CV date	Jun/5/2025

Part A. Personal information

First Name	Alejandro		
Family Name	Medina Domínguez		
Gender	Male	Birth (mm/dd/yyyy)	04/18/1967
ID Number	07865245G		
email address	amd385@usal.es	URL Web	https://diarium.usal.es/termodinamica/
Open Researcher and Contributor ID (ORCID) Scopus ID		0000-0001-9797-4909 7202723574	

A.1. Current position

Position	Full Professor (Catedrático de Universidad)		
From	2012		
Institution	University of Salamanca		
Department/ Faculty	Department of Applied Physics / Faculty of Sciences		
Country	Spain	Phone	+34 677565486
Keywords	Thermodynamics; Optimization; Renewable energies; Efficiency; Concentrated Solar Power; Thermal Storage		

A.2. Previous positions

Period	Position/ Institution/ Country
1991-1995	Teaching Assistant, University of Salamanca, Spain
1995-1996	Postdoctoral researcher. Penn State University, USA
1996-2011	Associate Professor, University of Salamanca, Spain

A.3. Education

PhD, Licensed, Graduate	**University/Country**	**Year**
Graduate in Physics	University of Salamanca	1990
PhD	University of Salamanca	1993

Part B. CV SUMMARY:

PhD in Physics in 1993. My research interests have evolved from quantum statistical mechanics problems (molecular spectroscopy in dense phases) towards problems related to thermodynamic optimization. The latter includes theoretical analysis and applied studies: thermodynamic cycles for renewable energy generation plants and thermal energy storage.

On the whole, this work led to about 90 international publications in JCR journals, several book chapters, the coordination of a complete book, several invited conferences, and different research stays in international centers (one year in USA). Other indicators:

H-index (Scopus) to date is 27
Scopus Documents: 117
Percent of documents co-authored with researchers in other countries/regions: 43.1%
Documents in top 25% most cited documents worldwide: 35.4% (23)
Percent of documents in the top 25% journals by CiteScore: 84.1% (37)
Total cites: 2196

I have experience in coordinating interdisciplinary (mainly physicists and engineers) and international research groups. I belong to a recognized research group (Research Group on Energy Optimization, Thermodynamics, and Statistical Physics) from University of Salamanca that maintains stable research collaborations with several international groups. I have directed

four PhD thesis on different problems related with thermodynamic optimization. All of them were awarded with the highest marks. Currently, I am supervising one PhD student.
Previously supervised PhD works:

-P.L. Curto Risso (May, 2009)
Numerical simulation and theoretical model of an irreversible Otto cycle
Qualification *cum laude (Extraordinary Doctorate Award);* Supervisor: A. Medina
-S. Sánchez Orgaz (March, 2012)
Model, analysis and thermodynamic optimization of multi-step Brayton-like power plants. Thermosolar applications
Qualification *cum laude (Extraordinary Doctorate Award);* Supervisor: A. Medina
-R.P. Merchán (November, 2020)
Thermodynamic optimisation of thermosolar hybrid Brayton cycle plants
Qualification *cum laude (Extraordinary Doctorate Award);* Supervisors: A. Medina and M.J. Santos
-J. García-Ferrero (December, 2023)
Concentrating thermosolar systems for distributed energy generation
Qualification *cum laude (Extraordinary Doctorate Award);* Supervisors: A. Medina and M.J. Santos

I have participated in about 20 research projects and coordinated several of them. Also, I have participated in R&D&i contracts with companies of the electric sector. I am reviewer for different JCR international journals such as Appl. Phys., Chem. Phys., Ener. Conv. Manage., Energies, Int. J. Ener. Res., Int. J. Green Ener., SAE Journal, etc. Presently I am Editor of the journal Entropy. I have participated in the organization of international conferences related to renewable energies. I am very involved with activities related with teaching research and dissemination, publishing papers in pedagogical journals and international conferences. Details on all these activities can be found in https://diarium.usal.es/termodinamica/

Institutional responsabilities and others:

- Vice-chair, Industrial Engineering School, University of Salamanca, 1997-2006.
- Member of the Research Advisory Council, University of Salamanca, 2013-2015.
- Maximum level in the Spanish system for research evaluation (5/5 research steps, “sexenios”)
- Member of the Working Groups on Renewable Energies and Energy Storage of Red CRUSOE (Universities and Institutions from South-West Europe)
- Representative of University of Salamanca at BatteryPlat Platform (Spanish Technological Platform for Energy Storage) and RedTES (Red Española de Almacenamiento de Energía Térmica)
- Evaluator of Energy for Future Program (E4F, Iberdrola, Horizon 2020 MSCA-Cofund)
- Main researcher of research projects at regional, national and European levels.
- Director of the Research Group on Energy Optimization, Thermodynamics and Statistical Physics, recognized as consolidated research unit by Junta de Castilla y León (UIC004).

Part C. RELEVANT MERITS

C.1. Relevant publications (selected from 2020)
Please, note that in our Research Group, it is usual that senior researchers appear back on the author list.

- D. Pérez-Gallego, J. González-Ayala, A. Medina, and A. Calvo Hernández
“*Comprehensive review of dynamical simulation models of packed-bed systems for thermal energy storage applications in renewable power production*”
Heliyon, 11, e42803 (2025).
JCR Impact Index (2023) 3.4 (Q1).
- Rodríguez, E., García-Ferrero, J., Sánchez-Aparicio, M., Iglesias, J. M., Oliver-Serra, A., Santos, M. J., Andrés-Anaya, P., Cascón, J.M., Montero García, G., Medina, y otros

"*Validation of a 3D Local-Scale Adaptive Solar Radiation Model by Using Pyranometer Measurements and a High-Resolution Digital Elevation Model*"
Sensors, *24*(6), 182 (2024)
JCR Impact Index (2023) 3.4 (Q2).
- J. García-Ferrero, R.P. Merchán, M.J. Santos, A. Medina, P. Canhoto, A. Giostri
"*Modelling a solar pressurized volumetric receiver integrated in a parabolic dish: off-design heat transfers, temperatures and efficiencies*". Ener. Conv. Manage. 293, 117436 (2023)
JCR Impact Index (2022): 10.40 (Q1). Times cited: 8 (Scopus)
- D. Salomone-González, P.L. Curto-Risso, A. Calvo Hernández, A. Medina, J.M.M. Roco and J. González-Ayala.
"*Pumped heat energy storage with liquid media: Thermodynamic assessment by a transcritical Rankine-like model*." Journal of Energy Storage 56, Part B, 105966 (December 2022): 1-14.
JCR Impact Index (2021): 8.907 (Q1). Times cited: 4 (Scopus)
- J. García-Ferrero, R.P. Merchán, M.J. Santos, A. Medina and A. Calvo. (AC: 4/5)
"*Brayton technology for Concentrated Solar Power plants: Comparative analysis of central tower plants and parabolic dish farm*", Ener. Conv. Manage., 271, 116312 (2022).
JCR Impact Index (2021): 11.533 (Q1). Times cited: 15 (Scopus)
- R.P. Merchán, M.J. Santos, A. Medina, and A. Calvo Hernández (AC: 3/4)
"*High temperature central tower plants for concentrated solar power: 2021 overview*". Renewable and Sustainable Energy Reviews, 155, 111828 (2022).
JCR Impact Index: 16.799 (Q1). Times cited: 155 (Scopus)
- J. Gonzalez-Ayala, D. Salomone-Gonzalez, A. Medina, J.M.M. Roco, P.L. Curto-Risso, and A. Calvo Hernández (AC: 3/6)
"*Multi-criteria optimization of Brayton-like pumped thermal electricity storage with liquid media*". J. Journal of Energy Storage 44, 103242 (2021).
6.583 (Q1). Times cited: 7 (Scopus)
- D. Salomone-González, J. González-Ayala, A. Medina, J.M.M. Roco, P.L. Curto-Risso, and A.C. Hernández (AC: 3/6)
"*Pumped heat energy storage with liquid media: Thermodynamic assessment by a Brayton-like model*".
Ener. Conv. Manage. (2020), *226*, 113540.
9.709 (Q1). Times cited: 7 (Scopus)
- R.P. Merchán, M.J. Santos, I. Heras, J. Gonzalez-Ayala, A. Medina, J.M.M. Roco, and A. Calvo Hernández (AC: 5/7)
"On-design pre-optimization and off-design analysis of hybrid Brayton thermosolar tower power plants for different fluids and plant configurations"
Renew. Sust. Ener. Rev. 119, 109590 (2020).
10.556 (Q1). Times cited: 20 (Scopus)
- J. Gonzalez-Ayala, J. Guo, A. Medina, J.M.M. Roco, and A. Calvo Hernández (AC: 3/5)
"Energetic Self-Optimization Induced by Stability in Low-Dissipation Heat Engines"
Phys. Rev. Lett. 124, 050603 (2020).
9.227 (Q1). Times cited: 23 (Scopus)

C.2. Relevant Conferences (summary from 2020)

-*SolarPACES Conference 2024 (SolarPACES24)* (Rome, Italy, 2024/08/10 – 2024/11/10); Oral Communication
"*Solar parabolic dishes for the production of solar synthetic fuels*"; Oral Communication
- *35th Congreso Nacional de Termodinámica* (Monterrey, México 2022/09/12 – 2022/09/5) ; Invited plenary talk
"*Termodinámica y generación sostenible de energía*"
- *SolarPACES Conference 2022 (SolarPACES22)* (Alburquerque, USA, 2022/09/27 – 2022/09/30); Oral Communication
"*Air vs sCO2 central tower plant thermodynamic comparison*"; Poster
- *35th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 20221)* (Copenhagen, Denmark 2022/07/3 – 2022/07/07); Oral Communication
"*Thermo-economic analysis of Brayton concentrated solar power systems in the context of other power generation technologies*"

- *34rd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2021)* (Taormina, Italy 2021/06/27 – 2021/07/02); Oral Communication
"*Hybrid Brayton termosolar plants at different latitudes and different power scales*"
-*SolarPACES Conference 2019 (SolarPACES19)* (Daegu, Corea del Sur, 2019/10/01 – 2019/10/04); Oral Communication
"*Techno-economic analysis of a solar hybrid combined cycle power plant integrated with a packed bed storage at gas turbine exhaust*"; Oral Communication

C.3. Research projects (summary from 2021)

- Title: *Integración de la dinámica de sistemas packed-bed en almacenamiento energético mediante sistemas de bombas a alta temperatura*
Financing agency: Ministerio de Ciencia e Innovación of Spain
Main researcher: Alejandro Medina
Dates: from 01/09/2024 to 31/08/2027
Personal contribution: Conceptualization, research, supervision
Budget: 62.500 €
- Title: *Novel hybrid CHP for flexible generation:Techno-economic and LCA assessments*
International level (European project)
Main researcher: Alejandro Medina
Financing agency: FIBE-USAL MSCA-COFUND-2020, E4f 2023/24 "Energy for Future", GRANT AGREEMENT NUMBER 101034297 — E4F
Dates: June, 2024 – June, 2026
Budget: 151.663 €
Personal contribution: supervision
- Title: *Integrated Hybrid Solar Photovoltaic Thermal Collector Combined with Reversible Heat Pump*
International level (European project)
Main researcher: Alejandro Medina
Financing agency: FIBE-USAL MSCA-COFUND-2020, E4f 2022/23 "Energy for Future", GRANT AGREEMENT NUMBER 101034297 — E4F
Dates: 01/07/2021 - 31/10/2024
Budget: 113.100 €
Personal contribution: Conceptualization and supervision

C.4. Contracts, technological or transfer merits (summary from 2021)

- Contract: *Convenio entre la Universidad de Salamanca e Ingeniería de Sistemas para la Defensa de España (ISDEFE) para la realización conjunta de actividades de I+D+i en materia de sostenibilidad y eficiencia energética en defensa*
Financing entity: ISDEFE
Main researchers: José Miguel Mateos Roco
Dates: from 28/06/2023 to 28/06/2025
Budget: 15.000 €
-Contract: *Energía termosolar eficiente y flexible: hibridación, almacenamiento térmico y bombas de calor*
Financing entity: Fundación General Universidad de Salamanca
Main researchers: Alejandro Medina and Rosa Pilar Merchán Corral
Dates: from 01/06/2021 to 31/12/2021
Budget: 4.500 €
-Contract: *Estudio de viabilidad de una planta termosolar de torre central operando con CO_2 supercrítico y almacenamiento térmico* Ref: PC_TCUE18-20P_010
Financing entity: Fundación General Universidad de Salamanca
Main researcher: Rosa Pilar Merchán Corral
Dates: from 21/04/2021 to 30/09/2021
Budget: 4.500 €