

# Asier López-Gordón

PREDOCTORAL RESEARCHER

Instituto de Ciencias Matemáticas (CSIC-UAM-UC3M-UCM)  
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## Education

### Universidad Autónoma de Madrid

Madrid, Spain

#### PHD MATHEMATICS

2021 -

- PhD thesis: The geometry of dissipation
- Advisor: Manuel de León

### Universidad Autónoma de Madrid

Madrid, Spain

#### MSc THEORETICAL PHYSICS

2020 - 2021

- MSc thesis: The geometry of Rayleigh dissipation (arXiv:[2107.03780](https://arxiv.org/abs/2107.03780))
- Advisor: Manuel de León

### Universidad Complutense de Madrid

Madrid, Spain

#### BSc PHYSICS

2016 - 2020

- BSc thesis: Integrability, chaos and entanglement in quantum systems
- Advisors: Federico Finkel and Artemio González-López

## Professional Experience

2021- **Predoctoral researcher**, Instituto de Ciencias Matemáticas (ICMAT-CSIC), Madrid, Spain

2020-2021 **"JAE Intro" research grantee**, Instituto de Ciencias Matemáticas (ICMAT-CSIC), Madrid, Spain

## Publications

### JOURNAL ARTICLES

M. de León, M. Lainz, A. L.-G., "Discrete Hamilton–Jacobi theory for systems with external forces", *J. Phys. A: Math. Theor.* (2022), doi: [10.1088/1751-8121/ac6240](https://doi.org/10.1088/1751-8121/ac6240).

M. de León, M. Lainz, A. L.-G., "Geometric Hamilton–Jacobi theory for systems with external forces", *J. Math. Phys.* **63**, 022901 (2022), doi:[10.1063/5.0073214](https://doi.org/10.1063/5.0073214).

M. de León, M. Lainz, A. L.-G., "Symmetries, constants of the motion, and reduction of mechanical systems with external forces", *J. Math. Phys.* **62**, 042901 (2021), doi:[10.1063/5.0045073](https://doi.org/10.1063/5.0045073).

### CONFERENCE PAPERS

M. E. E. Irazú, A. L.-G., L. J. Colombo, and M. de León, "Hybrid Routhian reduction for simple hybrid forced Lagrangian systems", 2022 European Control Conference (ECC), pp. 345-350 (2022), doi: [10.23919/ECC55457.2022.9838077](https://doi.org/10.23919/ECC55457.2022.9838077).

### PREPRINTS

M. de León, M. Lainz, A. L.-G., X. Rivas, "Hamilton–Jacobi theory for contact systems: autonomous and non-autonomous" (2022), [arXiv:2208.07436](https://arxiv.org/abs/2208.07436) [math-ph].

A. L.-G., L. Colombo, M. de León, "Nonsmooth Herglotz principle" (2022), [arXiv:2208.02033](https://arxiv.org/abs/2208.02033) [math.OC].

L. Colombo, M. de León, A. L.-G., "Contact Lagrangian systems subject to impulsive constraints" (2022), [arXiv:2206.11702](https://arxiv.org/abs/2206.11702) [math-ph].

L. J. Colombo, M. de León, M. E. Eyrea Irazú, A. L.-G., "Generalized hybrid momentum maps and reduction by symmetries of forced mechanical systems with inelastic collisions" (2022), [arXiv:2112.02573](https://arxiv.org/abs/2112.02573) [eess.SY].

### IN PREPARATION

- L. Colombo, M. de León, M. E. Eyrea Irazú, A. L.-G., “Hamilton–Jacobi theory for simple hybrid systems”.
- J. Gaset, A. L.-G., X. Rivas, “Symmetries, conservation and dissipation in time-dependent contact systems”.
- A. A. Simoes, A. L.-G., M. de León, L. Colombo, “Discrete Mechanics and Optimal Control for a Passive Walker Experiencing Foot Slip”.

## Awards, Fellowships, & Grants

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2021	“FPI” predoctoral contract, Ministerio de Ciencia e Innovación	
	“JAE Intro” Grant extension, Instituto de Ciencias Matemáticas (ICMAT)	3 000 €
2020	“JAE Intro” Grant, Consejo Superior de Investigaciones Científicas (CSIC)	3 000 €
2019	“Beca de Colaboración en Departamentos”, Universidad Complutense de Madrid	2 000 €

## Talks and Posters

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### CONTRIBUTED TALKS

- September 1, 2022. **XXX International Fall Workshop in Geometry and Physics.** *Hamilton-Jacobi theory for contact systems: autonomous and non-autonomous.* Instituto de Ciencias Matemáticas (ICMAT-CSIC), Madrid, Spain.
- July 20, 2022. **34th International Colloquium on Group Theoretical Methods in Physics.** *Non-conservative systems can have conserved quantities! Symmetries, reduction and Hamilton-Jacobi theory for forced mechanical systems.* Strasbourg University, Strasbourg, France.
- July 13, 2022. **2022 European Control Conference.** *Hybrid Forced Lagrangian Systems.* Imperial College and University College, London, UK (online).
- July 5, 2022. **14th International Summer School on Geometry, Mechanics and Control.** *Reduction of forced mechanical systems with inelastic collisions.* Universidad de Burgos, Burgos, Spain.
- April 1, 2022. **Geometry, Mechanics and Control Seminar.** *Reduction, Hamilton-Jacobi theory and discretization of mechanical systems with external forces.* Instituto de Ciencias Matemáticas, Madrid, Spain (online).
- March 7-11, 2022. **VII Iberoamerican Meeting on Geometry, Mechanics and Control.** *Forced Hamiltonian and Lagrangian systems. Symmetries, reduction and Hamilton-Jacobi theory.* Departamento de Matemática, Universidad Nacional del Sur, Bahía Blanca, Argentina (online).
- September 8, 2021. **XXIX International Fall Workshop in Geometry and Physics.** *Mechanical systems with external forces. Symmetries, reduction and Hamilton-Jacobi theory.* Centro de Matemática e Aplicações, Universidade da Beira Interior, Covilhã, Portugal (online).

### POSTERS

- January 17-21, 2022. **Congreso Bienal de la Real Sociedad Matemática Española** (Biennial Congress of the Royal Spanish Mathematical Society). *Systems with external forces. Symmetries, reduction and Hamilton-Jacobi theory.* Universidad de Castilla – La Mancha, Ciudad Real, Spain.
- December 1-3, 2021. **Young Researchers Workshop in Geometry, Mechanics and Control.** *Symmetries, reduction, Hamilton-Jacobi theory and discretization for systems with external forces.* Centre de Recerca Matemàtica, Campus de Bellaterra, Barcelona, Spain.

## Assistance to events

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### WORKSHOPS

- August 29-September 2, 2022. **XXX International Fall Workshop in Geometry and Physics.** Instituto de Ciencias Matemáticas (ICMAT-CSIC), Madrid, Spain.
- July 18-22, 2022. **34th International Colloquium on Group Theoretical Methods in Physics.** Strasbourg University, Strasbourg, France.
- July 12-15, 2022. **2022 European Control Conference.** Imperial College and University College, London, UK (online).
- May 23-26, 2022. **Geometric Aspects of the Swampland.** Centro de Física Teórica y Matemáticas, Madrid, Spain.

March 7-11, 2022. **VII Iberoamerican Meeting on Geometry, Mechanics and Control.** Departamento de Matemática, Universidad Nacional del Sur, Bahía Blanca, Argentina (online).

January 24-25, 2022. **XXIII Winter Meeting on Geometry, Mechanics and Control.** Universidad de Zaragoza, Zaragoza, Spain.

January 17-21, 2022. **Congreso Bienal de la Real Sociedad Matemática Española** (Biennial Congress of the Royal Spanish Mathematical Society). Universidad de Castilla – La Mancha, Ciudad Real, Spain.

December 1-3, 2021. **Young Researchers Workshop in Geometry, Mechanics and Control.** Centre de Recerca Matemàtica, Campus de Bellaterra, Barcelona, Spain.

September 7-10, 2021. **XXIX International Fall Workshop in Geometry and Physics.** Centro de Matemática e Aplicações, Universidade da Beira Interior, Covilhã, Portugal (online).

July 26-30, 2021. **Symposium on New Developments in Momentum Polytope Theory.** Instituto de Ciencias Matemáticas (ICMAT), Madrid, Spain (online).

February 18-19 2021. **XXII Winter Meeting on Geometry, Mechanics and Control.** Universidade de Santiago de Compostela, Santiago de Compostela, Spain (online).

December 1-3, 2020. **BYMAT Conference-Bringing Young Mathematicians Together.** Universitat de València and Universitat Politècnica de València, Valencia, Spain (online).

## SCHOOLS

July 4-8, 2022. **14th International Summer School on Geometry, Mechanics and Control.** Universidad de Burgos, Burgos, Spain.

August 2-5, 2021. **Summer School on New Developments in Momentum Polytope Theory.** Instituto de Ciencias Matemáticas (ICMAT), Madrid, Spain (online).

June 21-July 9, 2021. **JAE School of Mathematics.** Instituto de Ciencias Matemáticas (ICMAT), Madrid, Spain.

January 25-February 5, 2021. **Master School on Geometry, Analysis and Applications.** Universidad de Cantabria, Santander, Spain (online).

September 7-9, 2020. **JAE School of Mathematics.** Instituto de Ciencias Matemáticas (ICMAT), Madrid, Spain (online).

July 1-5 2019. **I International School on Particle Physics and Cosmology.** Universidad Internacional Menéndez Pelayo, Santander, Spain.

## SEMINARS

Weekly. **Geometric Mechanics and Control Seminar.** Instituto de Ciencias Matemáticas (ICMAT), Madrid, Spain (online).

Biweekly. **Geometry, Dynamics and Mechanics Seminar.** Università degli Studi di Padova, Padua, Italy (online).

## OTHERS

June 1, 2022. **Conferencia Final Net4impact. Impacto Social De La Investigación Científica.** Instituto de Ciencias Matemáticas, Madrid, Spain.

## Teaching Experience

Winter 2022-23	<b>Matemáticas (Mathematics)</b> , Teaching Assistant, Grado en Ciencia y Tecnología de los Alimentos, Doble Grado en Nutrición Humana y Dietética y CTA (Degree in Food Science and Technology, Double Degree in Human Nutrition and Dietetics and FST)	<i>Universidad Autónoma de Madrid</i>
Winter 2022-2023	<b>Matemáticas (Mathematics)</b> , Teaching Assistant, Grado en Bioquímica (Degree in Biochemistry)	<i>Universidad Autónoma de Madrid</i>

## Outreach & Professional Development

### PEER REVIEW

International Journal of Geometric Methods in Modern Physics  
Journal of Geometric Mechanics  
Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas  
61st IEEE Conference on Decision and Control

#### PROFESSIONAL MEMBERSHIPS

Real Sociedad Matemática Española (Royal Spanish Mathematical Society)  
Real Sociedad Española de Física (Spanish Royal Physics Society)

#### Languages \_\_\_\_\_

**English.** Advanced, C1 in the CEFR, 7.5 band score in IELTS Academic

**Spanish.** Mother tongue

#### Computer skills \_\_\_\_\_

**Advanced.**  $\text{\LaTeX}$ , GNU/Linux, Mathematica, Python

**Basic.** bash/shell, git, gnuplot, html, Julia, matlab, nginx, OriginLab, SciDAVis