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)
- 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

L. Colombo, M. de León, A. L.-G., "Contact Lagrangian systems subject to impulsive constraints", to appear in *J. Phys. A: Math. Theor.* , arXiv:2206.11702 [math-ph].

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.

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.

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.

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.

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 [math-ph].

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

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 [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., A. Bloch, L. Colombo, "Discrete Mechanics and Optimal Control for a Passive Walker Experiencing Foot Slip".

Awards, Fellowships, & Grants

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

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** (Biennal 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

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** (Biennal 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	**Matemáticas (Mathematics)**, 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), Universidad Autónoma de Madrid	*30 h*
Winter 2022-2023	**Matemáticas (Mathematics)**, Teaching Assistant, Grado en Bioquímica (Degree in Biochemistry), Universidad Autónoma de Madrid	*30 h*

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. LaTeX, GNU/Linux, Mathematica, Python

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