

# Alberto Rodríguez Vázquez

	<ul style="list-style-type: none"><li>■ KU Leuven ■ Department of Mathematics</li><li>■ Celestijnenlaan 200B B-3001 ■ Leuven, Heverlee (Belgium)</li><li>■ alberto.rodriguezvazquez@kuleuven.be</li></ul>
BIOGRAPHICAL	<ul style="list-style-type: none"><li>■ Born April 16, 1995, in A Coruña (Spain).</li></ul>
EMPLOYMENT	<ul style="list-style-type: none"><li>■ FWO Junior Postdoctoral Fellowship, KU Leuven, October 2023 – present.</li><li>■ Methusalem Project Postdoc Researcher, KU Leuven, November 2022 – October 2023.</li><li>■ FPU Fellow of the Spanish Ministry of Education. Univ. de Santiago de Compostela, October 2018 – October 2022.</li><li>■ Hired Researcher, Univ. de Santiago de Compostela, Grupo de Investigación en Matemáticas, August 2018 – October 2018.</li></ul>
EDUCATION	<ul style="list-style-type: none"><li>■ Ph. D. in Mathematics. Univ. de Santiago de Compostela, September 2022. Title: <i>Homogeneous hypersurfaces and totally geodesic submanifolds</i>. Advisors: José Carlos Díaz Ramos and Miguel Domínguez Vázquez.</li><li>■ M. Sc. in Mathematics (with average grade 9.8 out of 10). Univ. de Santiago de Compostela, July 2018. Msc. Project: <i>Hypersurfaces with constant principal curvatures in Kähler manifolds with constant holomorphic sectional curvature</i>.</li><li>■ Graduate in Mathematics (with average grade 9.27 out of 10). Univ. de Santiago de Compostela, July 2017. Graduate Final Project: <i>Minimal surfaces</i>.</li><li>■ Erasmus +, University of Southampton, 2015–2016.</li></ul>
RESEARCH INTERESTS	<ul style="list-style-type: none"><li>■ Riemannian geometry and geometric analysis: positive curvature, submanifold theory, symmetric spaces, totally geodesic submanifolds, minimal surfaces, isometric actions, isoparametric foliations, cohomogeneity one actions.</li></ul>
PUBLICATIONS	<ul style="list-style-type: none"><li>■ C. Olmos, A. Rodríguez-Vázquez: Hopf fibrations and totally geodesic submanifolds, arXiv:2302.11711 (to appear in <i>J. Eur. Math. Soc.</i>).</li><li>■ A. Rodríguez-Vázquez: Totally geodesic submanifolds in products of rank one symmetric spaces, arXiv:2205.14720 (to appear in <i>Ann. Sc. Norm. Super. Pisa Cl. Sci.</i>).</li><li>■ A. Kollross, A. Rodríguez-Vázquez: Totally geodesic submanifolds in exceptional symmetric spaces, <i>Adv. Math.</i> <b>418</b> (2023), Paper No. 108949. 37pp.</li><li>■ J. C. Díaz-Ramos, M. Domínguez-Vázquez, A. Rodríguez-Vázquez: Homogeneous and inhomogeneous hypersurfaces in rank one symmetric spaces, <i>J. Reine Angew. Math.</i>, <b>779</b>, (2021), 189-222.</li><li>■ A. Rodríguez-Vázquez: A nonisoparametric hypersurface with constant principal curvatures, <i>Proc. Amer. Math. Soc.</i> <b>147</b> (2019), 5417-5420.</li></ul>
PREPRINTS	<ul style="list-style-type: none"><li>■ C. Gorodski, A. Kollross, A. Rodríguez-Vázquez: Totally geodesic submanifolds and polar actions on Stiefel manifolds, arXiv:2402.08585.</li></ul>
WORK IN PROGRESS	<ul style="list-style-type: none"><li>■ J. DeVito, M. Domínguez-Vázquez, D. González-Álvaro, A. Rodríguez-Vázquez: New examples of spaces with <math>\text{Ric}_2 &gt; 0</math>.</li></ul>

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## INVITED TALKS (CONFERENCES)

- Methusalem Symposium, KU Leuven (Belgium), 15/04/24. *Generalizing fatness and positive curvature.*
- Spanish-Polish Mathematical Meeting 2023, Łódź (Poland), 7/09/23. *Totally geodesic submanifolds in homogeneous spheres.*
- PADGE Conference, KU Leuven (Belgium), 12/07/23. *Totally geodesic submanifolds in homogeneous spheres.*
- Methusalem Colloquium, KU Leuven (Belgium), 17/03/23. *Isometric actions on symmetric spaces.*
- Minicourses of the EoS-2 project, Universiteit Antwerpen (Belgium), 23/01/23. *Totally geodesic submanifolds and Hopf fibrations.*
- Symmetry and shape 2022, Univ. Santiago de Compostela (Spain), 16/10/22. *Totally geodesic submanifolds in Hopf-Berger spheres.*
- Workshop on submanifolds and differential equations in geometry, Univ. Santiago de Compostela (Spain), 2/06/22. *Totally geodesic submanifolds in Hopf-Berger spheres.*
- Workshop on Manifolds with Symmetries, Universität Stuttgart (Germany), 28/03/22. *Totally geodesic submanifolds in products of rank one symmetric spaces.*
- Conference of Young Researchers RSME, Castelló, (Spain), 30/1/2020. *Isoparametricity and isospectrality of the shape operator.*

## CONTRIBUTED TALKS (CONFERENCES)

- Differential Geometry and its Applications, Univ. Hradec Králové (Czech Republic), 18/07/22. *Totally geodesic submanifolds and Hopf fibrations.*
- Symmetry and shape. Univ. de Santiago de Compostela, 16/10/2021. *Totally geodesic submanifolds and Kähler angle in symmetric spaces.*
- 4th Geometric Analysis Festival (online), 28/10/2021. *Cohomogeneity one actions on quaternionic hyperbolic spaces.*
- Mathematics: Much more than numbers! Univ. de Santiago de Compostela (Spain), 27/07/2021. *The geometry of numbers.*
- Symmetry and shape: Celebrating the 60th birthday of Prof. J. Berndt, Univ. Santiago de Compostela, (Spain), 31/10/2019. *Homogeneous and inhomogeneous isoparametric hypersurfaces in quaternionic hyperbolic spaces.*
- Differential Geometry and its Applications conference, Univ. Hradec Kralove, (Czech Republic), 5/09/2019. *A non isoparametric hypersurface with constant principal curvatures.*
- VII Meeting of Young Researchers, Univ. Santiago de Compostela, (Spain), 27/05/2019. *The quaternions.*

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## TALKS (SEMINARS)

- Seminários de Matemática, Universidade Federal de Paraíba (Brazil), 27/03/24. *Novos exemplos de espaços com métricas de  $\text{Ric}_2 > 0$ .*
- Seminário de Geometria, USP (Brazil), 22/03/24. *Espaços com métricas  $\text{Ric}_2 > 0$ .*
- Geometry and Topology Seminar, Durham University (United Kingdom), 30/11/23. *New examples of spaces with  $\text{Ric}_2 > 0$ .*
- Seminario Vidal Abascal, Univ. Santiago de Compostela (Spain), 21/12/23. *Topology and curvature: spaces with  $\text{Ric}_2 > 0$ .*
- Geometry and Topology Seminar, Durham University (United Kingdom), 30/11/23. *New examples of spaces with  $\text{Ric}_2 > 0$ .*
- Junior Geometry Seminar, University of Oxford (United Kingdom), 02/11/23. *Generalising fat bundles and positive curvature.*
- Seminar on Differential Geometry, University of Hamburg (Germany), 28/06/23. *Totally geodesic submanifolds and Hopf fibrations.*
- Seminar on Differential Geometry, University of Stuttgart (Germany), 20/06/23. *Totally geodesic submanifolds and Hopf fibrations.*
- Topology-Geometry Seminar (online), University of Oregon (United States), 30/05/23. *Totally geodesic submanifolds and Hopf fibrations.*
- Seminar of the Differential Geometry Section, KU Leuven (Belgium), 01/12/22. *Totally geodesic submanifolds in exceptional symmetric spaces.*
- Seminar of the Differential Geometry Department, Univ. Nacional de Córdoba (Argentina), 25/11/21. *Totally geodesic submanifolds in exceptional symmetric spaces.*
- Seminar of the Institute of Geometry and Topology, Universität Stuttgart (Germany), 27/04/21. *Totally geodesic submanifolds in 3-plane real Grassmannians.*
- PG Forum, Lancaster University (United Kingdom), 08/03/21. *Symmetric spaces: Holonomy and totally geodesic submanifolds.*
- Junior Geometry Seminar KCL/UCL, University College London (United Kingdom), 12/03/20. *Homogeneous and inhomogeneous isoparametric hypersurfaces in symmetric spaces.*
- Workshop on Geometric Analysis IEMATH-GR, Univ. Granada (Spain), 5/12/2019. *The Plateau problem with topology.*
- Seminario de Iniciación á Investigación (Seminar of PhD students). Institute of Mathematics, Univ. Santiago de Compostela (Spain), 18/09/2019. *Crook metrics in  $\mathbb{R}^3$ .*
- Seminario de Iniciación á Investigación (Seminar of PhD students). Institute of Mathematics, Univ. Santiago de Compostela (Spain), 20/09/2017. *Why are soap bubbles round?*

## OUTREACH ACTIVITIES

- Participation in a short video of scientific dissemination, *Os sólidos platónicos* for the High School IES Terra do Xallas (2022).
- Participation in a short video of scientific outreach, *La Universidad responde* for La 2 in TVE (public TV Spanish channel). *¿Por qué las pompas de jabón son redondas?* (2021).

## RESEARCH STAYS

- *University of Oxford* (United Kingdom), 3 months, 15/09/2023 – 15/12/2023.
- *Universidad Nacional de Córdoba* (Argentina), 2 months, 1/11/2021 – 27/12/2021.
- *Universität Stuttgart* (Germany), 2 months, 16/03/2021 – 14/05/2021.
- *King's College London* (United Kingdom), 3 months, 15/01/2020 – 15/04/2020.
- *Instituto de Matemáticas de la Universidad de Granada – IEMATH* (Spain), 2 months, 1/10/2019 – 5/12/2019.
- *Universidad Autónoma de Madrid* (Spain), 2 months, 23/01/2019 – 25/03/2019.
- *Instituto de Ciencias Matemáticas – ICMAT-CSIC* (Spain), 2 months, 1/06/2018 – 31/07/2018.

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## GRANTS AND AWARDS

- *Marie Skłodowska Curie European Postdoctoral Fellowship* (€175.920). European Commission, August 2024 – August 2026. The project for this fellowship is entitled *Holonomy, symmetry and geometric flows* with acronym *HOLYFLOW* and reference number 101149711. This will be started in August 2024, and it will provide me with research costs for €24.000 for the whole 2-year period.
- *Oberwolfach Leibniz Fellow*. Mathematisches Forschungsinstitut Oberwolfach, May 2024 – June 2024.
- *FWO Junior Postdoctoral Fellowship*. FWO, October 2023 – October 2026.
- *Long Stay Grant* (5.082€). FWO, University of Oxford (United Kingdom), September 2023 – December 2023.
- *Short-Term Grant Programme* (1.625€). DAAD, Universität Stuttgart (Germany), March 2021 – May 2021.
- *Prize to the best talk in the Science section of the VII Meeting of Young Researchers*. Univ. de Santiago de Compostela (Spain), May 2019.
- *Prize to the quality of Msc. Project in the Science section*. Univ. de Santiago de Compostela (Spain), May 2018.
- *Grant of the National Programme for the Formation of University Professors (FPU)*. Ministry of Education (Spain), October 2018 – October 2022.
- *Collaboration grant*. IMAT, Univ. Santiago de Compostela (Spain), 2017 – 2018.
- *Severo Ochoa – Introduction to Research Grant*. CSIC, ICMAT, Madrid (Spain), June 2017 – August 2017.
- *Collaboration grant of the Spanish Education Ministry*. Departamento de Matemáticas, Univ. Santiago de Compostela (Spain), 2016 – 2017.
- *Erasmus + Scholarship*. EU, University of Southampton (United Kingdom), 2015 – 2016.

## ADVISORSHIP OF STUDENTS

- M.Sc. Thesis of *Andreas Vermeiren*, entitled *Totally geodesic submanifolds and symmetric spaces*. KU Leuven, 01/09/2023 – (ongoing).
- M.Sc. Thesis of *Mario Julián Rodríguez Sánchez de Toca* (co-advised jointly with Víctor Sanmartín López), entitled *Curvature adapted submanifolds in symmetric spaces*. Univ. de Santiago de Compostela, 01/09/2023 – (ongoing).
- Undergraduate Thesis of *Nuno Xoán Mesías de la Concepción* (co-advised jointly with Antonio Gómez Tato), entitled *The origins of Topology*. Univ. de Santiago de Compostela, 26/09/2020.
- Undergraduate Thesis of *Ángel Manuel Cousiño Sónora* (co-advised jointly with Elena Vázquez Abal), entitled *The differential geometry of a bicycle*. Univ. de Santiago de Compostela, 26/09/2021.
- Undergraduate Thesis of *Pedro Cháns Fanego* (co-advised jointly with J. C. Díaz-Ramos), entitled *Computational geometry*. Univ. de Santiago de Compostela, 16/07/2021.
- Undergraduate Thesis of *Julio Pardo Ripoll* (co-advised jointly with J. C. Díaz-Ramos), entitled *Curvature and gyroscopes*. Univ. de Santiago de Compostela, 16/09/2021.
- STEMBACH's Research project of *David Miguel-Canitrot* (co-advised jointly with O. Pérez-Barral), *Why are soap bubbles round?* Univ. de Santiago de Compostela, 2020-2021.
- Undergraduate Thesis of *Juan Manuel Lorenzo-Naveiro* (co-advised jointly with J. C. Díaz-Ramos), entitled *Transformations Groups*. Univ. de Santiago de Compostela, 23/07/2020. It deserved the highest mark (Matrícula de Honor).

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## SERVICE

- Referee for the journal *The Journal of Geometric Analysis* (x1);
- Referee for the journal *Results in Math.* (x1).
- Referee for the journal *Differential Geometry and its Applications* (x3).
- Reviewer for *Mathematical Reviews* of the American Mathematical Society (x4).
- Reviewer for *Zentralblatt MATH* (x3).

## OTHER PUBLICATIONS

- A. Rodríguez Vázquez, *Homogeneous hypersurfaces and totally geodesic submanifolds* in *Publicaciones del Departamento de Geometría y Topología* **155** Univ. Santiago de Compostela (2024). ISBN: 978-84-89390-72-0. (This is my Ph.D. thesis.)
- A. Rodríguez Vázquez, *Crook metrics* in *As matemáticas do veciño. Actas do Seminario de Iniciación á Investigación 2019*, Institute of Mathematics, Univ. Santiago de Compostela (2020). ISSN: 2171-6536 (Expository article (oriented to a general public) about my paper entitled: *A nonisoparametric hypersurface with constant principal curvatures*).
- A. Rodríguez Vázquez, *Hypersurfaces with constant principal curvatures in Kähler manifolds with constant holomorphic sectional curvature* in *Publicaciones del Departamento de Geometría y Topología* **140** Univ. Santiago de Compostela (2019). ISBN: 978-84-89390-57-7. (This is my M. Sc. thesis.)
- A. Rodríguez Vázquez, *Why the soap bubbles are round?* in *As matemáticas do veciño. Actas do Seminario de Iniciación á Investigación 2017*, Institute of Mathematics, Univ. Santiago de Compostela (2018). ISSN: 2171-6536 (Expository article about soap bubbles and constant mean curvature surfaces.).

## ATTENDED COURSES

- *Representation theory of compact groups*. September to December (2020). Univ. de Santiago de Compostela.
- *Principal bundles and their connections*. February to May (2020). Univ. de Santiago de Compostela.
- *The isoperimetric problem*. October (2019). Univ. de Sevilla.
- *Constant mean curvature surfaces*. October (2019). Univ. de Sevilla.
- *The isoperimetric problem*. October (2019). Univ. de Sevilla.
- *Minimal surfaces*. November (2019). Univ. de Granada.
- *Other Geometric PDE's*. November (2019). Univ. de Granada. (These four courses above are part of *Doc-Course 2019 on Geometric Analysis*, which was a 10-week post-graduate intensive school where 15 Ph. D. students from all over the world were selected to participate).
- *Calibrated submanifolds*. September (2019). Universität Freiburg.
- *Special holonomy in Supergravity*. September (2019). Universität Freiburg.
- *Topology and G<sub>2</sub>-geometry*. September (2019). Universität Freiburg.

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## ORGANISED EVENTS

- Co-organiser of the *I Foro da Investigación Galega no Estranxeiro (FIGaE)*, Brussels (Belgium), 08/03/24-09/03/24. (This is a conference for bringing Galician scientist abroad together.)
- Co-organiser of the 3-day session *Geometría Diferencial* at VI Congreso Biental de Jóvenes Investigadores de la RSME, Univ. de León (Spain), 06/02/23-08/02/23. (This is a conference for bringing young Spanish mathematicians together.)
- Organiser of the reading group *Lectures on Real Semisimple Lie Algebras and Their Representations*, 2021-2022. Univ. de Santiago de Compostela and King's College London.
- Co-organiser of the conference *Matemáticas: habelas hainas, seguimos contándochas!*, Univ. de Santiago de Compostela, 24/11/2021. (This is a conference for the dissemination of Mathematics.)
- Co-organiser of the conference *Matemáticas: habelas hainas, seguimos contándochas!*, Univ. de Santiago de Compostela, 26/11/2020. (This is a conference for the dissemination of Mathematics.)
- Co-organiser of the *Seminario de Iniciación á Investigación* (Seminar of PhD students) and editor of the proceedings, Univ. de Santiago de Compostela, 2020 - 2022.

## PARTICIPATION IN RESEARCH PROJECTS

- *Totally geodesic submanifolds and mean curvature flow in the presence of symmetry* (FWO Junior project V469023N), Flemish Government (Belgium), 2023 – 2026, €21.500, 1 researcher, A. Rodríguez-Vázquez.
- *Classification, symmetries and singularities at the frontiers of algebra, analysis and geometry*. Methusalem grant METH/21/03. Flemish Government (Belgium), 2023 - 2029, €2.800.000, Principal investigator: S. Vaes.
- *Classification, symmetries and singularities at the frontiers of algebra, analysis and geometry*. Methusalem grant METH/15/026. Flemish Government (Belgium), 2016 - 2022, €2.800.000, Principal investigator: S. Vaes.
- *Geometric and analytic aspects of symmetry*. (Excellence project, ref. ED431F 2020/04). Galician Government (Spain), 2020 – 2024, €115.000. Principal investigator: M. Domínguez-Vázquez.
- *Symmetry, curvature and geometric equations* (PID2019-105138GB-C21). Ministry of Science and Innovation (Spain), 2020 – 2023, €62.920. Principal investigators: José Carlos Díaz-Ramos, Eduardo García-Río.
- *Research group in Mathematics* (Competitive research groups ED431C 2019/10). Galician Government (Spain), 2019 – 2022, €190.000. Principal investigator: E. García-Río.
- *Homogeneity and curvature of manifolds and submanifolds* (ED431F 2017/03). Galician Government (Spain), 2017 – 2018, €40.000. Principal investigator: J. C. Díaz-Ramos.
- *Symmetry, curvature and differential equations in geometry* (MTM2016-75897-P). Ministry of Economy and Competitiveness (Spain), 2016 – 2019, €72.963. Principal investigators: José Carlos Díaz-Ramos, Eduardo García-Río.

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## TEACHING EXPERIENCE

- *Compact Lie groups*. Methusalem Lectures (2nd semester), KU Leuven, 2023 (6h).
- *Differential Topology*. Master in Mathematics (2nd semester), KU Leuven, 2023 (28h).
- *Introduction to smooth manifolds*. Degree in Mathematics (4th year), Univ. Santiago de Compostela, 2021/2022 (15h).
- *Global theory of surfaces*. Degree in Mathematics (3rd year), Univ. Santiago de Compostela, 2019/2020 (20h).
- *Curves and Surfaces*. Degree in Mathematics (2nd year), Univ. Santiago de Compostela, 2019/2020, 2020/2021, 2021/2022 (55h).
- *Topology of Surfaces*. Degree in Mathematics (3rd year), Univ. Santiago de Compostela, 2018/2019 (30h).
- *Topology of Euclidean spaces*. Degree in Mathematics (1st year), Univ. Santiago de Compostela, 2018/2019 (30h).
- *Mathematics and Statistics I*. Degree in Pharmacy (1st year), Univ. Santiago de Compostela, 2018/2019, 2019/2020 (30h).
- *Mathematics and Statistics II*. Degree in Pharmacy (1st year), Univ. Santiago de Compostela, 2018/2019, 2019/2020, 2020/2021, 2021/2022 (65h).

## LANGUAGES

- Native speaker of Galician and Spanish.
- Fluent in English.
- Reading skills in French and Portuguese.