Álvaro González

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Nationality: Spaniard (Logroño, La Rioja, Spain, 1978)

Overview

After **graduating in Geology at the University of Zaragoza** (Spain) with the **highest grades nationwide** (2001), I specialized in earthquake research for my PhD, also in this *alma mater*, but from the point of view of complex systems and statistical Physics. During this stage, I was a **teaching assistant** there (2003-2005) and spent **2.5 years in research stays abroad**: at the **University of California at Davis, USA** (2004); at the **GNS Institute for Geological and Nuclear Sciences** (New Zealand, 2005) and at the **GFZ German Research Centre for Geosciences** (Germany, 2011-2013). I also devoted long career leaves to family care.

Just after completing my **European Doctorate with the highest grade**, on "Contributions to Probabilistic Earthquake Forecasting" (2016), I first served as **teacher and department head of natural sciences in a rural high school** (2016-2017). Later on, I overlapped several roles: **freelance consultant for the official seismic hazard assessment of the Spanish nuclear power plants** (2017-2021), **postdoctoral researcher at the CRM Centre for Mathematical Research** (Barcelona, Spain, 2018-2021) and a dual appointment as **visiting researcher again at GFZ** (2019), where I also returned in 2021-2022. Since 2022, I am again a **postdoctoral researcher at CRM**. Moreover, I have also been a **guest lecturer at the universities of Barcelona** (2018-2021) **and Zaragoza** (2018-2023). I have **advised an MSc thesis,** I am **advising a PhD thesis**, and I routinely engage in **outreach on natural hazards** for the benefit of society.

My research covers diverse topics, the main focus being on calculating **earthquake probabilities in space and time**, using new physical and statistical models, and applying it to assessing **seismic hazard and risk**. I reviewed the **Spanish earthquake database**, co-discovered **active normal faults in the Iberian Range (Spain) and the Taupo volcanic rift (New Zealand)**, calculated earthquake probabilities in a section of the **San Andreas Fault (California) and analysed the seismicity and lithospheric thermal structure in the Caribbean and northwestern South America**. Also I helped characterize **seismicity triggered by a gas injection**, the **size distribution of earthquakes, meteorite impacts**, **tropical cyclones**, **rain events**, **karst subsidence**, **wildfires**, and the hazards of **radioactive waste disposal**. My most cited publication deals with optimal sampling on **Earth geodesy**.

During my academic career, I have authored **26 peer-reviewed publications** (including **18 articles in international journals**) **cited over 1120 times** so far. I have contributed to research projects funded by the European Union, USA and Spain. And I have been awarded **8 competitive, personal research fellowships**, **one grant as PI**, and managed **three research & development contracts with industry**, totalling over 370,000 €.

Education

University of Zaragoza (Spain)

Doctorate in Geology (Mention *Doctor Europaeus*) *2016*	Contributions to probabilistic earthquake forecasting Advisors: Amalio F. Pacheco and Javier B. Gómez Grade: Outstanding *cum laude* (maximum grade in Spain).
Certificate of Pedagogic Aptitude *2004*	300-hour Postgraduate Certificate in Education. Officially equivalent to the Master of Secondary Education. Awarded by the Institute of Education Sciences.
Diploma of Advanced Studies *2003*	Postgraduate Diploma in Petrology and Geochemistry. Advisor: Javier B. Gómez Grade: Outstanding (maximum possible grade).
Degree (MSc) in Geological Sciences *2001*	Five-course degree, with the highest grades nationwide. (Passed with honours 23 out of 26 subjects.)

Awards

National end-of-degree award in Geology
(Spanish Government, 2002).

Award to extraordinary academic achievement in Geology.
(Faculty of Sciences, University of Zaragoza, 2001).

Languages

- **Spanish:** Native
- **English:** Certificate of Advanced English, Grade A
- **Catalan:** Written and oral comprehension.

Relevant International Specialization Courses

- **Ocean Bottom and Amphibian Experiment Seismological Data.**
  GFZ German Research Centre for Geosciences (2019)
- **European Science Foundation Course on Impact Geophysics.**
  Friggesund (Dellen impact crater), Sweden (2003)
- **European Science Foundation Course on Impact Stratigraphy.**
  Osservatorio Geologico di Coldigioco, Italy (2003)
- **EuroSummer School in Planetary Geology.**
  International Research School of Planetary Sciences, Universitá D'Annunzio, Italy (2002).

Research and Teaching Positions

Centre for Mathematical Research (Bellaterra, Spain)
Postdoctoral researcher *(2022/03 – Present)*

- Member of the Group on Climate Change and Natural Hazards.
- Contract financed by a personal, competitive, "Juan de la Cierva – Incorporación" Fellowship (Spanish National Research Agency).
- Research on: Spatial, temporal and magnitude distributions of seismicity at the global scale; remote earthquake triggering, depth distribution of seismicity and its relation to the lithospheric thermal structure.

German Research Centre for Geosciences (Potsdam, Germany)
Guest postdoctoral researcher *(2021/02 – 2022/02)*

- In Section 2.6 (Seismic Hazard and Risk Dynamics). Supported by GFZ funds and the EU Horizon 2020 RISE project (Real-time Earthquake Risk Reduction for a Resilient Europe).
- Analysis of the completeness and heterogeneities of the Global Centroid Moment Tensor Catalog (Global CMT).

University of Zaragoza (Spain)
Guest lecturer *(2018/09 – 2023/08)*

- Invited by the Earth Sciences Department as formal "extraordinary collaborator" during five academic courses, teaching Geophysics seminars, rock laboratory and geological fieldwork for students of the Degrees of Geology, Physics and Chemistry.

Centre for Mathematical Research (Bellaterra, Spain)
Postdoctoral researcher *(2018/09 – 2021/01)*

- Member of the Complex Systems Group.
- Contract financed by a personal, competitive, "Juan de la Cierva – Formación" Fellowship (Spanish National Research Agency).
- Statistical research on the size-frequency distribution of earthquakes, "labquakes", wildfires, karst sinkholes, tropical cyclones, rain and meteorite impacts.

German Research Centre for Geosciences (Potsdam, Germany)
Guest postdoctoral researcher *(2019/06 – 2019/12)*

- In Section 2.6 (Seismic Hazard and Risk Dynamics), within the contract at CRM mentioned just above, supported by a competitive "José Castillejo" mobility fellowship (Ministry of Sciences, Innovation and Universities, Spain).
- Research on earthquake triggering, magnitude-frequency distributions of seismicity, seismic hazard analysis for the Spanish nuclear power plants. And with Section 4.5 (Basin Modelling), on relating seismicity to the lithospheric thermal structure in the Caribbean.

Freelance seismic hazard consultant *(2017/10–2021/01)*

- Official Probabilistic Seismic Hazard Assessment of the six Spanish nuclear power plant sites, financed by Iberdrola and overseen by the Spanish Nuclear Safety Council (CSN).
- Final responsible of compiling and updating the earthquake catalogue (>23,000 events), overseeing the review of historical earthquakes, and characterizing fault and area sources as member of the Seismic Source Characterization Team (led by Kevin J. Coppersmith).

Castejón de Sos Public High School (Pyrenees, Spain)
Head, Department of Biology and Geology *(2016/09 – 2017/09)*

- Teacher of Biology, Geology and scientific culture in a rural high school in the Pyrenees.
- Head of the Department of Natural Science. Manager of the laboratory.
- Organizer of outreach activities (seminars, workshops, visits to research centres).

German Research Centre for Geosciences (Germany)
Guest scientist *(2011/10 – 2013/09)*

- Stay supported by a competitive postgraduate fellowship (Caja Madrid Foundation, Spain), in Section 2.1 (Physics of Earthquakes and Volcanoes).
- Analysis of earthquake databases and testing of probabilistic earthquake forecasts, with Danijel Schorlemmer, for the Global Earthquake Model.
- Analysis of the shock wave of the Chelyabinsk meteor (Russia), and earthquakes triggered by a gas injection offshore Spain.

University of Zaragoza (Spain)
Staff researcher *(2008/04 – 2008/12)*

- Principal investigator of a research grant at the Earth Sciences Department, funded by Mapfre Insurance Foundation.
- Probabilistic spatial earthquake forecasting based on statistical analysis of the distances between epicentres, applied to worldwide and regional seismicity.
- Mapping and paleoseismology of active faults in the Iberian Range (Spain).

Institute of Geological and Nuclear Sciences (New Zealand)
Visiting scientist *(2005/10– 2005/12)*

- Collaboration with Mark W. Stirling and Pilar Villamor (GNS Natural Hazards Division).
- Field mapping and paleoseismology of active faults in the proposed site of the new Te Mihi geothermal power plant. Compilation of fault databases used for seismic hazard assessment.
- Comparison of seismic hazard curves using different ground motion prediction equations.

University of California at Davis (USA)

Visiting scholar *(2004/07– 2004/10)*

- Collaboration with the team of Donald L. Turcotte and John B. Rundle, at the Center for Computational Science and Engineering.
- Programming of numerical models applied to earthquake physics and magnitude-frequency distributions.

University of Zaragoza (Spain)

Research fellow & teaching assistant *(2002/01 – 2005/12)*

- Fellow at the Earth Sciences Department, with two consecutive personal fellowships.
- Teaching assistant of geological fieldwork, rock laboratory, and geostatistics in Petrology and Geochemistry (Degree on Geology).
- Calculation of time-varying earthquake probabilities, and of potential earthquake casualties and damages in earthquake scenarios.
- Numerical modelling of earthquake sequences with new statistical physics models, and development and testing of probabilistic forecast methods.

University of Zaragoza (Spain)

Undergraduate research fellow *(2000/01 – 2001/12, part time)*

- Fellow on applied geochemistry at the Earth Sciences department, within a research project with industry. Review of hazards and geochemical processes potentially affecting deep geological storages of radioactive waste.

Compagnie Générale de Géophysique (France)

Technical field worker *(08/1999)*

- Deployment of geophone arrays for deep seismic reflection profiling in the search of commercial hydrocarbons in the Iberian Range (Spain).

Publications

Profiles:

ORCID: https://orcid.org/0000-0002-9300-4283

Google Scholar: https://scholar.google.es/citations?user=UEr3BOgAAAAJ&hl=en

Web of Science: https://www.webofscience.com/wos/author/rid/B-6956-2008

ResearchGate: https://www.researchgate.net/profile/Alvaro_Gonzalez13

Scopus: https://www.scopus.com/authid/detail.uri?authorId=56892822300

Publications summary

- **26 scientific publications:**
  - **18 papers in international, peer-reviewed journals (& 1 under review).**
    2 of them as the sole author (& 1 under review) + 4 as the first author.
    Collaborations with co-authors based on:
    Colombia, Germany, France, Italy, Portugal, Spain, UK and USA.
    1123 citations (Google Scholar; 663 in Web of Science)**. 4 papers cited over 100 times.**
    ***H*-index = 13** (Google Scholar; 12 in Web of Science);
  - **5 papers in national (Spanish) peer-reviewed journals, 2 of them as the sole author.**
  - **2 books & 1 book chapter.**
- **3 popular science articles, as the sole author.**

Legend

Impact

- **Top three cited papers**
- **Top downloaded & top cited in its journal**
- **Echoed in the media**

Hazards adressed

- **Earthquakes**
- **Meteorite impacts**
- **Cyclones and rain**
- **Wildfires**
- **Karst**
- **Tsunamis**
- **Radioactivity**

Papers in international, peer-reviewed journals

In reverse chronological order. Citations from Google Scholar (GS) and Web of Science (WoS). Titles are linked to full texts.

Thermal structure of the southern Caribbean and northwestern South America: implications for seismogenesis

Gómez-García, Á.M.; **González, Á.**; Cacace, M.; Scheck-Wenderoth, M. & Monsalve, G. (2024)

Solid Earth, 15, 281-303.

Using a lithospheric-scale 3D thermal model down to 75 km depth, we estimate at which temperatures earthquakes nucleate in this region (in agreement with laboratory experiments of rock friction). Regional variations in the depth distribution of seismicity are found and related to the lithospheric structure and active faults. A correlation between seismicity and heat flow is presented.

MagellanPlus Workshop: mission-specific platform approaches to assessing natural hazards that impact society

Daigle, H.; Duarte, J.C.; Fagereng, A.; Paris, R.; Persaud, P.; Gómez-García, A.M. & the **Lisbon MagellanPlus Workshop Participants** (2023)

Scientific Drilling, 32, 101-111.

We identify worldwide locations where one or several natural hazards can be addressed with mission-specific platform (MSP) drilling. Hypotheses on the hazard occurrence are set out, as well of recommendations on the specific areas or locations where drilling could be used to test them.

A proxy-based model for estimating V_{S30} in the Iberian Peninsula

Crespo, M.J.; Benjumea, B.; Moratalla, J.M.; Lacoma, L.; Macau, A.; **González, Á.**; Gutiérrez, F. & Stafford, P.J. (2022)

Soil Dynamics and Earthquake Engineering, 155, 107165. *[Citations: 10 (GS) & 8 (WoS)]*

We build a new database of V_{S30} measurements (shear-wave velocity in the upper 30 m of soil) in the Iberian Peninsula, and correlate them with topographic slope, lithology and geological age of the rock at each site. These correlations can be used to estimate V_{S30} where direct measurements are lacking.

Power-law size distributions in geoscience revisited

Corral, Á. & **González, Á.** (2019)

Earth and Space Science, 6 (5), 673-697. *[Citations: 101 (GS) & 69 (WoS)]*

Using a novel statistical technique, the size-frequency distributions of diverse natural hazards are analysed: earthquakes, karstic dolines, forest fires, tropical cyclones, rain events, and meteorite impacts on the atmosphere. We find that not them all are simple power laws as traditionally assumed.

Universality of power-law exponents by means of maximum likelihood estimation

Navas-Portella, V.; **González, Á.**; Serra, I.; Vives, E. & Corral, Á. (2019)

Physical Review E, 100, 062106. *[Citations: 9 (GS) & 6 (WoS)]*

Data of natural seismicity and of laboratory experiments are combined for obtaining a universal size-frequency relationship of earthquakes and acoustic emission events ("labquakes") produced by fracturing of porous materials in the laboratory.

The Spanish National Earthquake Catalogue: Evolution, precision and completeness

González, Á. (2017)

Journal of Seismology, 21 (3), 435–471. *[Citations: 48 (GS) & 29 (WoS)]*

The compilation of the database ("catalogue") of earthquakes in Spain is revised in detail. It is assessed how complete it is over time, and the precision of its hypocentral locations, as a basis for future studies of the seismicity in the region.

The 2013 September–October seismic sequence offshore Spain: A case of seismicity triggered by gas injection?

Cesca, S.; Grigoli, F.; Heimann, S.; **González, Á.**; Buforn, E.; Maghsoudi, S.; Blanch, E. & Dahm, T. (2014)

Geophysical Journal International, 198 (2), 941–953. *[Citations: 153 (GS) & 91 (WoS)]*

First research published about the seismicity triggered by gas injection in an underground storage project. For the first time, a clear relationship was shown between the underground injection of a gas (not a liquid) and the triggering of earthquakes. These findings, later corroborated by independent ones, led to the closure of the project.

Seismic characterization of the Chelyabinsk meteor's terminal explosion

Heimann, S.; **González, Á.**; Wang, R.; Cesca, S. & Dahm, T. (2013)

Seismological Research Letters, 84 (6), 1021–1025. *[Citations: 36 (GS) & 20 (WoS)]*

Seismic analysis of the largest meteor recorded in the last century, produced by the impact of an asteroid in the stratosphere over Russia. The resulting shock wave caused injuries to more than 1700 people, and shook the ground up to more than 3000 km away.

The Quaternary Active Faults Database of Iberia (QAFI v.2.0)

García-Mayordomo, J.; Insua-Arévalo, J.M.; Martínez-Díaz, J.J.; Jiménez-Díaz, A.; Martín-Banda, R.; Martín-Alfageme, S.; Álvarez-Gómez, J.A.; Rodríguez-Peces, M.; Pérez-López, R.; Rodríguez-Pascua, M.A.; Masana, E.; Perea, H.; Martín-González, F.; Giner-Robles, J.; Nemser, E.S.; Cabral, J. & **QAFI Compilers** (2012)

Journal of Iberian Geology, 38 (1), 285–302. *[Citations: 133 (GS) & 75 (WoS)]*

First systematic compilation of bibliography, data and digital cartography of faults active during the Quaternary in the Iberian Peninsula, intended for seismic hazard assessments. My contribution was the compilation and cartography of twelve faults of the Iberian Range.

- **Measurement of areas on a sphere using Fibonacci and latitude-longitude lattices**

González, Á. (2010)

Mathematical Geosciences, 42 (1), 49–64. *[Citations: 366 (GS) & 221 (WoS)]*

Proposal of a homogeneous lattice of sampling points on the sphere, applied to the numerical measurement of areas on the Earth's surface with highly improved precision. It has been cited in papers of a plethora of disciplines, from Earth Sciences to Medicine, Biology, industrial design, etc.

Late Quaternary paleoseismic evidence on the Munébrega half-graben fault (Iberian Range, Spain)

Gutiérrez, F.; Masana, E.; **González, Á.**; Guerrero, J., Lucha, P. & McCalpin, J.P. (2009)

International Journal of Earth Sciences, 98 (7), 1691–1703. *[Citations: 25 (GS) & 16 (WoS)]*

By means of a paleoseismological investigation (using geomorphology, stratigraphy and geochronology), it is demonstrated that this normal fault in Spain has been active during the Late Quaternary and that it has generated at least three large prehistoric earthquakes.

A way to synchronize models with seismic faults for earthquake forecasting: Insights from a simple stochastic model

González, Á.; Vázquez-Prada, M.; Gómez, J.B. & Pacheco, A.F. (2006)

Tectonophysics, 424 (3–4), 319–334. *[Citations: 18 (GS) & 11 (WoS)]*

It is shown that it is possible to forecast "synthetic" earthquakes, that is, simulated by a numerical model, using other models forced to be synchronized with the latter. It is proposed how to force the models to imitate the sequences of real earthquakes.

Updating seismic hazard at Parkfield

González, Á.; Gómez, J.B. & Pacheco, A.F. (2006)

Journal of Seismology, 10 (2), 131–135. *[Citations: 24 (GS) & 14 (WoS)]*

Statistical and physical models are used to calculate the probability of occurrence of earthquakes with magnitude 6 or larger at Parkfield (San Andreas Fault, California), and how this probability changes with the time elapsed since the last one, occurred in 2004.

The occupation of a box as a toy model for the seismic cycle of a fault

González, Á.; Gómez, J.B. & Pacheco, A.F. (2005)

American Journal of Physics, 73 (10), 946–952 + Erratum: (2007), 75 (3), 286.

[Citations: 19+3 (GS) & 12+4 (WoS)]

A new, simple, statistical model is devised for imitating the loading process of a seismic fault, and the occurrence of earthquake sequences with diverse temporal irregularity. It is applied to calculating earthquake probabilities at Parkfield (San Andreas Fault).

Preliminary quantitative assessment of earthquake casualties and damages

Badal, J.; Vázquez-Prada, M. & **González, Á.** (2005)

Natural Hazards, 34 (3), 353–374. *[Citations: 88 (GS) & 52 (WoS)]*

The expected number of human casualties and economic costs of scenario earthquakes in urban areas of Spain are calculated. This assessment is based on empirical relationships which consider the population density, economic investment and shaking intensity.

Using synchronization to improve the forecasting of large relaxations in a cellular automaton model

González, Á.; Vázquez-Prada, M.; Gómez, J.B. & Pacheco, A.F. (2004)

Europhysics Letters, 68 (5), 611–617. *[Citations: 4 (GS) & 2 (WoS)]*

A new method is proposed for the temporal forecasting of the "synthetic" earthquakes generated by a numerical model. For the first time it is demonstrated that it is possible to make these forecasts by synchronizing models between themselves.

Forecasting characteristic earthquakes in a minimalist model

Vázquez-Prada, M.; **González, Á.**; Gómez, J.B. & Pacheco, A.F. (2003)

Nonlinear Processes in Geophysics, 10 (6), 565–571. *[Citations: 19 (GS) & 13 (WoS)]*

It is demonstrated that the times of occurrence of the largest "synthetic" earthquakes produced by a simple numerical model of a seismic fault can be statistically forecast.

A minimalist model of characteristic earthquakes

Vázquez-Prada, M.; **González, Á.**; Gómez, J.B. & Pacheco, A.F. (2002)

Nonlinear Processes in Geophysics, 9 (5–6), 513–519. *[Citations: 34 (GS) & 20 (WoS)]*

The simplest model able to imitate the size-frequency distribution of earthquakes generated by some faults is introduced. In this distribution, the largest earthquakes, called characteristic, are more frequent than those with intermediate size.

Submitted manuscripts

Improvements and heterogeneities of the Global Centroid Moment Tensor Catalog

González, Á. (2024)

Under review in *Seismological Research Letters*.

It is shown that the Global CMT catalog is more heterogeneous and less complete than typically assumed. This has implications on the statistical analysis of the distributions of magnitude, rake, depth and fraction of double-couple component.

Papers in Spanish, peer-reviewed journals

Proyecto Castor: Relación de la secuencia sísmica con la inyección de gas
[*Castor Project: Relationship between a seismic sequence and gas injection*]

González, Á. (2014)

Enseñanza de las Ciencias de la Tierra, 22 (3) 298–302. *[Citations: 3 (GS)]*

It is didactically revised how a sequence of earthquakes occurred offshore Spain in 2013 was triggered by an underground injection of natural gas. For this reason, such a gas storage project had to be cancelled, with economic losses of over 1350 million €.

Mapa de localizaciones probables de futuros terremotos en la Península Ibérica, Baleares y Canarias **[*Map of likely locations of future earthquakes in the Iberian Peninsula, Balearic Islands and Canary Islands*]**

González, Á. (2009)

Seguridad y Medio Ambiente, 114, 44–54.

A spatial model for earthquake probabilities is improved and applied to Spain, after being tested successfully with past earthquakes. The method considers that future earthquakes will tend to happen, close to past ones (according to the past statistical distribution of distances between them).

Nuevo modelo de renovación para la recurrencia de terremotos en una falla
[*New renewal model for earthquake recurrence in a fault*]

Abadías, N.L.; **González, Á.**; Gómez, J.B. & Pacheco, A.F. (2006)

Revista de la Real Academia de Ciencias Exactas, Físicas, Químicas y Naturales de Zaragoza, 61, 121–134. *[Citations: 3 (GS)]*

A new statistical model is introduced for calculating the temporal probability of occurrence of earthquakes in a fault, for cases in which these are particularly irregular in time.

Escenarios urbanos de impacto sísmico

Badal, J.; Vázquez-Prada, M. & **González, Á.** (2004)

Geo-Temas, 6 (3), 213–216.

Possible victims and economic costs of scenario earthquakes in Spain are calculated considering empirical models, the population distribution, and the economic investment.

- **Análisis de la deformación a partir del estudio de la anisotropía de susceptibilidad magnética (ASM) en una estructura de pliegues y cabalgamientos. Ejemplo de un corte del sector central del Pirineo Oscense.**

  [Deformation analysis using the anisotropy of magnetic susceptibility (AMS) in a fold-and-thrust structure. Example of a cross section of the central Pyrenees (Huesca, Spain)]

  Pueyo, Ó.; **González, Á.**; Ipas, J.; Manuel, J.; Orgaz, J.Á.; Rodés, Á.; Teixido, F.; Gil, A. & Millán, H. (2004)

  Geo-Temas, 6, (4), 327–330. *[Citations: 7 (GS)]*

  It is shown how the anisotropy of magnetic susceptibility is an excellent marker of rock deformation. This is exemplified with detailed measurements along a north-south profile of the Pyrenees, with a complex tectonic structure.

Books & Book Chapters

Maximum likelihood estimation of power-law exponents for testing universality in complex systems.

Navas-Portella, V.; **González, Á.**; Serra, I.; Vives, E. & Corral, Á. (2021)

In: ***Multidisciplinary Mathematical Modelling.***
Francesc Font & Tim Myers (Eds.), Springer Nature, Cham (Switzerland), p. 65-89.

Data of natural seismicity and of laboratory experiments are combined in detail for obtaining a universal size-frequency relationship of earthquakes and acoustic emission events.

Aplicación de los análogos a la evaluación de seguridad y comunicación del almacenamiento geológico. Catálogo de análogos más significativos.
[*Analogue application to safety assessment and communication of radioactive waste geological disposal. Catalogue of the most significant analogues.*]

Gimeno, M.J.; Auqué, L.F.; Gómez, J.; Acero, P.; **González, Á.**; Samper, J.; Montenegro, L.; Molinero, J.; Delgado, J.; Criado, J.A.; Martínez, J.A.; Ruiz, S.; Recreo, F.; Ruiz, C.; Prado, P.; Hernán, P.; Ruiz M.C. & Rodríguez, J. (2005)

Consejo de Seguridad Nuclear, Madrid. Colección Documentos I+D, 13.2005. 675 pp.

Detailed review of natural analogues of underground geological repositories of radioactive waste. In these systems it is possible to measure the diffusion of radioactive elements through the rocks, and to assess the related long-term hazards.

Analogue application to safety assessment and communication of radioactive waste geological disposal. Illustrative synthesis.

Ruiz, C.; Rodríguez, J.; Hernán, P.; Recreo, F.; Ruiz, C.; Prado, P.; Gimeno, M.J.; Auqué, L.F.; Gómez, J.; Acero, P.; **González, Á.**; Samper, J.; Montenegro, L.; Molinero, J.; Delgado, J.; Criado, A.; Martínez, J.A. & Ruiz, S. (2004)

Consejo de Seguridad Nuclear, Madrid. Colección Documentos I+D, 11.2004. 167 pp. + CD.

[Citations: 3 (GS)]

Synthesis of lessons learnt about the hazards of underground repositories of radioactive waste, from the study of natural analogues and their geochemical processes.

Popular science articles

Terremotos y tsunamis. **[*Earthquakes & tsunamis.*]**
González, Á. (2012), ***conCIENCIAS.digital***, 10, p. 25–37.

Ciencia para la supervivencia. **[*Science for survival.*]**
González, Á., ***El País***, 2012/10/20, p. 34.

El próximo tsunami que puede llegar a la península.
[*The next tsunami that can reach the Iberian Peninsula.*]
González, Á., ***El Periódico de Aragón****, 2011/03/31, suplemento, p. 1.*

Relevant Unpublished Reports

- **Seismic Characterization of Nuclear Power Plant Sites in Spain**
  Coppersmith, K.; Hanson, K.; Coppersmith, R.; Gutiérrez, F.; Perea, H.; **González, Á.**; Bommer, J.; Youngs, R.; Rodríguez-Marek, A.; Crespo, M.J.; Stafford, P.; Cabañas, L., Navarro, M. & Montaldo Falero, V. (2020)
  Iberdrola Generación Nuclear Report INEX-FO-20-405941-00069. Bilbao, Spain. 2,433 pages.

- **Compilation of the Earthquake Catalogue**
  for the Seismic Characterization of the Spanish Nuclear Power Plant Sites.
  González, Á. (2019)
  Iberdrola Generación Nuclear Report INEX-FO-17-004241-00010. Bilbao, Spain. 96 pages + database & software.

- **Peer Review of the Re-Evaluation of Major Iberian Earthquakes**
  González, Á. (2018)
  Iberdrola Generación Nuclear Report INEX-FO-18-002949-00048. Bilbao, Spain. 14 pages.

- **Active Fault Mapping in the Te Mihi Area [Taupo Rift, New Zealand]**
  Villamor, P., Lukovic, B. & **González, Á.** (2005)
  GNS Institute for Geological and Nuclear Sciences Client Report 2005/180
  (to Contact Energy Ltd.). Lower Hutt, New Zealand. 19 pages + Digital cartography.
  (This discovery of previously unknown, active faults led to re-locating the proposed site of a new geothermal power plant.)

Conference Proceedings

Author of coauthor of **over 60 contributions to conferences** in Germany, Austria, France, Italy, Japan, New Zealand, Portugal, USA and Spain.

The following list includes only some of the **invited contributions (marked with the symbol Φ)**, and others not already published elsewhere. Titles are linked to full texts.

- **Robust estimation of seismogenic depths and their uncertainties**
  González, Á. (2024) *European Geoscience Union General Assembly*. Vienna (Austria). Abstract EGU24-6149.

- **Slow-slip earthquake observations in Costa Rica and their potential impact on seismic hazard assessments**
  Arroyo-Solórzano, M.; Cotton, F.; Weatherill, G.; Jara, J. & **González, Á.** (2024). *European Geoscience Union General Assembly*. Vienna (Austria). Abstract EGU24-19554.

- **Seismogenic depth in Iberia**
  González, Á. & Gómez-García, A.M. (2022). *IberFault*. Teruel (Spain). Proceedings, p. 49-52.

- **The statistical distribution of time intervals between consecutive earthquakes worldwide.** **González, Á.**; Serra, I. & Corral, Á. (2022). *12th International Workshop on Statistical Seismology*. Carguèse (France). Abstracts, p. 34.

- **The Global Centroid Moment Tensor Catalog: Heterogeneities and improvements** **González, Á.** (2021). *Seismological Society of America Annual Meeting*. Seismological Research Letters, 92, 2B, 1329.

- **3D density structure of the Caribbean lithosphere derived from Vertical Gravity Gradients: Implications for regional tectonic boundaries and the characterisation of geohazards.** Gómez García, Á.M.; Meeßen, C.; Scheck-Wenderoth, M.; **González, Á.**; Monsalve, G.; Bott, J.; Bernhardt, A. & Bernal, G. (2019). *Latin-American Colloquium of Geosciences*, Hamburg (Germany). *Terra Nostra*, 2019, 1, 48-49.

- **The largest earthquakes on Earth: Comparison of magnitude-frequency distributions of tectonic and impact events.** **González, Á.** (2019). *European Geoscience Union General Assembly*. Vienna (Austria). *Geophysical Research Abstracts*, 21, EGU2019-17392. [Highlighted by the EGU press office. Delivered press conference on site.]

- **The early history of global earthquake maps.** **González, Á.** (2019). *European Geoscience Union General Assembly*. Viena (Austria). *Geophysical Research Abstracts*, 20, EGU2018-14793.

- **New Zealand geothermal power plants as critical facilities: an active fault avoidance study in the Wairakei Geothermal Field, New Zealand.** Villamor, P.; Clark, K.; Watson, M.; Rosenberg, M.; Lukovic, B.; Ries, W.; **González, Á.**; Milicich, S.D.; McNamara D.D. & Pummer, B. (2015). *Proceedings of the World Geothermal Congress, paper 03014, 12 p. [Citations: 13 (GS)].*

- **Φ** **The simplest probabilistic model for spatial forecasting of earthquake locations.** **González, Á.** (2015). *9th International Workshop on Statistical Seismology*. Potsdam (Germany). San Francisco. *Abstracts*, 106.

- **The testability of maximum magnitude.** Clements, R.A.; Schorlemmer, D.; **González, Á.**; Zöller, G. & Schneider, M. (2012). *American Geophysical Union Fall Meeting*. San Francisco. *Abstracts*, S31A-2478.

- **Database of Iberian seismogenic sources parameterized for use in the SHARE European-scale seismic source model.** Nemser, E.S., García-Mayordomo, J. *et al.* (2012). *15th World Conference on Earthquake Engineering*. Lisbon (Portugal). Paper 4421.

Φ **«Nearest»: An empirical, non-parametric, forecasting model based on nearest-neighbour distances between earthquakes.** **González, Á.** (2010) *European Seismological Commission 32nd General Assembly*. Montpellier (France). *Abstracts*, p. 71.

Φ **Measurement of areas on a sphere using Fibonacci and latitude-longitude lattices.** **González, Á.** (2010). *Conference "Optimal Configurations on the Sphere and Other Manifolds"*. Department of Mathematics, Vanderbilt University, Nashville (Tennessee, EE.UU.).

- **Earthquake recurrence intervals of Quaternary faults in the USA: relationships with other fault parameters.** **González, Á.**; Gómez, J.B. & Pacheco, A.F. (2007). *European Geosciences Union General Assembly*. Vienna, Austria. *Geophysical Research Abstracts* 9, 02284.

- **Possible lithospheric plate movement in Inverness Corona, Miranda [Uranus' moon].** **González, Á.** (2003). *EGS-AGU-EUG Joint Assembly*. Nice (France). *Geophysical Research Abstracts* 5, 07393.

- **Gravity and magnetic model of the Dellen impact structure (Sweden).** Rajmon, D. & **González, Á.** (2003). *European Science Foundation Course on Impact Geophysics*, Friggesund, Sweden. Abstracts, p. 1-3.

Software and Databases

- **Programming in Python, Fortran 2023, Matlab & C.**
- **Mapping with Generic Mapping Tools (GMT) and QGIS.**
- **Statistics and data analysis with R and OriginPro.**
- **Seismicity analysis with ZMAP and Pyrocko.**
- **User of computer clusters** (specially that of the University of Zaragoza's Institute of Biocomputation and Complex Systems, BIFI: www.bifi.es/computation/)
- Co-author of **QPCatalog**, part of **QuakePy, a free Python library for the statistical analysis of earthquake databases.** ETH Swiss Federal Institute of Technology (2013): quake.ethz.ch/quakepy/
- Author of **EQdecluster**, a free Fortran program for earthquake catalogue declustering using windowing methods, for probabilistic seismic hazard assessment (2024): https://github.com/TheGeonaut/EQdecluster
- Contributor to the **database of seismogenic zones in the Iberian Peninsula**, used for the update of the Spanish national seismic hazard map:
  Instituto Geológico y Minero de España (2015): info.igme.es/zesis/

- Contributor of digital cartography, literature review and parametric characterization of active faults for public databases used for seismic hazard assessment:

  Quaternary Active Fault Database of Iberia (QAFI)
  Instituto Geológico y Minero de España (2012-Present): info.igme.es/qafi/

  The European Database of Seismogenic Faults (Project SHARE)
  Instituto Nazionale di Geofisica e Volcanologia (2013): diss.rm.ingv.it/share-edsf/

- **Open research data publication:**
  Hypocentral temperatures, geothermal gradients, crustal seismogenic depths and 3D thermal model of the Southern Caribbean and NW South America.
  Gómez-García, Á.M.; *González, Á.*; Cacace, M.; Scheck-Wenderoth, M. & Monsalve, G. (2023).
  GFZ Data Services. https://doi.org/10.5880/GFZ.4.5.2023.002

Competitive Fellowships

Research Fellowships

(The stated amounts are the original ones, not corrected for inflation.)

- **Spanish Ministry of Science and Innovation** (2022-2025).
  Fellowship "Juan de la Cierva-Incorporación" for the 2nd postdoc stay at CRM (97,800 €).
- **Spanish Ministry of Economy** (2018-2021).
  Fellowship "Juan de la Cierva-Formación" for the 1st postdoc stay at CRM (60,420 €).
- **Spanish Ministry of Science, Innovation and Universities** (2019).
  Fellowship "José Castillejo" for the research stay at GFZ (16,620 €).
- **Caja Madrid Foundation, Spain** (2011-2013).
  Postgraduate fellowship for the research stay at GFZ (30,520 €).
- **Spanish Ministry of Education, Culture and Sport** (2003 – 2005)
  Fellowships for PhD research, university teaching training and stays abroad (42,280 €).
- **Regional Government of Aragón, Spain** (2002)
  PhD research training fellowship (11,540 €).
- **Foundation Enterprise-University of Zaragoza** (2000 – 2001)
  Research fellowship (7,200 €).
- **Spanish Ministry of Education, Culture and Sport** (2000 – 2001)
  Scholarship for research collaboration as undergraduate student (2,100 €).

Travel Grants to Courses and Conferences

- **University of Potsdam, Germany** (2015): International Workshop on Statistical Seismology.
- **European Seismological Commission** (2010): ESC assembly (Montpellier, France).
- **Vanderbilt University, USA** (2010): Conference on optimal configurations on the sphere.
- **European Science Foundation** (2002, 2003 & 2008): Courses in Austria, Italy and Sweden.
- **UNESCO** (2003): Workshop on non-linear dynamics and earthquake prediction (Trieste, Italy).

Participation in Research Projects

(The stated amounts are the original ones, not corrected for inflation.)

Industrial projects

2017/09 – 2020/12
Seismic source characterization
(Seismic Hazard Assessment of the Spanish nuclear power plant sites)
Iberdrola, overseen by the Spanish Council for Nuclear Safety (CSN).
57,637 € (only the **contract personally managed**).
Coordinator: Kevin J. Coppersmith.

2019
Compilation of the earthquake catalogue
(Seismic Hazard Assessment of the Spanish nuclear power plant sites).
Iberdrola, overseen by the Spanish Council for Nuclear Safety (CSN).
10,000 € (**Contract personally managed**).

2018
Peer-review of the re-evaluation of major earthquakes
(Seismic Hazard Assessment of the Spanish nuclear power plant sites).
Iberdrola, overseen by the Spanish Council for Nuclear Safety (CSN).
20,000 € (**Contract personally managed**).

2005
Active fault mapping in the Te Mihi power plant site (New Zealand).
Institute of Geological & Nuclear Sciences (GNS) and Contact Energy Ltd.
Principal investigator (*PI*): Pilar Villamor.

2000 – 2001
Application of natural analogues to the safety assessment and public communication of radioactive waste geological disposals.
Spanish Council for Nuclear Safety (CSN) and Spanish Nuclear Waste Company (ENRESA). ~ 171,000 €. *Coordinator*: Francisco J. Rodríguez.

Academic projects

2022/09– 2025/08 (minimum)
Applications of Complex-Systems Science to natural hazards, epidemics, and population patterns
Spanish Government. 48,400 €. *PI*: Álvaro Corral.

2019–2022
Statistical and probabilistic tools for complex systems.
Spanish Government. 36,300 €. *PI*: Álvaro Corral.

2021/02– 2022/02
RISE: Real-time earthquake risk reduction for a resilient Europe
European Union's Horizon 2020 Research and Innovation Programme
Work package 7, PI: Danijel Schorlemmer 8,360,000 € (project total)

2009 – 2013
Collaboratory for the Study of Earthquake Predictability.
University of Southern California (Los Angeles, USA), W. M. Keck Foundation and USA National Science Foundation. ~1,200,000 $. *PI*: Thomas H. Jordan.

2011 – 2013
Global Earthquake Model, Testing and Evaluation Facility.
GFZ German Research Centre for Geosciences (Potsdam, Germany) and Global Earthquake Model Foundation (Pavia, Italy). *PI*: Danijel Schorlemmer.

2011–2014
Modelling of natural complex systems: Earthquake generation and forecast.
Spanish Government. 20,570 €. *PI*: Javier B. Gómez.

2006 – 2008 **Research on seismic faults, and modelling of complex systems**.
Spanish Government. 38,080 €. *PI*: Amalio F. Pacheco.

2008 **Map of likely locations of future earthquakes on the Iberian Peninsula, Balearic Islands and Canary Islands.**
Mapfre Insurance Foundation. 15,000 €. ***PI*: Álvaro González**.

2005 – 2007 **Geophysical and geochemical modelling.**
Regional Government of Aragón, Spain. 28,891 €. *PI*: Luis F. Auqué.

2003–2004 **Geochemical modelling**.
Regional Government of Aragón, Spain. 10,535 €. *PI*: Luis F. Auqué.

2002 – 2005 **Physical models of many-body systems. Geophysical applications**.
Spanish Government. 62,460 €. *PI*: Amalio F. Pacheco.

2003 **Can earthquakes be forecast?**
Experimental study of a mechanical model of seismic fault.
Spanish National Research Council. 3,900 €. *PI*: Javier B. Gómez.

Teaching

Formal University Teaching:

University of Zaragoza (Spain)

- **Official ratings as professor**: **"Outstanding"** (over 9/10) whenever graded (last 5 courses).

- ***Degrees in Physics & Chemistry*** (2018–2023, as guest lecturer)

  Fieldwork of general Geology. Laboratory of mineral and rock identification. Geophysics seminars on geothermometry, atmospheric physics and climate change. (**55 teaching hours**).

- ***Degree in Geology*** (2003–2005, as teaching assistant & 2018–2023, as guest lecturer)

  Fieldwork of active tectonics, petrology & soil science. Geostatistics (computer lab) applied to geochemical prospecting. (**181 teaching hours**).

- ***Course "Earth Sciences for Society"*** (2011-2018, as guest lecturer)

  Open course of the "University of the Experience", addressed to senior, non-technical audiences at multiple locations. Lessons on earthquakes, tsunamis and planetary science (**14 teaching hours**).

University of Barcelona (Spain)

- ***Master's Degree in Mineral Resources & Geological Hazards*** (2018–2021, as guest lecturer)

  Seminars on hazards of active faults & size-frequency distributions of natural hazards (**9 teaching hours**.)

Supervision of MSc & PhD Theses

- **Marc García Lloveras**
  Probabilistic Forecasting Model for Earthquake Shaking Intensity in the Iberian Region
  MSc thesis, Programme on "Modeling for Science and Engineering".
  Autonomous University of Barcelona (2023). Grade 8.8 / 10.
  (Immediately hired as data scientist in industry.)

- **Mario Arroyo-Solórzano**
  The seismic source model for Costa Rica and analysis of the role of slow slip silent earthquakes in the seismic energy release. Applications to Probabilistic Seismic Hazard Assessment.
  PhD thesis, Geophysics
  University of Potsdam, Germany (ongoing, since November 2023).
  Co-supervised by Fabrice Cotton & Graeme Weatherill.

Accreditations for University Teaching in Spain

- **AQU Catalunya** (2023/07/18):

  - *Professor Lector*

- **ANECA** (2023/07/26):

  - *Profesor Ayudante Doctor*
  - *Profesor Contratado Doctor*
  - *Profesor de Universidad Privada*

Formal High School Teaching

Castejón de Sos Public High School (Pyrenees, Spain)

- **Biology, Geology and general scientific culture** to ~100 pupils, 12 to 18 years old. Six different subjects, in four different levels, with personal academic mentoring and guidance for each student.

  > **700 teaching hours** (20 hours/week during a whole academic course, 2016-2017).

Invited University and Public Seminars:

Swiss Federal Institute of Technology, Zürich, Switzerland
Recurrence interval of large earthquakes on active faults (2006).

University of Southern California, Los Angeles
Simple attempts at earthquake forecasting (2009).

National University for Distance Education, Spain
Geology of the Haiti earthquake (2010).
(Attended by the Haitian Ambassador to Spain.)

Technical University of Madrid, Spain
Earthquake and tsunami hazard assessment at nuclear power plant sites (2011).

University of Granada, Spain
Meteorites and meteorite impacts (2018)

Autonomous University of Barcelona, Spain
Advances in probabilistic earthquake forecasting (2019)
Earthquakes and tsunamis (2024)

Training for University Teaching

Over 90 hours of training courses for university professors (University of Zaragoza, Spain) on:

- **Academic and scientific communication in English.**
- **Elaboration of academic programmes.**
- **Prevention of risks in the laboratory.**
- **Effective time management.**
- **Project-based learning.**

Outreach

Expositions

- **Curator of the public exposition: "Earthquakes and Tsunamis: A Mathematical View".**
  CRM Centre for Mathematical Research and Autonomous University of Barcelona (2024)

Published Scientific Photography

- **Two pictures selected for the catalogues and international expositions of the FotCiencia contest, organized by the Spanish National Research Council (CSIC):**
  - **Geometrical fantasy** (on a natural fractal structure, 2007)
  - **Trapped in ice and time** (on gas bubbles trapped on seasonal ice, 2022)
- **Pictures of the Inferno Glaciers (Spanish Pyrenees)**, used for measuring the ice extent during the **1998** glaciological campaign (University of Zaragoza).

Examples of mentions and interviews in the media

- ***"Interview with the discoverer of dinosaur footprints in a cave at Cervera".***
  (La Rioja, 2022).
- ***"Earthquakes, hurricanes and other natural disasters obey same mathematical pattern"*** (Phys.org , La Vanguardia, 2019).
- **EGU Press Conference on giant earthquakes, Vienna, 2019.**
- ***"Magnitude 10 or larger earthquakes can happen on average once every 2000 years, new study says"*** (Global Earthquake Model News, 2019).
- ***"Future earthquakes in the Castor project cannot be ruled out"***(El País, 2014).
- ***"The Russian meteor shook the Earth even at thousands of kilometres away"*** Deutsche Welle (German international TV channel) live interview, 2013.
- ***"The magnitude of the great Japanese earthquake could not be anticipated by the occurrence of earlier earthquakes"*** (El Mundo, 2011).

Fieldwork Related to Geophysics and Geohazards

Research:

- **Active faulting:** Pyrenees and Iberian Range (Spain); Taupo Rift (New Zealand).
- **Seismological Networks:** Analysis of the performance of the Spanish National Seismological Network. Measurement and modelling of on-site, shallow shear wave velocities (V_{S30}) for assessing station site conditions.
- **Magnetic susceptibility of rocks:** Pyrenees (Spain)

Commercial Network Deployment:

- **Deployment of geophone arrays for reflection seismics:** Iberian Range (Spain).

Teaching:

- **Active faulting** (plus Petrology, Geomorphology and Soil Science): Pyrenees, Iberian Range and Ebro Basin (Spain).

Training and volunteering:

Volunteer assistance to colleagues acknowledged in publications is marked with underline.

- **Active faulting:** Alpine, Hope, Wairarapa and Wellington faults (New Zealand); Betic Cordillera (Spain); Walker Lane (Nevada); Hayward and San Andreas Fault (California); Iberian Range and Pyrenees (Spain).

- **Volcanism:** Campo de Calatrava volcanic Field (Spain); Santorini Island (Greece); Mono Lake (Nevada, USA); Lava Beds National Monument and Mount Shasta (California, USA).

- **Impact cratering:** Dellen impact crater (Sweden, electrical prospecting); Sirente structure (Italy); Cretaceous/Paleogene boundary (Italy, Spain and New Zealand); Eocene-Oligocene boundary stratotype (Italy).

- **Flash flooding:** Iberian Range, Pyrenees and Mediterranean coast (Spain).

- **Landslides and rockfalls:** Cantabrian Mountains, Pyrenees and Iberian Range (Spain).

- **Karst subsidence and fluvial erosion:** Ebro valley (Spain).

- **Coastal uplift:** Raukumara Peninsula, North Island (New Zealand).

- **Climate change:** Photographic monitoring of mountain glaciers in the Pyrenees (Spain) and Alps (Austria); millennial transition from humid to arid regimes in the Iberian Range (Spain) and Kara-Kum desert (Turkmenistan, aerial reconnaissance).

Professional Memberships

- The Planetary Society (1995–).
- European Geosciences Union (2004–).
- American Geophysical Union (2008–).
- Seismological Society of America (2010–).
- Spanish Association of Professional Geologists (2017–)

Service to the Scientific Community

Organization of conferences

- **European Geosciences Union General Assembly**
  Viena, Austria (2016-2019, 2022-2024) & online (2020-2021). Co-convenor of nine consecutive sessions on the statistical analysis of spatio-temporal properties of earthquake occurrence.
- **Workshop on Micromechanics, Statistics and Hazards of Mechanical Failure**
  Online (2020). Funded by the CRM Centre for Mathematical Research & AXA Research Fund. Co-organizer.
- **Iberian Meeting on Active Faults and Paleoseismology**
  Lorca, Spain (2014) and Alicante, Spain (2018). Member of the Scientific Committee.
- **Sixth International Workshop on Statistical Seismology**
  Tahoe City, California (2009). Session "Forecasting and Hazard". Co-convenor.
- **National Meeting of Young Researchers**
  Zaragoza, Spain (2004). Co-organizer.

Volunteer mentoring of researchers

- **Roseanne Clement**

  University of Edinburgh, United Kingdom (2018; PhD in 2019).
  European Geoscience Union Mentoring Programme.

- **Tatiana Laskina**

  Perm State University, Russia (2018; PhD in 2019).
  American Geophysical Union Mentoring365 Programme (which offers external mentoring support to researchers, independently from their formal supervisors).

- **Ángela María Gómez García**

  Universidad Nacional de Colombia (2018-2019; PhD in 2020 with meritorious distinction).

  American Geophysical Union Mentoring365 Programme & ***hosted her in a research stay at the CRM*** (February-May 2019), with grant for covering travel and accommodation.

Examination of PhD and MSc theses

Member of the examining committee for:

Pouye Yazdi (2020):
Analysis of Earthquake Sequences and Activity Rates: Implications for Seismic Hazard
PhD, Technical University of Madrid, Spain.

Rebecca Amberger (2021):
Probabilistic Seismic Hazard and Risk Analysis for Chile Based on Synthetic Earthquake Catalogues Approach
MSc, University of Potsdam, Germany

Cristina Crespo (2021):
Analysis of Seismic Series in an Intraplate Region (Northwestern Iberian Peninsula)
PhD, King Juan Carlos University, Spain

Peer review of manuscripts for scientific journals

- Acta Geophysica
- Boletín Geológico (2)
- Bulletin of the Seismological Society of America (8)
- Estudios Geológicos (2)
- Frontiers in Earth Science
- Geomorphology (2)
- Geophysical Journal International (2)
- Geophysical Research Letters
- Journal of Earth System Science (3)
- Journal of Geophysical Research (5)
- Journal of Seismology (2)
- Mathematical Geosciences (2)
- Natural Hazards
- Physics of the Earth and Planetary Interiors (2)
- Scientific Reports.
- Seismological Research Letters (2)

Peer review of grant proposals

- Ministry of Science and Innovation (Spain).
- National Agency for Research (Agence Nationale de la Recherche, France).
- Natural Environmental Research Council (United Kingdom)

Academic Management

- **Elected member of the University of Zaragoza's Senate**.
  Representative of researchers and teaching trainees (2004–2007).