M. Logares and V. Muñoz.

#### Conference proceedings

- 2021 [1] **Á. González-Prieto and V. Muñoz**, *Character varieties of torus knots*, To appear in *TEMat monográficos. Proceedings of the 3th BYMAT Conference*.

#### Preprints

- 2021 [12] **Á. González-Prieto, Márton Hablicsek and Jesse Vogel**, *Virtual Classes of Character Stacks*, To appear.
- 2021 [11] **R. Lara-Cabrera, A. González, F. Ortega and Á. González-Prieto**, *Dirichlet Matrix Factorization: A Reliable Classification-based Recommender System*.
- 2021 [10] **Á. González-Prieto, A. Mozo, S. Gómez-Canaval and E. Talavera**, *Improving the quality of generative models through Smirnov transformation*, arXiv:2110.15914.
- 2021 [9] **J. Bobadilla, F. Ortega, A. Gutiérrez and Á. González-Prieto**, *Deep Variational Models for Collaborative Filtering-based Recommender Systems*.
- 2021 [8] **J. Díaz, J. Pérez, C. Gallardo and Á. González-Prieto**, *Applying Inter-rater Reliability and Agreement in Grounded Theory Studies in Software Engineering*, arXiv:2107.11449.
- 2021 [7] **A. Mozo, Á. González-Prieto, A. Pastor, S. Gómez-Canaval and E. Talavera**, *Synthetic flow-based cryptomining attack generation through Generative Adversarial Networks*, arXiv:2107.14776.

- 2021 [6] **Á. González-Prieto, A. Brú, J. C. Nuño and J. L. González-Álvarez**, *Machine learning for risk assessment in gender-based crime*, [arXiv:2106.11847](https://arxiv.org/abs/2106.11847).
- 2020 [5] **Á. González-Prieto and M. Logares**, *Character varieties over singular manifolds*, [arXiv:2011.04603](https://arxiv.org/abs/2011.04603).
- 2020 [4] **Á. González-Prieto, J. Pérez, J. Díaz and D. López-Fernández**, *Reliability in Software Engineering Qualitative Research through Inter-Coder Agreement: A guide using Krippendorff's  $\alpha$  and Atlas.ti*, [arXiv:2008.00977](https://arxiv.org/abs/2008.00977).
- 2020 [3] **Á. González-Prieto and V. Muñoz**, *Motive of the  $SL_4$ -character variety of torus knots*, [arXiv:2006.01810](https://arxiv.org/abs/2006.01810).
- 2018 [2] **Á. González-Prieto**, *Motivic theory of character varieties via Topological Quantum Field Theories*, [arXiv:1810.09714](https://arxiv.org/abs/1810.09714).
- 2018 [1] **Á. González-Prieto**, *Pseudo-quotients and their application to character varieties*, [arXiv:1807.08540v3](https://arxiv.org/abs/1807.08540v3).

### Patents

- 2021 **A. Mozo, S. Gómez-Canaval, A. Pastor, D. López, E. Talavera and Á. González-Prieto**, *Method for modelling synthetic data in Generative Adversarial Networks*, European patent. Submitted 28/01/2021.  
Reference: EP 21382064.0

### 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.

## Teaching

- 2021–2022 **Geometría Lineal**, (*Linear Geometry*). *Double Degree in Mathematics and Computer Science and Double Degree in Mathematics and Physics*, Facultad de Ciencias Matemáticas (Universidad Complutense de Madrid).
- 2020–2021 **Matemáticas II**, (*Mathematics II*). *Degree in Chemical Engineering*, Facultad de Ciencias (Universidad Autónoma de Madrid).
- 2020–2021 **Geometría de Curvas y Superficies**, (*Geometry of Curves and Surfaces*). *Degree in Mathematics*, Facultad de Ciencias (Universidad Autónoma de Madrid).
- 2020–2021 **Lógica para la Inteligencia Artificial**, (*Logic for Artificial Intelligence*). *Degree in Data Science and Artificial Intelligence*, ETSI de Sistemas Informáticos (Universidad Politécnica de Madrid).  
Coordinator
- 2020–2021 **Massively Parallel Machine Learning**, *Master in Digital Innovation: Data Science*, ETSI de Ingenieros Informáticos (Universidad Politécnica de Madrid).

- 2020–2021 **Bases de Datos**, (*Databases*). *Degree in Software Engineering*, ETSI de Sistemas Informáticos (Universidad Politécnica de Madrid).
- 2018–2020 **Fundamentos de Ingeniería del Software**, (*Fundamentals of Software Engineering*). *Degree in Software Engineering*, ETSI de Sistemas Informáticos (Universidad Politécnica de Madrid).
- 2018–2019 **Programación de Hardware Reconfigurable**, (*Programming of Reconfigurable Hardware*). *Degree in Computer Engineering*, ETSI de Sistemas Informáticos (Universidad Politécnica de Madrid).
- 2018–2019 **Verificación y Validación**, (*Verification and Validation*). *Degree in Software Engineering*, ETSI de Sistemas Informáticos (Universidad Politécnica de Madrid).
- 2017–2018 **Geometría Computacional**, (*Computational Geometry*). *Double Degree in Mathematics and Computer Science and Degree in Mathematics*, Facultad de Ciencias Matemáticas (Universidad Complutense de Madrid).
- 2015–2018 **Geometría Diferencias y Aplicaciones**, (*Differential Geometry and Applications*). *Degree in Mathematical Engineering*, Facultad de Ciencias Matemáticas (Universidad Complutense de Madrid).
- 2015–2017 **Elementos de Matemáticas y Aplicaciones**, (*Elements of Mathematics and Applications*). *Degree in Mathematics*, Facultad de Ciencias Matemáticas (Universidad Complutense de Madrid).
- 2014–2015 **Álgebra**, (*Algebra*). *Degree in Computer Science*, Facultad de Ciencias (Universidad Autónoma de Madrid).

#### Supervised students

- 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 **Experimental Analysis of Algorithms for Attacking Elliptic Curve Cryptography**, *Bachelor's Thesis*, Roberto Morante Gil-Ortega. Universidad Politécnica de Madrid.
- 2020–2021 **Machine learning for COVID-19 diagnosis**, *Bachelor's Thesis*, Elvira Bausili Llamas. Universidad Pontificia de Comillas.
- 2020–2021 **Deep Web. Fundamentals, Cryptographic Methods and Crime Prosecution**, *Master's Thesis*, Jonathan Martín Aparicio. Universidad de Salamanca y Escuela Nacional de Policía.
- 2020–2021 **Secure Chat through Cryptographic algorithms based on Elliptic Curves**, *Bachelor's Thesis*, Mario Rodríguez Prieto. ETSI de Sistemas Informáticos (Universidad Politécnica de Madrid).

- 2019–2020 **Topological Complexity and Path Planning Algorithms**, *Bachelor's Thesis*, Pablo Gutierrez Sánchez.  
Facultad de Ciencias Matemáticas (Universidad Complutense de Madrid).
- 2018–2019 **Elliptic Curve Cryptography. Mathematical fundamentals and implementation**, *Bachelor's Thesis*, Santiago Raposo Briceño.  
ETSI de Sistemas Informáticos (Universidad Politécnica de Madrid).
- 2018–2019 **Cryptographic attacks to Elliptic Curve Cryptosystems**, *Bachelor's Thesis*, Jorge Ayala Talón.  
ETSI de Sistemas Informáticos (Universidad Politécnica de Madrid).

#### Currently supervised students

- Convergence of Generative Adversarial Networks**, *Bachelor's Thesis*, Ángel Alberto Carretero.  
Universidad Autónoma de Madrid.
- Pseudo-riemannian Geometry and General Relativity**, *Bachelor's Thesis*, David Fontecha.  
Universidad Autónoma de Madrid.

#### Others

- 2021 **CompuMates:  $\LaTeX$** , Facultad de Ciencias Matemáticas, Universidad Complutense de Madrid.  
9 hours.
- 2021 **Machine Learning**, *Ericsson*, ETSI de Sistemas Informáticos, Universidad Politécnica de Madrid.  
56 hours.
- 2020–Present **Probability and Statistics for Machine Learning**, *Samsung*, ETSI de Sistemas Informáticos, Universidad Politécnica de Madrid.  
60 hours.
- 2019–2020 **Introduction to Mathematics and Statistics for Data Science**, Banco Santander, Ciudad Financiera and Santander Asset Management.  
June 2019 (14 hours), September 2019 (30 hours), November-December 2019 (18 hours) and May-June 2020 (15 hours).
- 2019 **Algebraic geometry from a holomorphic viewpoint**, Universidad Complutense de Madrid and Instituto de Matemática Interdisciplinar, Doctorate course.  
20 hours.
- 2018 **XII Modelling Week**, *Coordinator of a Working Group*, Universidad Complutense de Madrid, Drone flight via Artificial Intelligence.  
26 hours.
- 2016–2017 **Introduction to Sage**, Universidad Complutense de Madrid,  
Sessions: 'Basic programming' and 'Computational formal proofs'.  
4 hours.

## Conferences and Talks

### Invited speaker



- 2021 **b-Lab Seminar**, Universitat Politècnica de Catalunya,  
Topological Quantum Field Theories for Dummies. Part I.  
15 November 2021, 10 December 2021
- 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, Univer-  
sidad Politécnica de Madrid,  
Motives of character varieties of torus knots.  
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.  
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 **JAE 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.  
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.*  
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
- 2018 **Algebra and Topology Seminar**, Department of Mathematical Sciences, University of Copenhagen,  
*Topological Quantum Field Theories for representation varieties.*  
17th December 2018
- 2018 **XII Workshop of Young Researchers in Mathematics**, Faculty of Mathematical Sciences, Universidad Complutense de Madrid,  
*How to use a quantum sledgehammer to crack a topological nut (and to get something in return).*  
24th September 2018
- 2018 **Algebra, Geometry and Topology Seminar**, Faculty of Mathematical Sciences, Universidad Complutense de Madrid,  
*Algebraic topology through Topological Quantum Field Theories.*  
7th June 2018
- 2018 **Mathematics PhD Seminar**, Faculty of Mathematical Sciences, Universidad Complutense de Madrid,  
*Algebraic quotients and Geometric Invariant Theory.*  
10th May 2018
- 2018 **I BYMAT Conference**, Instituto de Ciencias Matemáticas,  
*Field theory and quantisation of Hodge structures.*  
7th May 2018
- 2018 **Geometry for the future**, Instituto de Ciencias Matemáticas,  
*Topological Geometric Invariant Theory.*  
16th April 2018

- 2018 **Seminari de Geometria Algebraica**, Universitat de Barcelona,  
*Topological Quantum Field Theories and their application to Hodge theory.*  
5th April 2018
- 2018 **Junior Geometry Seminar (Geometry Tea)**, University of Cambridge,  
*Hodge structures through Topological Quantum Field Theory.*  
23th February 2018
- 2018 **III Meeting of the Network of Algebraic Geometry and Singularities (RGAS)**,  
Faculty of Mathematical Sciences, Universidad Complutense de Madrid,  
*Topological Quantum Field Theory for Hodge structures on character varieties.*  
29th January 2018
- 2017 **Pure Mathematics Research Seminar**, Centre for Mathematical Sciences, University  
of Plymouth,  
*Quantisation of Hodge structures of representation varieties.*  
22th November 2017
- 2017 **Pure Mathematics Research Seminar**, Centre for Mathematical Sciences, University  
of Plymouth,  
*Duality in Topological Quantum Field Theories.*  
15th November 2017
- 2017 **Group Theory Seminar UAM-ICMAT**, Department of Mathematics, Universidad  
Autónoma de Madrid,  
*Categorical methods for representation varieties.*  
25th October 2017
- 2017 **Mathematics PhD Seminar of Universidad Autónoma de Madrid**, Department  
of Mathematics, Universidad Autónoma de Madrid,  
*Topological Quantum Field Theories: A parade of monoidal functors.*  
11th October 2017
- 2017 **Modern Moduli Theory Graduate School**, Mathematical Institute, University of  
Oxford,  
*Lax quantum field theory for Deligne-Hodge polynomials of representation varieties.*  
20th September 2017
- 2016 **Mathematics PhD Seminar of Universidad Complutense de Madrid**, Faculty of  
Mathematical Sciences, Universidad Complutense de Madrid,  
*Hodge structures and monodromy.*  
20th December 2016
- 2016 **X Workshop of Young Researchers in Mathematics**, Faculty of Mathematical  
Sciences, Universidad Complutense de Madrid,  
*Gluing Hodge structures on character varieties.*  
20th September 2016
- 2016 **Geometry and Topology Seminar**, Faculty of Mathematical Sciences, Universidad  
Complutense de Madrid,  
*Geometric and algebraic tools in Hodge theory with a view towards character varieties.*  
17th May 2016

- 2016 **Mathematics PhD Seminar of University of Oxford**,  
Mathematical Institute, University of Oxford,  
*Mixed Hodge structures on parabolic character varieties via geometric methods.*  
28th April 2016
- 2015 **Mathematics PhD Seminar of Universidad Complutense de Madrid**, Faculty of  
Mathematical Sciences, Universidad Complutense de Madrid,  
*Hodge structures via stratification of character varieties.*  
29th October 2015 and 15th November 2015
- 2015 **Geometry Seminar**, Instituto de Ciencias Matemáticas,  
*Deligne-Hodge polynomials of character varieties of doubly periodic instantons.*  
13th October 2015
- 2014 **I Young Seminar**, Instituto de Ciencias Matemáticas, Taught courses: The h-  
cobordism theorem, Derived functors and sheaf cohomology and Introduction to  
Hodge theory.  
23-27 June 2014
- 2012 **III Conferences about Sage/Python**, Universidad de Vigo,  
*Analyzing diplomatic cables of USA using Python.*  
21-22 June 2012

### Organizer

- 2021–Present **Organizer of Mathematical Physics and Algebraic Geometry Seminar (MA-PHYAG)**, Universidad Complutense de Madrid.
- 2021–Present **Organizer of Geometry Seminar**, Instituto de Ciencias Matemáticas.
- 2019–2020 **Organizer of Reading Courses**, *Representation theory of compact Lie groups*,  
Universidad Complutense de Madrid.
- 2019 **Head of the Scientific Committee**, *II BYMAT Conference*, Instituto de Ciencias  
Matemáticas.  
20-24 May 2019
- 2018-2019 **Organizer of Reading Courses**, *Representation theory of finite groups*, Universidad  
Complutense de Madrid.  
20 hours
- 2018 **Organizer of II PhDay**, *Mathematics*, Universidad Complutense de Madrid.  
27 June 2018
- 2016–2018 **Organizer of the Network of PhD Students in Mathematics (ReDM)**, *Mathe-  
matics PhD seminar*, Universidad Complutense de Madrid.  
Course 2016/2017 and 2017/2018
- 2015 **Organizer of IV Workshop on Topological Groups**, Universidad Complutense de  
Madrid.  
3-4 December 2015
- 2014 **Organizer of the I Young Seminar**, Instituto de Ciencias Matemáticas.  
23-27 June 2014

### Others

- 2020 **Speaker of Teaching Innovation Project**, *Use of specific software for creating Flipped Learning activities*, Universidad Complutense de Madrid.  
3 February 2020
- 2017 **Speaker at the II PhDay Complutense**, Universidad Complutense de Madrid, Scientific outreach contest. Winner.  
27 June 2017
- 2018 **Speaker at the Three Minute Thesis Complutense**, Universidad Complutense de Madrid, Scientific outreach.  
23 April 2018
- 2017 **Speaker at the workshop 'Orientations and tools for the preparation of Bachelor's Thesis'**, Faculty of Mathematical Sciences, Universidad Complutense de Madrid, Organized by the Miguel de Guzmán chair.  
13 Decembre 2017
- 2017 **Speaker at the I PhDay Complutense**, Universidad Complutense de Madrid, Scientific outreach contest. Winner.  
29 November 2017

## Services to community

- Editor Guest and Co-guest editor of the journal *Applied Sciences*.
- Referee Referee of the journals *Geometriae Dedicata*, *Revista Matemática Complutense*, *Information Science*, *Scientific Reports*, *Applied Sciences*, *Sensors*...

## Research Visits

- 2017 **University of Plymouth**, *Centre for Mathematical Sciences*.  
1 month (November)
- 2016 **University of Oxford**, *Mathematical Institute*.  
1 week (April)

## Participation in Research Projects

### Research projects

- 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,  
Universidad Politécnica de Madrid.
- 2021 **H2020 Deep-Augur 2019**,  
Principal Researcher: Alberto Mozo,  
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,  
Universidad Complutense de Madrid.
- 2015 **"Severo Ochoa" Excellence Programme, SEV-2011-0087**,  
Principal Researcher: Diego Córdoba Gazolaz,  
Instituto de Ciencias Matemáticas.

#### Innovative teaching projects

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

#### University R&D projects with companies

- 2020 **Detection of hidden relations in black box testing**, *Coordinator: Raúl Lara-Cabrera*,  
Universidad Politécnica de Madrid - Netzima.

### Courses and Conferences Attended

- 2020 **Málaga and Topology Meeting**, Universidad de Málaga.  
5th-7th February 2020
- 2019 **Workshop on Geometric Methods in Symplectic Topology**, Instituto de Ciencias Matemáticas.  
16th-20th December 2019
- 2019 **GESTA School. Symplectic Geometry with Algebraic Techniques with applications to Mathematical Physics**, Instituto de Ciencias Matemáticas.  
10th-13th December 2019
- 2019 **Lectures on Geometric Connections and their Holonomy Theory**, Faculty of Mathematical Sciences, Universidad Complutense de Madrid.  
8 hours
- 2018 **Geometry, Derived Categories and Moduli Spaces**, Centre for Mathematical Sciences, University of Plymouth.  
12-13 July 2018

- 2018 **Topics on Instantons Probability, Geometry and Physics**, Faculty of Mathematical Sciences, Universidad Complutense de Madrid.  
20 hours
- 2018 **I BYMAT Conference**, Instituto de Ciencias Matemáticas.  
7th - 9th May 2018
- 2018 **Geometry for the Future**, Instituto de Ciencias Matemáticas.  
16th April 2018
- 2018 **III Meeting of the Network of Algebraic Geometry and Singularities (RGAS)**, Faculty of Mathematical Sciences, Universidad Complutense de Madrid.  
29th January - 2nd February 2018
- 2017 **Modern Moduli Theory Graduate School**, Mathematical Institute (University of Oxford).  
18th September - 22th September 2017
- 2017 **Invariant metrics on proper G-spaces**, *Given by Prof. Sergey Antonyan*, Universidad Complutense de Madrid.  
Doctorate course
- 2016 **Topics in Geometric Analysis: Geometry of the Affine Sphere**, *Given by Prof. Daniel J. F. Fox*, Universidad Complutense de Madrid.  
Doctorate course
- 2016 **Introduction to Moduli Spaces**, *Given by David Alfaya*, Instituto de Ciencias Matemáticas.  
30 May - 3 June 2016
- 2016 **Hasse-Schmidt Derivations and Rings of Differential Operators**, *Given by Prof. Luis Narváez*, Universidad Autónoma de Madrid.  
31 Mayo - 7 Junio de 2016
- 2016 **Topics in Geometric Analysis: Maximum Principles, Gradient Estimates, and Growth of Second Fundamental Forms**, *Given by Prof. Daniel J. F. Fox*, Universidad Complutense de Madrid.  
Doctorate course
- 2015 **IV Workshop on Topological Groups**, Universidad Complutense de Madrid, Madrid.  
3-4 December de 2015
- 2015 **Non-linear Partial Differential Equations. Concepts and current methods**, *Given by Prof. Juan Luis Vázquez*, Universidad Autónoma de Madrid.  
Doctorate course
- 2014 **JAE School of Mathematics 2014**, Instituto de Ciencias Matemáticas.  
64 hours
- 2014 **IV International School of Geometry and Physics: The Geometry and Physics of Moduli Spaces**, Instituto de Ciencias Matemáticas, Miraflores de la Sierra (Madrid, España).  
19-23 May 2014
- 2013 **JAE School of Mathematics 2014**, Instituto de Ciencias Matemáticas.  
71 hours

- 2012 **JAE School of Mathematics 2014**, Instituto de Ciencias Matemáticas.  
58 hours
- 2012 **Indo-Spanish Conferences of Geometry and Analysis**, Instituto de Ciencias Matemáticas.  
10-14 September 2012
- [Courses about mathematics education](#)
- 2018 **Service-learning and gamification**, *Trends in innovative education and its implementation at UPM*, Universidad Politécnica de Madrid.  
5 hours
- 2018 **Challenge-based learning**, *Trends in innovative education and its implementation at UPM*, Universidad Politécnica de Madrid.  
5 hours
- 2018 **Methods and models of reseach applied to university learning**, *Coordinated by Prof. Inés M<sup>a</sup> Gómez-Chacón*, Universidad Complutense de Madrid.  
10 hours
- 2017 **Tools for designing, managing and analyzing processes in university teaching**, *Coordinated by Prof. Inés M<sup>a</sup> Gómez-Chacón*, Universidad Complutense de Madrid.  
20 hours

## External Memberships

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

## Management

- 2020-2021 **Elected member of the School Board (Junta de Escuela)**,  
*ETSI de Sistemas Informáticos (School of Engineering of Compluter Systems)*..

## Outreach

### Radio Interviews

- 2021 **Onda Cero**, *Por Fin no es Lunes*, [Link](#).  
7 November 2021
- 2021 **Radio 5**, *Raíz de 5*, [Link](#).  
1 November 2021
- 2021 **RNE**, *Interview with Santi García Cremades*.  
27 October 2021
- 2021 **Radio 3**, *Generación Ya*, [Link](#).  
6 October 2021
- 2021 **Podcast BBVA**, *Deep Talks*, [Link](#).  
10 October 2021
- 2021 **SER**, *La Ventana*, Collaboration, [Link](#).  
23 August 2021
- 2021 **SER**, *La Ventana*, [Link](#).  
11 August 2021



- 2021 **COPE**, *La Tarde de COPE*, [Link](#).  
10 August 2021
- Newspapers**
- 2021 **ABC**, “*Usen las Matemáticas contra el maltrato y reducirán los casos*”, [Link](#).  
1 November 2021
- 2021 **Tribuna Complutense**, *Las matemáticas y la inteligencia artificial se alían contra la violencia machista*, [Link](#).  
16 September 2021
- 2021 **El País**, *Matemáticas e inteligencia artificial contra el maltrato machista*, [Link](#).  
2 September 2021
- 2021 **El País**, *Seis matemáticos españoles menores de 30 años desafían las fronteras de la ciencia*, [Link](#).  
3 August 2021
- 2021 **El Español**, *Ángel, el matemático que hace todo en España: afina Netflix, calcula el Universo y previene el maltrato*, [Link](#).  
26 July 2021

### Others

- 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

## Languages

Spanish **Mothertongue.**

English **Advanced**