

Education

- 2017–2018 **PhD in** , *Universidad de Autónoma de Madrid*, Madrid, Mark: 9.67 / 10 .
- 2017–2018 **Master in Mathematics**, *Universidad de Autónoma de Madrid*, Madrid, Mark: 9.67 / 10 .
- 2014–2017 **Degree in mathematics**, *Universidad de Cantabria*, Santander, Mark: 8.865 / 10. **Extraordinary Award for the best grades in the class.**
- 2012–2016 **Degree in Physics**, *Universidad de Cantabria*, Santander, Mark: 8.81 / 10.
- 2015–2016 **Exchange program during undergraduate studies**, *Princeton University*, Princeton, I took some courses on both Mathematics and Physics, and wrote my Physics undergraduate thesis.

Research experience

- 2022–2023 **Postdoc researcher at ICMAT**.
- 2018–2022 **PhD. Program at ICMAT-CSIC**, *PhD thesis on Contact Hamiltonian Systems, under the supervision of Prof. Manuel de León.*
- 2017–2018 **Research grant on ICMAT during Master studies (Beca de colaboración en centros de excelencia Severo Ochoa y Unidades de Excelencia María de Maeztu ICMAT-CSIC)**, *ICMAT*, Madrid, Spain.
I worked on applications of contact geometry to mechanics under the supervision of Prof. Manuel de León

Teaching experience

- 2021 **Assistant Professor of Statistics applied to the environment**, *Universidad Autónoma de Madrid*, Madrid, Spain.
Degree of Environmental Sciences and Degree in Land planning
- 2019 **Assistant Professor of Algebra**, *Universidad Autónoma de Madrid*, Madrid, Spain.
Degree of Computer Sciences
- 2019 **Assistant Professor of Linear Algebra**, *Universidad Autónoma de Madrid*, Madrid, Spain.
Degree of Telecommunications Engineering
- 2017 **Teacher assistant on Física Cuántica III (Solid state Physics)**, *Universidad de Cantabria*, Santander, Spain.
Degree of Physics

Languages

Spanish Native

Other merits

- 2021-2022 **Organizer of the Joint Junior Colloquium (ICMAT-UAM-UC3M-UCM).**
Biweekly Colloquium aimed at PhD Students and Young researchers
- 2016 Bronze Medal on International Mathematics Competition for University Students en Blagoevgrad, Bulgaria.

Publications

1. Manuel de León, Manuel Lainz, and Miguel C. Muñoz-Lecanda. "Optimal Control, Contact Dynamics and Herglotz Variational Problem". In: *J Nonlinear Sci* 33.1 (Feb. 2023), p. 9. ISSN: 1432-1467. DOI: 10.1007/s00332-022-09861-2.
2. Manuel de León, Jordi Gaset, and Manuel Lainz. "Inverse Problem and Equivalent Contact Systems". In: *Journal of Geometry and Physics* 176 (Mar. 2022), p. 104500. ISSN: 03930440. DOI: 10.1016/j.geomphys.2022.104500.
3. Manuel de León, Manuel Lainz, and Asier López-Gordón. "Geometric Hamilton–Jacobi Theory for Systems with External Forces". In: *J. Math. Phys.* 63.2 (Feb. 2022), p. 022901. ISSN: 0022-2488, 1089-7658. DOI: 10.1063/5.0073214.
4. Ogul Esen, Manuel de León, Manuel Lainz, Cristina Sardón, and Marçin Zajac. "Reviewing the Geometric Hamilton–Jacobi Theory Concerning Jacobi and Leibniz Identities". In: *J. Phys. A: Math. Theor.* 55.40 (Oct. 2022), p. 403001. ISSN: 1751-8113, 1751-8121. DOI: 10.1088/1751-8121/ac901a.
5. Alexandre Anahory Simoes, David Martín de Diego, Manuel Lainz, and Manuel de León. "On the Geometry of Discrete Contact Mechanics". In: *J Nonlinear Sci* 31.3 (Apr. 2021), p. 53. ISSN: 1432-1467. DOI: 10.1007/s00332-021-09708-2.
6. Alexandre Anahory Simoes, David Martín de Diego, Manuel Lainz, and Manuel de León. "The Geometry of Some Thermodynamic Systems". In: *Geometric Structures of Statistical Physics, Information Geometry, and Learning*. Ed. by Frédéric Barbaresco and Frank Nielsen. Springer Proceedings in Mathematics & Statistics. Cham: Springer International Publishing, 2021, pp. 247–275. ISBN: 978-3-030-77957-3. DOI: 10.1007/978-3-030-77957-3_13.
7. Manuel de León, Jordi Gaset, Manuel Lainz, Miguel C. Muñoz-Lecanda, and Narciso Román-Roy. "Higher-Order Contact Mechanics". In: *Annals of Physics* 425 (Feb. 2021), p. 168396. ISSN: 0003-4916. DOI: 10.1016/j.aop.2021.168396.
8. Manuel de León, Manuel Lainz, and Asier López-Gordón. "Symmetries, Constants of the Motion, and Reduction of Mechanical Systems with External Forces". In: *Journal of Mathematical Physics* 62.4 (Apr. 2021), p. 042901. ISSN: 0022-2488, 1089-7658. DOI: 10.1063/5.0045073.
9. Manuel de León, Manuel Lainz, and Álvaro Muñoz-Brea. "The Hamilton–Jacobi Theory for Contact Hamiltonian Systems". In: *Mathematics* 9.16 (Aug. 2021), p. 1993. ISSN: 2227-7390. DOI: 10.3390/math9161993.
10. Manuel de León, Manuel Lainz, and Miguel C. Muñoz-Lecanda. "The Herglotz Principle and Vakonomic Dynamics". In: *Geometric Science of Information*. Ed. by Frank Nielsen and Frédéric Barbaresco. Vol. 12829. Cham: Springer International Publishing, 2021, pp. 183–190. ISBN: 978-3-030-80208-0. DOI: 10.1007/978-3-030-80209-7_21. (Visited on 02/16/2022).

11. Manuel de León, Manuel Lainz, Miguel C. Muñoz-Lecanda, and Narciso Román-Roy. "Constrained Lagrangian Dissipative Contact Dynamics". In: *J. Math. Phys.* 62.12 (Dec. 2021), p. 122902. ISSN: 0022-2488, 1089-7658. DOI: 10.1063/5.0071236.
12. Oğul Esen, Manuel Lainz, Manuel de León, and Juan Carlos Marrero. "Contact Dynamics: Legendrian and Lagrangian Submanifolds". In: *Mathematics* 9.21 (Jan. 2021), p. 2704. ISSN: 2227-7390. DOI: 10.3390/math9212704.
13. Alexandre Anahory Simoes, Manuel de León, Manuel Lainz, and David Martín de Diego. "Contact Geometry for Simple Thermodynamical Systems with Friction". In: *Proc. R. Soc. A.* 476.2241 (Sept. 2020), p. 20200244. ISSN: 1364-5021, 1471-2946. DOI: 10.1098/rspa.2020.0244.
14. Manuel de León, Jordi Gaset, Manuel Lainz, Xavier Rivas, and Narciso Román-Roy. "Unified Lagrangian-Hamiltonian Formalism for Contact Systems". In: *Fortschr. Phys.* 68.8 (Aug. 2020), p. 2000045. ISSN: 0015-8208, 1521-3978. DOI: 10.1002/prop.202000045.
15. Manuel de León, Víctor Manuel Jiménez, and Manuel Lainz. "Contact Hamiltonian and Lagrangian Systems with Nonholonomic Constraints". In: *Journal of Geometric Mechanics* (Dec. 2020). ISSN: 1941-4889. DOI: 10.3934/jgm.2021001.
16. Manuel de León and Manuel Lainz. "Infinitesimal Symmetries in Contact Hamiltonian Systems". In: *Journal of Geometry and Physics* 153 (July 2020), p. 103651. ISSN: 03930440. DOI: 10.1016/j.geomphys.2020.103651.
17. Manuel de León and Manuel Lainz. "Contact Hamiltonian Systems". In: *Journal of Mathematical Physics* 60.10 (Oct. 2019), p. 102902. DOI: 10.1063/1.5096475.
18. Manuel de León and Manuel Lainz. "Singular Lagrangians and Precontact Hamiltonian Systems". In: *Int. J. Geom. Methods Mod. Phys.* 16.10 (Aug. 2019), p. 1950158. ISSN: 0219-8878. DOI: 10.1142/S0219887819501585.
19. Manuel Lainz, Cristina Sardón, and Alan Weinstein. "Plasma in a Monopole Background Does Not Have a Twisted Poisson Structure". In: *Phys. Rev. D* 100.10 (Nov. 2019), p. 105016. ISSN: 2470-0010, 2470-0029. DOI: 10.1103/PhysRevD.100.105016.
20. Michael Aizenman, Manuel Lainz, and Simone Warzel. "Pfaffian Correlation Functions of Planar Dimer Covers". In: *Journal of Statistical Physics* 166.3 (2017), pp. 1078–1091. ISSN: 1572-9613. DOI: 10.1007/s10955-016-1684-8.

■ Talks

1. Manuel Lainz. "An Introduction to Contact Hamiltonian Systems". Talk. VI Congreso de Jóvenes Investigadores de La RSME (Universidad de León, León, Spain). Feb. 9, 2023.
2. Manuel Lainz. "Minicourse on Contact Hamiltonian Systems". Talk. Workshop on Nonlinear Systems III (Gebze Technical University, Turkey). Jan. 3, 2023.
3. Manuel Lainz. "The Herglotz Principle for Fields". Talk. XVI International Young Researchers Workshop on Geometry, Mechanics and Control (KU Leuven, Spain). Mar. 31, 2023.
4. Manuel Lainz. "An Introduction to Contact Hamiltonian Systems". Talk. II Encuentro RSME-UMA (Ronda, Spain). Dec. 12, 2022.
5. Manuel Lainz. "The Herglotz Principle for Fields". Talk. XXX International Fall Workshop on Geometry and Physics (ICMAT, Madrid, Spain). Sept. 1, 2022.
6. Manuel Lainz. "Variational Principles in Physics and Their Geometry. An Introduction to the Herglotz Principle". Talk. XVI Workshop of Young Researchers in Mathematics (Universidad Complutense de Madrid, Madrid, Spain). Sept. 26, 2022.

7. Manuel Lainz. "Contact Geometry and Thermodynamic Systems: The Evolution Vector Fields". Talk. XV International Young Researchers Workshop on Geometry, Mechanics and Control (Utrecht Universiteit, Utrecht, Netherlands). Dec. 4, 2021.
8. Manuel Lainz. "Geometry of Herglotz's Principle of Least Action". Talk. Geometry, Analysis and Applications (GAiA) (Universidad de Cantabria, Santander, Spain). Jan. 25, 2021.
9. Manuel Lainz. "The Herglotz Principle and Vakonomic Dynamics". Talk. GSI2021 Learning Geometric Structures (Sorbonne Université, Paris, France). June 1, 2021.
10. Manuel Lainz. "The Herglotz Principle for Fields". Talk. XVI Young Researchers Workshop in Geometry, Mechanics and Control (CRM, Barcelona, Spain). Dec. 3, 2021.
11. Manuel Lainz. "Contact Systems with Nonholonomic Constraints". Talk. V Congreso de Jóvenes Investigadores de La RSME (Universidad Jaume I, Castellón de la Plana, Spain). Jan. 29, 2020.
12. Manuel Lainz. "Contact Systems with Nonholonomic Constraints". Talk. XXI Winter Meeting on Geometry, Mechanics and Control (Santiago de Compostela, Galicia, España). Jan. 23, 2020.
13. Manuel Lainz. "Principles of Least Action in Physics and Their Geometry". Talk. BYMAT (Valencia, Comunidad Valenciana, España). Dec. 3, 2020.