CV date	Jan/23/2023

Part A. Personal information

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 electric energy generation plants and automotive engines.
On the whole, this work led to about 85 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 24
Scopus Documents: 110
Average citations per article: 20
Total cites: 1750

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 three PhD thesis on different problems related with thermodynamic optimization. All of them were awarded with the highest marks. Currently, I am supervising three PhD students. 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

Dr. Curto-Risso is now the Head of the Institute of Mechanical Engineering and Industrial Production, University of La República, Montevideo. He is also the head of a very active research group and directed several PhD thesis. Dr. Sánchez Orgaz has now a full position at Polytechnical University of Madrid, in the Department of Energy Engineering and belongs to an active research group. Dr. Merchán is now a post-doctoral researcher at my Research Group and is expending a one year stay at University of Cagliari (April 2022-April 2023) granted by the Spanish Program Margarita Salas.

I have participated in about 16 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 Group on Sustainability of Red CRUSOE (Universities and Institutions from South-West Europe)
- Representative of Universty of Salamanca at BatteryPlat Platform (Technological Platform for Energy Storage)
- Nominee to the ENI Awards 2023 (Energy Frontiers Topic)
- Evaluator of Energy for Future Program (E4F, Iberdrola, Horizon 2020 MSCA-Cofund)
- Main researcher of research projects at regional, national and european levels.

Part C. RELEVANT MERITS

C.1. Relevant publications (selected from 2016)
Please, note that in our Research Group, it is usual that senior researchers appear back on the author. AC: position in authorship list; (nº x / nº y): position / total number of authors

1.- D. Salomone-González, P.L. Curto-Risso, A. Calvo Hernández, A. Medina, J.M.M. Roco and J. González-Ayala. (AC: 4/6)
“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. DOI: 10.1016/j.est.2022.105966. eISSN: 2352-152X
JCR Impact Index (2021): 8.907 (Q1). Times cited: 0 (Scopus)
2.- 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). DOI: 10.1016/j.enconman.2022.116312. ISSN: 0196-8904; eISSN: 1879-2227
JCR Impact Index (2021): 11.533 (Q1). Times cited: 1

3.- 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). DOI: /10.1016/j.rser.2021.111828 . JCR Impact Index: 16.799 (Q1). Times cited: 17
4.- 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). DOI: 10.1016/j.est.2021.103242
6.583 (Q1). Times cited: 4
5.- 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. DOI: /10.1016/J.ENCONMAN.2020.113540
9.709 (Q1). Times cited: 15
6.- 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). DOI: 10.1016/J.RSER.2019.109590
10.556 (Q1). Times cited: 13
7.- 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). DOI: /10.1103/PHYSREVLETT.124.050603
9.227 (Q1). Times cited: 16
8.- M.J. Santos, C. Miguel-Barbero, R.P. Merchán, A. Medina, and A. Calvo (AC: 4/5)
"Roads to improve the performance of hybrid thermosolar gas turbine power plants: Working fluids and multi-stage configurations"
Ener. Conv. Manage. 165, 578-592 (2018). DOI: /10.1016/J.ENCONMAN.2018.03.084
5.59 (Q1). Times cited: 19
9.- A. Durante, G. Pena-Vergara, P.L. Curto-Risso, A. Medina, and A. Calvo (AC: 4/5)
"Thermodynamic simulation of a multi-step externally fired gas turbine powered by biomass"
Ener. Conv. Manage. 140, 182-191 (2017). DOI: /10.1016/J.ENCONMAN.2017.02.050
5.59 (Q1). Times cited: 19
10.- M.J. Santos, R.P. Merchán, A. Medina, and A. Calvo Hernández (AC: 3/4)
"Seasonal thermodynamic prediction of the performance of a hybrid solar gas-turbine power plant"
Ener. Conv. Manage. 115, 89-102 (2016). DOI: /10.1016/J.ENCONMAN.2016.02.019
5.59 (Q1). Times cited: 53

C.2. Relevant Conferences (summary from 2019)

- *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)* (Copenhage, 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
"*Hybrid parabolic-type thermosolar gas-turbine power plants: working fluid analysis*"
-*ECOS 2019* (Wroclaw, Polonia, 2019/06/23 – 2019/06/28) ; Oral communication
"*On-design and off-design thermodynamic analysis of a hybrid multi-stage solar thermal power plant*"
Oral communication
"*Thermo-economic study of hybrid parabolic dish solar power plants in different regions of Spain*"

C.3. Research projects (from 2016)

1. Title: *Integrated Hybrid Solar Photovoltaic Thermal Collector Combined with Reversible Heat Pump*
International level (European project)
Main researcher: A. Medina
Financing agency: FIBE-USAL MSCA-COFUND-2020, E4f 2022/23 "Energy for Future", GRANT AGREEMENT NUMBER 101034297 — E4F
Dates: 01/07/2021 - 01/07/2023, 2 years
Budget: 113.100 €
Personal contribution: Conceptualization, research, supervision
2. Title: *Low-scale hybrid thermosolar plants for distributed energy generation*
Regional level
Main researchers: A. Calvo Hernández; Number of researchers: 7
Financing agency: JCyL (Spain), SA017-P17; Dates: 01/01/2017 - 31/12/2019, 3 years
Budget: 108.380 €
Personal contribution: Conceptualization, research, work package supervision, original draft writing
3. Title: *Efficient energy converters and sustainable working fluids*
National level
Main researchers: J.A. White and A. Calvo Hernández; Number of researchers: 13
Financing agency: MINECO (Spain), ENE2013-40644-R; Dates: 01/01/2014 - 31/12/2016
Budget: 56.870 €
Personal contribution: Conceptualization, research, work package coordination and supervision, original drafts writing, review and editing

C.4. Contracts, technological or transfer merits (summary from 2016)

1. Reference: PC_TCUE1517_F2_013
Title: "*Clean and efficient production of electric energy at small scale: hybrid solar parabolic Dishes"*
Main researcher: M.J. Santos ; Financing agency: Junta de Castilla y León, Fundación General Universidad de Salamanca; Period: 01/02/2019 – 01/02/2020; Budget: 10.000 €
2. Reference: PC_TCUE1517_F2_013
Title: "*Thermo-economic optimization of recuperative multi-stage hybrid thermosolar plants in Castilla y León"*
Main researcher: A. Medina; Financing agency: Junta de Castilla y León, Fundación General Universidad de Salamanca; Period: 01/04/2016 – 31/03/2017; Budget: 6.000 €
3. Reference: FPC-TERMOHIBRIDAS
Title: "*Thermo and techno-economic assessment of hybrid thermosolar plants"*
Main researcher: A. Calvo Hernández; Financing agency: Junta de Castilla y León, Fundación General Universidad de Salamanca; Period: 01/04/2016 – 31/07/2016; Budget: 9.000 €
4. Title: "*Thermodynamic and simulation study of different working conditions for the Combined Cycle Plant ACECA. Evaluation of the actions that could reduce plant technical Minimum"*
Main researcher: J.M.M. Roco; Financing agency: Art. 83 LOU. IBERDROLA; Period: 01/04/2016 – 31/12/2017; Budget: 77.000 €