

Alejandro Gil García

Curriculum Vitae

December 14, 2024

About me

Date and place of birth: 4 October 1996 in Madrid, Spain

Address: Beijing Institute of Mathematical Sciences and Applications (BIMSA)

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Education

Postdoctoral researcher

2024 – present

Beijing Institute of Mathematical Sciences and Applications, China

Since August 2024 I have been part of the Analysis and Geometry research group with Sebastian Heller as advisor.

Doctoral visiting position

2024

Universidad Nacional de Educación a Distancia, Spain

From January 15 to March 31, 2024, I worked with Carlos Shahbazi Alonso on the research project *Supersymmetric evolution flows and their applications to differentiable geometry*. This project, funded by a Leonardo-BBVA grant, is devoted to studying various differential-geometric problems inspired by the mathematical structure of supergravity.

PhD in Mathematics

2021 – 2024

Universität Hamburg, Germany

I started my PhD on May 1, 2021 under the supervision of Vicente Cortés. I was funded by the Cluster of Excellence Quantum Universe. I defended my thesis on June 26, 2024 and passed the doctorate with the overall grade “with distinction (summa cum laude)”.

Master on Advanced Mathematics

2019 – 2020

Universidad Complutense de Madrid, Spain

Qualification of 10/10 with honors in the Master’s Thesis and average grade of 9.40/10. The Master’s Thesis supervised by Giovanni Bazzoni and Adela Latorre was an original research work that gave rise to an article.

Generalized Geometry Course

2019

Universitat Autònoma de Barcelona, Spain

Course taught by Roberto Rubio from July 8 to 19, 2019, in the framework of the Marie Skłodowska-Curie Action GENERALIZED project of the European Union.

Degree in Mathematics

2014 – 2019

Universidad Autónoma de Madrid, Spain

Qualification of 10/10 in Bachelor's Degree Final Project supervised by Ernesto

Girondo and average grade of 7.39/10.

Brief research statement

My main research interests within differential geometry are manifolds with special holonomy and special geometric structures. In particular, I am mainly interested in quaternionic Kähler manifolds and geometries related with them and in left-invariant structures on Lie groups. Recently I also started the study of spinors using the formalism of spinorial exterior forms.

Preprints

1. *Born Lie algebras* 2024
(with P. N. Pilatus)
<https://arxiv.org/abs/2411.04856>
2. *Parallel spinors for G_2^* and isotropic structures* 2024
(with C. S. Shahbazi)
<https://arxiv.org/abs/2409.08553>
3. *Symmetries of one-loop deformed q -map spaces* 2024
(with V. Cortés and D. Thung)
<https://arxiv.org/abs/2402.16178>

Publications

1. *Pseudo-Kähler and hypersymplectic structures on semidirect products* 2024
(with D. Conti)
Differential Geometry and its Applications
<https://doi.org/10.1016/j.difgeo.2024.102220>
<https://arxiv.org/abs/2310.20660>
2. *Moduli spaces of (co)closed G_2 -structures on nilmanifolds* 2024
(with G. Bazzoni)
The Quarterly Journal of Mathematics
<https://doi.org/10.1093/qmath/haae037>
<https://arxiv.org/abs/2307.04732>
3. *A class of locally inhomogeneous complete quaternionic Kähler manifolds* 2023
(with V. Cortés and A. Saha)
Communications in Mathematical Physics
<https://doi.org/10.1007/s00220-023-04830-6>
<https://arxiv.org/abs/2210.10097>
4. *Symmetric and skew-symmetric complex structures* 2021
(with G. Bazzoni and A. Latorre)
Journal of Geometry and Physics
<https://doi.org/10.1016/j.geomphys.2021.104348>
<https://arxiv.org/abs/2101.11953>

Dissertation

Curvature, symmetries and hypersurfaces of supergravity c-map spaces ([link](#))

2024

Talks

<i>Curvature, symmetries and hypersurfaces of supergravity c-map spaces</i> Geometry Seminar Yau Mathematical Sciences Center, Tsinghua University, China (Beijing) (link)	2024
<i>On the existence of Ricci solitons on hypersurfaces of quaternionic Kähler manifolds</i> Junior Meeting Einstein Geometry and Special Holonomy Christian-Albrechts-Universität zu Kiel, Germany (Kiel) (link)	2024
<i>On the existence of Ricci solitons on hypersurfaces of c-map spaces</i> Forschungsseminar über Differentialgeometrie Universität Hamburg, Germany (Hamburg) (link)	2024
<i>Pseudo-Kähler and hypersymplectic structures on semidirect products</i> Forschungsseminar über Differentialgeometrie Universität Hamburg, Germany (Hamburg) (link)	2024
<i>Pseudo-Kähler and hypersymplectic structures on semidirect products</i> Seminario de Geometría y Topología Universidad de Zaragoza, Spain (Zaragoza) (link)	2024
<i>Pseudo-Kähler and hypersymplectic structures on semidirect products</i> Seminario de investigación Universidad Politécnica de Madrid, Spain (Madrid) (link)	2024
<i>Pseudo-Kähler and hypersymplectic structures on semidirect products</i> Seminario Geometría Instituto de Ciencias Matemáticas, Spain (Madrid) (link)	2024
<i>Curvature, symmetries and hypersurfaces of supergravity c-map spaces</i> Mathematical supergravity Universidad Nacional de Educación a Distancia, Spain (Madrid) (link)	2024
<i>Pseudo-Kähler and hypersymplectic structures on semidirect products</i> Geometry in Como Università degli studi dell'Insubria, Italy (Como) (link)	2023
<i>Complete cohomogeneity one quaternionic Kähler manifolds</i> ULB Geometry Seminar Université libre de Bruxelles, Belgium (Brussels) (link)	2023
<i>Complete cohomogeneity one supergravity c-map spaces</i> Mathematisches Seminar Christian-Albrechts-Universität zu Kiel, Germany (Kiel) (link)	2023
<i>Complete cohomogeneity one supergravity c-map spaces</i> Differential Geometry Seminar Torino Università degli Studi di Torino, Italy (Turin) (link)	2023
<i>A class of locally inhomogeneous complete quaternionic Kähler manifolds</i> Geometry Seminar Università di Pisa, Italy (Pisa) (link)	2023
<i>A class of locally inhomogeneous complete quaternionic Kähler manifolds</i> Seminario di Geometria Università degli Studi di Firenze, Italy (Florence) (link)	2023
<i>Moduli spaces of G_2-structures on nilmanifolds</i> Forschungsseminar über Differentialgeometrie Universität Hamburg, Germany (Hamburg) (link)	2023

<i>A class of locally inhomogeneous complete quaternionic Kähler manifolds</i> Seminar Topics in Differential Geometry Leibniz Universität Hannover, Germany (Hannover) (link)	2023
<i>A class of locally inhomogeneous complete quaternionic Kähler manifolds</i> Joint UHH-UCPH Workshop on Geometry Universität Hamburg, Germany (Hamburg) (link)	2022
<i>A class of locally inhomogeneous complete quaternionic Kähler manifolds</i> Forschungsseminar über Differentialgeometrie Universität Hamburg, Germany (Hamburg) (link)	2022
<i>A class of locally inhomogeneous complete quaternionic Kähler manifolds</i> Conference “Spaces, Structures, Symmetries” Università degli Studi di Bari Aldo Moro, Italy (Bari) (link)	2022
<i>Quaternionic Kähler geometry</i> Forschungsseminar über Differentialgeometrie Universität Hamburg, Germany (online) (link)	2021
<i>Symmetric and skew-symmetric complex structures</i> Forschungsseminar über Differentialgeometrie Universität Hamburg, Germany (online) (link)	2021

Workshops

<i>International Symposium on Singularities and Applications</i> Tsinghua Sanya International Mathematics Forum, China (webpage)	2024
<i>Geometric Structures</i> Beijing Institute of Mathematical Sciences and Applications, China (webpage)	2024
<i>Postdoc Workshop III 2024</i> Yau Mathematical Sciences Center, Tsinghua University, China (webpage)	2024
<i>Junior Meeting Einstein Geometry and Special Holonomy</i> Christian-Albrechts-Universität zu Kiel, Germany (webpage)	2024
<i>Northern German Differential Geometry Day (NGDG-Day)</i> Universität Hamburg, Germany (webpage)	2024
<i>Generalized Geometry Meets String Theory</i> Universidad de Granada, Spain (webpage)	2024
<i>Mathematical supergravity</i> Universidad Nacional de Educación a Distancia, Spain (webpage)	2024
<i>Workshop on Curvature and Global Shape</i> Westfälische Wilhelms-Universität Münster, Germany (webpage)	2023
<i>Northern German Differential Geometry Day (NGDG-Day)</i> Christian-Albrechts-Universität zu Kiel, Germany (webpage)	2023
<i>The 7th Workshop “Complex Geometry and Lie Groups”</i> Università del Salento, Italy (webpage)	2023
<i>A Complex Differential Geometry Meeting at UniTo</i> Università degli Studi di Torino, Italy (webpage)	2023
<i>Joint UHH-UCPH Workshop on Geometry</i> Universität Hamburg, Germany (webpage)	2022

<i>Construction and degeneration of Einstein 4-manifolds</i> Block seminar in Sulzbürg, Universität Regensburg, Germany (webpage)	2022
<i>Conference “Spaces, Structures, Symmetries”</i> Università degli Studi di Bari Aldo Moro, Italy (webpage)	2022
<i>Northern German Differential Geometry Day (NGDG-Day)</i> Leibniz Universität Hannover, Germany (webpage)	2022
<i>Generalized Geometry in Interaction</i> Instituto de Ciencias Matemáticas, Spain (webpage)	2022
<i>Workshop on Special Geometries on Riemannian Manifolds</i> Centre de Recherches Mathématiques, Université de Montréal, Canada (webpage)	2021

Teaching experience

Teaching assistant:

<i>Mathematical Communication</i> (link) Beijing Institute of Mathematical Sciences and Applications	2024
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Organized activities

Workshops:

<i>Geometric Structures</i> Beijing Institute of Mathematical Sciences and Applications	2024
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Seminars:

<i>Mathematical gauge theory and the standard model of physics</i> Universität Hamburg	2023
<i>Riemann surfaces and Hitchin integrable systems</i> Universität Hamburg	2022

Community service

Reviewer for zbMATH Open https://zbmath.org/authors/gil-garcia.alejandro	2023 – present
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