

Miguel Zumalacárregui

Ramón y Cajal Fellow — Instituto de Física Teórica IFT-UAM/CSIC, Madrid
Group Leader, ACR Department — Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Potsdam

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The publication record is maintained on [INSPIRE-HEP](#); research [projects](#) and [funding](#) are listed on the website.

Positions

- **Ramón y Cajal Fellow**

Instituto de Física Teórica IFT-UAM/CSIC, Madrid · 2026–

- **Group Leader**, Astrophysical and Cosmological Relativity

Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Potsdam · 2020–

- **Marie Skłodowska-Curie Global Fellow**

Berkeley Center for Cosmological Physics, with return phase at IPhT Saclay · 2017–2020

- **Nordita Fellow**

Nordic Institute for Theoretical Physics, Stockholm · 2015–2017

- **Postdoctoral Researcher**

Institut für Theoretische Physik, University of Heidelberg · 2013–2015

- **Postdoctoral Researcher**

Instituto de Física Teórica IFT-UAM/CSIC, Madrid · 2013

Education

- **PhD in Physics**, *Cum Laude* with International Mention

Universidad Autónoma de Madrid · 2012 · Graduate work at ICC Barcelona and IFT-UAM/CSIC (FPI fellowship)

Dissertation: [Probing the Foundations of the Standard Cosmological Model](#) · defense presentation

- **Master in Theoretical Physics**

Universidad Autónoma de Madrid · 2009

Thesis: [Disformal Quintessence: Observational Constraints and Linear Perturbations](#)

Supervision

Postdoctoral researchers

- **Daniel Ballard** — from November 2026
- **Han-Gil Choi** — 2026–
- **Xikai Shan** — Affiliated postdoctoral researcher, 2026–
- **Juan Urrutia** — from November 2026
- **Héctor Villarrubia-Rojo** — 2026–
- **Srashti Goyal** — 2023–2026 → Independent Fellow at IUCAA
- **Serena Giardino** — 2024–2025 → Postdoc at Imperial College London
- **Guilherme Brando** — Humboldt Fellow, 2022–2024 → Tenured Researcher at UFES, Brazil
- **Giovanni Tambalo** — 2020–2023 → Postdoc at ETH Zürich, then Marie Skłodowska-Curie Fellow at IPhT Saclay

PhD students

- **Emanuela Alberici** — from October 2026

- **Manon van Zyl** — from October 2026
- **Nicola Menadeo** — PhD student, U. Naples (co-supervised), 2023–2025, long-term stay → Postdoc at Humboldt University of Berlin
- **Stefano Savastano** — PhD student (co-supervised with A. Buonanno), 2020–2024 → PhD awarded at HU Berlin
- **Carlos García-García** — PhD student, IFF-CSIC (co-supervised), 2017–2020 → Beecroft Fellow at Oxford, now tenure-track scientist at CIEMAT

Master’s students

Matteo Pagani (U. Bologna, co-supervised, 2026); **Louis Salimbeni** (ETH Zürich, co-supervised, 2026); **Pablo Vega del Castillo** (LMU, 2026); **Shashwat Singh** (Paris Observatory, 2022–2023 → PhD at the University of Glasgow); **Julius Streibert** (FU Berlin, co-supervised, 2022–2023); **Richard Stiskalek** (LMU, co-supervised, 2021–2022 → PhD at Oxford, pre-doctoral Fellow at CCA, now postdoc at Oxford); **Alessandro Longo** (U. Trieste, co-supervised, 2020–2021 → PhD student at SISSA); **Janina Renk** (U. Heidelberg, co-supervised, 2015–2016 → PhD at Stockholm University).

Research interns and undergraduates

Selin Üstündag (2026 → PhD at Newcastle University); **Marcel Glätzer** (HU Berlin, 2024–2025); **Jaime Raynaud** (TU Berlin & KTH, 2024–2025 → PhD at MPIA); **Vaibhav Omble** (LMU, 2023–2024); **Daryna Yushchenko** (Princeton summer program, 2024 → PhD at Carnegie Mellon University); **Lyla Choi** (Princeton summer program, 2023 → PhD at Stanford); **Yukei Murakami** (UC Berkeley, 2018–2019 → PhD at Johns Hopkins University); **Brindha Kanniah** (MIT summer program in Heidelberg, 2015 → Master’s at MIT).

Visiting researchers, and students mentored informally rather than formally supervised, are listed at miguelzumalacarregui.es/group.html.

Scientific coordination

- **LISA Consortium**
member since 2018
Council member and Senior Co-Chair of the Cosmology Working Group (2025–); section coordinator for gravitational-wave lensing in the LISA Cosmology white paper (2022)
- **Euclid Consortium**
member since 2014
Co-lead of the Science Working Group on Gravitational Waves and of its “bright sirens” work package (2025–); member of the Strong Lensing, Cosmology Theory, and Supernovae & Transients working groups
- **GW-Space 2050**
Coordinator for the cosmography section, defining ESA’s gravitational-wave missions after LISA (2023–)
- **Multi-messenger lensing white paper**
Coordinator for the microlensing section (2024)

Workshops and meetings organized

- **13th LISA Cosmology Working Group Workshop**
Barcelona, 2026
- **12th LISA Cosmology Working Group Workshop**
Tallinn, 2025
- **Lensing and Wave Optics in Strong Gravity**
Erwin Schrödinger Institute, Vienna, 2024
- **LISA joint Fundamental Physics + Waveform meeting**

Potsdam, 2024

- [ACR Division Seminars](#)
Max Planck Institute for Gravitational Physics, 2020–2022
- BCCP Cosmology Lunch
UC Berkeley, 2016–2017
- Cosmology Seminars, Institut für Theoretische Physik
University of Heidelberg, 2014–2015
- TRR33 Winter Schools
Passo del Tonale, 2013, 2014 and 2015

Teaching

Graduate schools

- **Gravitational waves**, TAE (Taller de Altas Energías), Benasque, 2024
[Slides](#)
- **Tests of gravity and dark energy with cosmology and gravitational waves**
II Mesoamerican Workshop on Gravity and Cosmology, Chiapas, 2018
- **Alternative gravity theories**, Cosmology School in the Canary Islands, 2017
[Video lecture](#)
- **School for Cosmology Tools**, IFT Madrid, 2017
Lectures on CLASS, hi_class and MontePython; material on the [Talks & Teaching page](#)
- **Workshop on CLASS and MontePython**, MPIA Munich, 2014

University courses

- **Berkeley Connect Instructor**, UC Berkeley, 2018–2019
Two semesters of undergraduate mentoring and teaching
- **Lecturer**, University of Heidelberg, 2014–2015
Advanced Cosmology; Introduction to CMB Physics; Statistical Mechanics; advanced seminar
- **Teaching assistant**, University of Heidelberg, 2014–2015
Theoretical Astrophysics (graduate), with M. Bartelmann
- **Teaching assistant**, Universidad Autónoma de Madrid, 2013
Gravitation and Cosmology; Physics of the Cosmos
- **Mini-course on inhomogeneous cosmologies**, University of Barcelona, 2012

Awards and fellowships

- ERC Consolidator Grant (2025): GLOW, Gravitational Lensing of Waves.
- Ramón y Cajal Fellowship (2024 call, awarded 2025).
- Max Planck Society Annual Project (2024): With Einstein on Crooked Paths.
- R3 certification, Spanish Research Agency.
- Berkeley Connect Fellow, UC Berkeley (2018).
- Marie Skłodowska-Curie Global Fellowship (2015).
- Nordita Fellowship (2015).
- Yggdrasil Fellowship (2011): research stay at ITA Oslo.
- FPI doctoral fellowship (2008) and UAM Master's scholarship (2007).

Evaluation and peer review

Evaluation panels

- NASA Hubble Fellowship Program, Physics and Cosmology panel.
- FCT (Portuguese Foundation for Science and Technology), Individual Support Call.
- Max Planck Institute for Gravitational Physics, postdoctoral hiring committee, since 2020.

External evaluator for funding agencies

European Research Council (Starting Grants), STFC/UKRI, Swiss National Science Foundation, Alexander von Humboldt Foundation, InterTalentum (Marie Skłodowska-Curie COFUND), Netherlands Research Council (NWO), Research Grants Council of Hong Kong, and the Estonian Research Council.

Refereeing

Peer review for more than 40 papers, including Physical Review Letters, Physical Review D, Nature Astronomy, JCAP, The Astrophysical Journal and Astrophysical Journal Letters.

Selected talks

- **IAS and Princeton University**, gravitational-wave meeting, Princeton, 2026 · seminar
GW231123 as a diffracted and magnified black-hole merger
- **Spanish & Portuguese Relativity Meeting**, Universidad de Murcia, 2026 · plenary
Gravitational lensing of waves: a new window into astrophysics, dark matter and gravity
- **Leibniz Institute for Astrophysics**, Potsdam, 2024 · institute colloquium
Gravitational lensing of waves
- **New Frontiers in Strong Gravity**, Benasque, 2024 · plenary
Wave-optical phenomena in gravitational-wave lensing
- **Workshop on Tensions in Cosmology**, Corfu, 2022 · plenary
Towards solutions to the Hubble problem beyond Einstein's gravity
- **EuCAPT Annual Symposium**, CERN, 2022 · plenary review
[Dark energy and tests of gravity with cosmology and gravitational-wave propagation](#)
- **Institute of Theoretical Astrophysics**, University of Oslo, 2021 · institute colloquium
The dark Universe in the era of gravitational-wave astronomy
- **Progress in Old and New Themes in Cosmology**, Palais des Papes, Avignon, 2020 · plenary
Tests of gravity with gravitational waves
- **COSMO**, Aachen University, 2019 · plenary
Tests of dark energy and modified gravity
- **Rencontres du Vietnam**, Very High Energy Phenomena in the Universe, 2018 · plenary
The dark Universe in the era of gravitational-wave astronomy

Languages

Spanish (native), English (C2), German (C1).

Selected publications

The complete record is on [INSPIRE-HEP](#).

- [Across the Universe: GW231123 as a magnified and diffracted black hole merger](#)
S. Goyal, H. Villarrubia-Rojo, M. Zumalacárregui · *Astrophys. J. Lett.* 1008, L12 (2026)
- [Black holes as telescopes: discovering supermassive binaries through quasi-periodic lensed starlight](#)

- H. Wang, M. Zumalacárregui, B. Kocsis · Phys. Rev. Lett. 136, 061403 (2026) · Editors' Suggestion
- [GLoW: novel methods for wave-optics phenomena in gravitational lensing](#)
H. Villarrubia-Rojo, S. Savastano, M. Zumalacárregui, L. Choi, S. Goyal, L. Dai, G. Tambalo · Phys. Rev. D 111, 103539 (2025)
 - [Gravitational wave lensing as a probe of halo properties and dark matter](#)
G. Tambalo, M. Zumalacárregui, L. Dai, M. Cheung · Phys. Rev. D 108, 103529 (2023)
 - [Gravitational wave lensing beyond general relativity: birefringence, echoes and shadows](#)
J. M. Ezquiaga, M. Zumalacárregui · Phys. Rev. D 102, 124048 (2020) · Editors' Suggestion
 - [Gravity in the era of equality: towards solutions to the Hubble problem without fine-tuned initial conditions](#)
M. Zumalacárregui · Phys. Rev. D 102, 023523 (2020)
 - [Limits on stellar-mass compact objects as dark matter from gravitational lensing of type Ia supernovae](#)
M. Zumalacárregui, U. Seljak · Phys. Rev. Lett. 121, 141101 (2018) · Editors' Suggestion
 - [Dark energy after GW170817: dead ends and the road ahead](#)
J. M. Ezquiaga, M. Zumalacárregui · Phys. Rev. Lett. 119, 251304 (2017) · Editors' Suggestion
 - [hi_class: Horndeski in the Cosmic Linear Anisotropy Solving System](#)
M. Zumalacárregui, E. Bellini, I. Sawicki, J. Lesgourgues, P. G. Ferreira · JCAP 08, 019 (2017)
 - [Transforming gravity: from derivative couplings to matter to second-order scalar–tensor theories beyond the Horndeski Lagrangian](#)
M. Zumalacárregui, J. García-Bellido · Phys. Rev. D 89, 064046 (2014)