

CV Date	27/11/2023
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## Part A. PERSONAL INFORMATION

First Name	Julián		
Family Name	González Ayala		
Sex	Not Specified	Date of Birth	
ID number Social Security, Passport			
URL Web	<a href="https://www.researchgate.net/profile/Julian_Gonzalez-Ayala">https://www.researchgate.net/profile/Julian_Gonzalez-Ayala</a>		
Email Address			
Open Researcher and Contributor ID (ORCID)	0000-0002-2896-7542		

### A.1. Current position

Job Title	Researcher		
Starting date	2022		
Institution	University of Salamanca		
Department / Centre	Department of Cartographic and Terrain Engineering / Polytechnic School of Avila		
Country	Spain	Phone Number	
Keywords	Physics - General physics; Soil analysis; Geophysics; Information technology and adata processing		

### A.2. Previous positions (Research Career breaks included)

Period	Job Title / Name of Employer / Country
2020 - 2022	Researcher / Universidad de Salamanca / Spain
2019 - 2019	Associate Professor / University of Salamanca
2018 - 2019	Researcher / University of Salamanca
2016 - 2017	Postdoc / CONACyT-México / Spain
2015 - 2016	Postdoc / CONACyT-México / Spain
2015 - 2015	Profesor de asignatura "A" interino / National Autonomous University of Mexico UNAM / Mexico

### A.3. Education

Degree/Master/PhD	University / Country	Year
Doctorate in Physicomathematical Sciences	National Polytechnic Institute (IPN-México) / Mexico	2014
Master of Physicomathematical Sciences	National Polytechnic Institute (IPN-México) / Mexico	2010
Degree in Physics and Mathematics	National Polytechnic Institute (IPN-México) / Mexico	2009

## Part B. CV SUMMARY

**Formation:** My bachelor, master and doctorate (with Honorific Mention) degrees were in physics and mathematics. The three theses were in thermodynamics and statistical physics.

**Research topics:** My research involves the areas of thermodynamics, multi-objective and multiparametric optimization, power plants, thermal energy storage, complex systems, statistical physics, and fluid dynamics applied to heat transfer in porous media.

**Research groups:** I am a researcher in the following groups:

- Tecnología de la Información para la Digitalización Inteligente de Objetos y Procesos (TIDOP) at the Department of Cartographic and Terrain Engineering of the Higher Polytechnic School of Ávila of Salamanca University.
- Energy optimization, thermodynamics, and statistical physics (GTFE) at the Applied Physics Department in the Science Faculty of Salamanca University.

**Member of:**

- Instituto de Física Fundamental y Matemáticas (IFFyM) de la USAL.
- Investigador Nacional Nivel I del Sistema Nacional de Investigadores del CONACyT-México.

**Participation in research projects**

- European projects (research team): "Tecnologías Inteligentes Avanzadas para la transición Energética Sostenible" IA4TES del Programa Misiones de I+D en Inteligencia Artificial 2021
- Recently, I participated in the project "PHES: Almacenamiento de energía eléctrica con bombas de calor y su impacto en la matriz energética nacional" a National Project funded by ANII-Uruguay. Other previous projects include:
  - National projects (IP):2 (Postdoc CONACyT-México)
  - Local projects (IP):1 (Programa II-USAL)
  - Regional projects (research team):1 (Desafío Universidad-Empresa)
  - Local projects (research team):10 (Programa XI-USAL, TCUE (3), IPN-México (6))

**Merits in scientific production:** I have published 35 papers in peer-reviewed scientific journals, from which 31 are research papers (18 in first decile journals, 26 in first quartile according to Scopus) and 4 are related to Physics Education.

- My H index is 13 (Scopus, 14 in Google Scholar)
- Accreditation of Junta de Castilla y León for "Profesor Contratado Doctor", "Profesor Ayudante Doctor" and "Profesor de Universidad".
- Winner of the Entropy Travel Award in 2019,
- Winner of the prize to the best oral communication at the conference Entropy 2021: The Scientific Tool of the 21st Century.
- Finalist at the Ilya Prigogine Prize of Thermodynamics 2015 for the best doctorate thesis, given by the Center for Advances Studies in Thermodynamics in the Joint European Thermodynamics Conference. · Award to the best doctorate thesis in the area of exact sciences by National Polytechnic Institute-Mexico
- Some of the articles have received mediatic coverage, including press releases, one interview in Canal 11-Mexico, and some mentions in scientific dissemination sites, such as, Phys.org, Finland Astrophysical Journal Tähdet ja avaruus, abc.es and some more in local media sites (local tv and newspapers).
- One of the articles was included in the Highlight Papers of 2016 in Europhysics Letters.
- Winner of the best postgraduate academic performance 2013-2014 in the Ph.D. program in Physical-mathematical Sciences awarded by the National Polytechnic Institute, Mexico.
- Honorable Mention for the best Master's thesis in Thermodynamics award at a national level, granted by the Mexican Thermodynamics Society (2011).
- Recognition for the best postgraduate academic performance 2009-2010 in the Master's program in Physical-mathematical Sciences, awarded by the National Polytechnic Institute, Mexico.
- Best undergraduate thesis award in the area of thermodynamics presented during 2009, awarded by the Mexican Thermodynamics Society.

**Reviewer in scientific journals:** I have made 84 reviews in the last 5 years for 24 different journals (being in the top 1% of the researchers with more reviews according to Web of Science).

**Editorial activities:** I'm an Editor of Frontiers of Physics, Frontiers in Genetics, and Frontiers in Physiology.

**Collaborations with research groups.** During the 5 postdocs stays I've created collaborations with research groups outside the University of Salamanca, which include: Research groups in the field of thermodynamics and complex systems in Mexico (Instituto Politécnico Nacional, CINVESTAV, UAM), Groups in China (Fuzhou University, Xiamen University, and Shenzhen University), one group in Uruguay (Universidad de la República).

**Conferences:** I have participated in 33 conferences from which 13 have been international and I've been invited to give the opening plenary talk for the XXXIV Congreso Nacional de Termodinámica – México.

**Participation in books:** I was invited to write the prologue of the book *An Account of Thermodynamic Entropy*, by Alberto Gianinetti (Bentham Science, U.A.E. 2017) ISBN: 978-1-68108-394-0.

**Knowledge Transfer:**

- Doctorate thesis: 0+1 (ongoing)
- Master thesis: 1
- TFM: 2+1(ongoing)
- TFG: 1+1(ongoing)

## Part C. RELEVANT ACCOMPLISHMENTS

### C.1. Most important publications in national or international peer-reviewed journals, books and conferences

AC: corresponding author. (n° x / n° y): position / total authors. If applicable, indicate the number of citations

- 1 Scientific paper.** D Salomone-González; P. L. Curto-Risso; A. Calvo Hernández; J. M. M. Roco; A. Medina; (6/6) J. Gonzalez-Ayala (AC). 2022. Pumped heat energy storage with liquid media: Thermodynamic assessment by a transcritical Rankine-like model. *Journal of Energy Storage*. PERGAMON-ELSEVIER SCIENCE LTD. 56-105966, pp.1-14. ISSN 2352-152X. <https://doi.org/10.1016/j.est.2021.103242>
- 2 Scientific paper.** (1/6) J. Gonzalez-Ayala (AC); D Salomone-González; A. Medina; J. M. M. Roco; P. L. Curto-Risso; A. Calvo Hernández. 2021. Multicriteria optimization of Brayton-like pumped thermal electricity storage with liquid media. *Journal of Energy Storage*. PERGAMON-ELSEVIER SCIENCE LTD. 44-103242, pp.1-15. ISSN 2352-152X. <https://doi.org/10.1016/j.est.2021.103242>
- 3 Scientific paper.** W. Peng; (2/5) J. Gonzalez-Ayala; G. Su; J. Chen; A. Calvo-Hernández. 2021. Solar-driven sodium thermal electrochemical converter coupled to a Brayton heat engine: Parametric optimization. *Renewable Energy*. Elsevier. 164-2021, pp.260-271. ISSN 0960-1481. <https://doi.org/10.1016/j.renene.2020.09.084>
- 4 Scientific paper.** W. Peng; (2/5) J. Gonzalez-Ayala; S. Su; J. Chen; A. Calvo Hernández. 2020. A two-stage sodium thermal electrochemical converter: Parametric optimization and performance enhancement. *Journal of Power Sources*. Elsevier. 480-229147, pp.1-9. ISSN 0378-7753. <https://doi.org/10.1016/j.jpowsour.2020.229147>
- 5 Scientific paper.** J. Gonzalez-Ayala; A. Medina; J. M. M. Roco; A. Calvo Hernández. 2020. Thermodynamic optimization subsumed in stability phenomena. *Scientific Reports*. Springer Nature. 10-14305. ISSN 2045-2322.
- 6 Scientific paper.** (1/5) J. Gonzalez-Ayala (AC); J. Guo; A. Medina; J. M. M. Roco; A. Calvo Hernández. 2020. Energetic self-optimization induced by stability in low-dissipation heat engines. *Physical Review Letters*. American Physical Society. 124-050603, pp.1-5. ISSN 0031-9007. <https://doi.org/10.1103/PhysRevLett.124.050603>
- 7 Scientific paper.** W. Peng; (2/5) J. Gonzalez-Ayala; J. Guo; J. Cheng; A. Calvo Hernández. 2020. An alkali metal thermoelectric converter hybridized with a Brayton heat engine: Parametric design strategies and energetic optimization. *Journal of Cleaner Production*. Elsevier. 260-120953. ISSN 0959-6526. <https://doi.org/10.1016/j.jclepro.2020.120953>

- 8 **Scientific paper.** R.P. Merchán; M.J. Santos; I. Heras; (4/6) J. Gonzalez-Ayala; A. Medina; A. Calvo Hernández. 2020. On-design pre-optimization and off-design analysis of hybrid Brayton thermosolar tower power plants for different fluids and plant configurations. Renewable and Sustainable Energy Reviews. PERGAMON-ELSEVIER SCIENCE LTD. 2019-109590, pp.1-22. ISSN 1364-0321. <https://doi.org/10.1016/j.rser.2019.109590>
- 9 **Scientific paper.** D Salomone-González; (2/6) J. Gonzalez-Ayala (AC); A. Medina; J. M. M. Roco; P. L. Curto-Risso; A. Calvo Hernández. 2020. Pumped heat energy storage with liquid media: Thermodynamic assessment by a Brayton-like model. Energy Conversion and Management. PERGAMON-ELSEVIER SCIENCE LTD. 226-113540, pp.1-14. ISSN 0196-8904. <https://doi.org/10.1016/j.enconman.2020.113540>

## C.2. Conferences and meetings

- 1 J. González-Ayala. Optimización y estabilidad como un fenómeno en conjunto. XXXIV Congreso Nacional de Termodinámica. Sociedad Mexicana de Termodinámica. 2021. Mexico. Participatory - Plenary session.
- 2 D. Pérez Gallego; Julian Gonzalez-Ayala; Alejandro Medina; Antonio Calvo-Hernández. Analysis of a Brayton Pumped Heat Energy Storage System with Internal and External Irreversibilities. 15th Joint European Thermodynamics Conference. JETC and European Center for Advanced Studies in Thermodynamics. 2021. Spain. Participatory - oral communication.
- 3 Julian Gonzalez-Ayala; Alejandro Medina; J. M. M. Roco; Antonio Calvo-Hernández. Stability under limited control in weakly dissipation cyclic heat engines. Entropy 2021. Entropy MDPI. 2021. Portugal. Participatory - oral communication. Conference.
- 4 Julian Gonzalez-Ayala; Rosa Merchan; Irene Heras; Juncheng Guo; J. M. M. Roco; Alejandro Medina; Antonio Calvo-Hernández. Thermodynamic self-improvement in the stability of a low dissipative heat engine. 15th Joint European Thermodynamics Conference. JETC and European Center for Advanced Studies in Thermodynamics. 2017. Spain. Participatory - oral communication. Conference.

## C.3. Research projects and contracts

- 1 **Project.** Inteligencia Artificial para la Transición Energética Sostenible (IA4TES). Comisión Europea. Malumbres Martínez 1. (Universidad de Salamanca). 01/01/2022-2024.
- 2 **Project.** Proyecto programa propio II contratos posdoctorales USAL conv. 2019. Universidad de Salamanca. Julián González Ayala. (University of Salamanca). 26/11/2020-04/10/2022. 60.720 €.
- 3 **Project.** Estudio de viabilidad de una planta termosolar de torre central operando con CO<sub>2</sub> supercrítico y almacenamiento térmico. (Universidad de Salamanca). 21/04/2021-30/09/2021. 4.500 €.
- 4 **Project.** PHES: Almacenamiento de energía eléctrica con bombas de calor y su impacto en la matriz energética nacional. Pedro Andrés Galione Klot. (Universidad de la República, Montevideo). 11/06/2019-11/06/2021. 58.760 €.
- 5 **Project.** Planta de concentración termosolar de disco parabólico con ciclo Brayton híbrida para generación distribuida de energía. (Universidad de Salamanca). 25/06/2019-25/06/2020. 12.000 €.
- 6 **Project.** Generación limpia y eficiente de energía eléctrica y calor a pequeña escala: parábolas termosolares híbridas. (Universidad de Salamanca). 01/01/2019-31/12/2019. 10.000 €.
- 7 **Project.** UEX Física Fundamental y Matemáticas. (Instituto de Física Fundamental y Matemáticas). 01/07/2017-31/12/2019. 59.800 €.
- 8 **Project.** Estudio de ligaduras en ciclos y proceso de baja disipación. Consejo Nacional de Ciencia y Tecnología-México. Julián González Ayala. (University of Salamanca). 01/11/2016-31/10/2017. 25.000 €.