CV Date	20/01/2025

Part A. PERSONAL INFORMATION

First Name	Juan José		
Family Name	Serrano Aguilera		
Sex	Male	Date of Birth	13/04/1987
ID number Social Security, Passport			
URL Web			
Email Address	jj.serragui@uma.es		
Open Researcher and Contributor ID (ORCID)	0000-0003-4341-3967		

A.1. Current position

Job Title	Associate Professor (Profesor Titular)		
Starting date	2023		
Institution	Universidad de Málaga (UMA)		
Department / Centre	Mechanical, Thermal Engineering and Fluid Mechanics / Escuela Ingenierías Industriales		
Country	Spain	Phone Number	(+34) 951953469
Keywords	Mechanical engineering		

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

Period	Job Title / Name of Employer / Country
2022 - 2023	Profesor Contratado Doctor / Universidad de Málaga
2021 - 2022	Profesor Ayudante Doctor / Universidad de Málaga
2020 - 2021	Postdoctoral Fellow / HETERSOL Project - UMA
2019 - 2020	Postdoctoral Fellow / Juan de la Cierva-Formación
2017 - 2019	Profesor Sustituto Interino / Universidad de Málaga
2017 - 2017	Profesor Sustituto Interino / Universidad de Jaén
2013 - 2017	PhD Candidate / Plataforma Solar de Almeria / Spain
2023 -	Parental leave (5 months in 2023) / Second son
2020 -	Parental leave (5 months in 2020&2021) / First son

A.3. Education

Degree/Master/PhD	University / Country	Year
Programa Oficial de Doctorado en Ingeniería Mecatrónica	Plataforma Solar de Almería-CIEMAT (Defended at the University of Málaga)	2017
Máster Oficial en Hidráulica Ambiental	Universidad de Granada / Universidad de Málaga	2012
Ingeniero Industrial	Universidad de Málaga / Spain	2011

Part B. CV SUMMARY

I was awarded with honors for being the topranked student in the Batchelor Degree (Ingeniería Téc. Industrial). When I finished my degree in Ingeniería Industrial (2011), I joined the Department of Fluid Mechanics to focus my research on Experimental Fluid Dynamics. As a resuly, two papers were published (Journal of Non-Newtonian Fluid Mechanics, 2016; Experiments in fluids, 2016) as well as several oral contributions to int. conferences. I obtained another grant for being the engineering student with the highest overall mark in 2011 in the University of Málaga (UMA). I completed a Masters in aerohydrodynamics in 2012 obtaining two prestigious PhD fellowships (FPU and FPI). I took the decision to move to Almería to perform my PhD at Plataforma Solar de Almería with the FPI fellowship (2013-2017) under the

supervision of Dr. Loreto Valenzuela (a world leading expert in Parabolic-Trough Collectors, PTCs). In this period the main goal was to develop new thermal-hydraulic modeling tools for Direct Steam Generation Systems based on PTCs. Articles related to this topic were published in Q1 journals (Applied Energy, 2014; Energy, 2017). I was also a visiting scholar in the US at the Nuclear Engineering Department of the University of Michigan (Ann Arbor) during 4 months (2016), where I started to implement a new code for the solar industry from previous codes developed by the Nuclear Industry to model two-phase flow. During the course of this thesis, I proposed an innovative method to create modified geometries of parabolic reflectors called Inverse Monte-Carlo Ray Tracing method. As a result of this work, two additional articles were published in the Solar Energy Journal (Q1). This method has shown excellent prospects for both concentrated solar thermal and photovoltaic systems. I took part in two Spanish National projects (GediVa and DETECSOL) and one European Project (STAGE-STE) as well as participated/attended several international Conferences on Solar Energy (e.g. SolarPaces2014 in Beijing) and Fluid Mechanics. All this research lead to my PhD degree with highest honors and distinction (Sobresaliente Cum Laude y premio extraordinario de doctorado) with the International Distinction (Mención Internacional). I was the first person in obtaining the Industrial Distinction (Mención Industrial) at UMA. Right after finishing my PhD (since September 2017), I started working for the University of Jaén, and the University of Málaga as full-time lecturer (Profesor Sustituto Interino).

I gained the Juan de la Cierva Postdoc Position in 2019. In that time, I started my research on buoyancy-driven flows (one paper published, International Journal of Heat and Mass Transfer (Q1), 2021), and I kept working on the Optical Modeling of Solar Concentrating Systems (Renewable Energy, Q1, 2021). In that time, I also carried out a second stay in the University of Michigan (an additional publication in the International Journal of Multiphase flow, 2021 in cooperation with my host researcher in Michigan, Dr Annalisa Manera) and gained my first Research Project (HERTERSOL, 75000€) as PI, funded by Junta de Andalucía and UMA. In that project a new concept of HorseShoe receiver has been developed for linear focusing solar Collectors, getting two national patents and an additional publication at Applied Thermal Engineering (Q1, 2022). Conversations took place with company Rioglass to adapt this receiver to his Sun2Heat Fresnel Collector.

Due to all the expertise acquired in modeling techniques for solar thermal systems a new paper has been recently published in Journal of Energy Storage (2024,Q1) where the decarbonization of industrial processes at high temperature has been dealt. It has been the result a collaboration with members of Universidad de Córdoba and the private sector. I am currently codirecting one PhD Thesis in (Funded by CIEMAT). It deals with fast computing modeling methods for linear focusing collectors and one article has been published so far at the journal Heliyon(Q1, 2023).

Since the beginning of my thesis, I have acquired experience in the field of concentrated solar systems (linear focus). I would like to emphasize as my stronger skills my expertise in programming in-house codes for Heat Transfer. I also excel at two-phase flow modeling with both in-house codes and Commercial Nuclear Reactor Safety Analysis software (RELAP5). I have published a total of 14 JCR papers, more than 18 conference contributions and three patents have been obtained. According to Google Scholar 351 cites and a 9 h-index are reported.

Part C. RELEVANT ACCOMPLISHMENTS

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

AC: corresponding author. (nº x / nº y): position / total authors. If applicable, indicate the number of citations

1 **Scientific paper**. Julio Diaz; (2/4) J.J. Serrano-Aguilera; Victor Petrov; Annalisa Manera. 2021. Development of a More Accurate Dynamic Bias Error Model for Two-Phase Flow Measurements Performed with Radiation Transmission. International Journal of Multiphase Flow. Elsevier. 146, pp.103881. ISSN 0301-9322. https://doi.org/10.1016/j.ijmultiphaseflow.2021.103881

2 **Scientific paper**. J. Serrano-Arrabal; (2/3) J.J. Serrano Aguilera (AC); A. Sánchez-González. 2021. Dual-tower CSP plants: optical assessment and optimization with a novel cone-tracing model. Renewable Energy. Elsevier. 178-1, pp.429-442. ISSN 0960-1481. https://doi.org/10.1016/j.renene.2021.06.040

3 **Scientific paper**. (1/3) J.J. Serrano Aguilera (AC); Francisco J. Blanco-Rodríguez; L. Parras. 2021. Global stability analysis of the natural convection between two horizontal concentric cylinders. International Journal of Heat and Mass Transfer. Elsevier. 172, pp.121151. https://doi.org/10.1016/j.ijheatmasstransfer.2021.121151

4 **Scientific paper**. (1/3) J.J. Serrano-Aguilera (AC); L. Valenzuela; L. Parras. 2017. Thermal hydraulic RELAP5 model for a solar direct steam generation system based on parabolic trough collectors operating in once-through mode. Energy. Elsevier. 133, pp.796-807. ISSN 0360-5442. https://doi.org/10.1016/j.energy.2017.05.156

5 **Scientific paper**. (1/3) J.J. Serrano-Aguilera (AC); L. Valenzuela; J. Fernández-Reche. 2015. Inverse Monte Carlo Ray-Tracing method (IMCRT) applied to line-focus reflectors. Solar Energy. Elsevier. 124, pp.184-197. https://doi.org/10.1016/j.solener.2015.11.036

6 **Scientific paper**. (1/3) J.J. Serrano-Aguilera (AC); L. Valenzuela; L. Parras. 2014. Thermal 3D model for Direct Solar Steam Generation under superheated conditions. Applied Energy. Elsevier. 132-1, pp.370-382. https://doi.org/10.1016/j.apenergy.2014.07.035

7 **Scientific paper**. A. Martín-Alcántara; J.J. Serrano-Aguilera; A. Sánchez Sánchez de Puerta; J.L. Aranda-Hidalgo. 2024. Decarbonizing an industrial process through a combined, high-temperature CSP and sensible heat storage. Journal of Energy Storage. Elsevier. 97-A, pp.112727. https://doi.org/10.1016/j.est.2024.112727

8 **Scientific paper**. Sergio Alcalde-Morales; Loreto Valenzuela; J.J. Serrano-Aguilera. 2023. Heat losses in a trapezoidal cavity receiver of a linear Fresnel collector: A CFD approach. Heliyon. CellPress. 9-8, pp.e18692. https://doi.org/10.1016/j.heliyon.2023.e18692

9 **Scientific paper**. A. Martín-Alcántara; J.J. Serrano-Aguilera; L. Parras. 2022. Modeling the external flow of a novel HorseShoe receiver and the evaluation of thermal performance. Applied Thermal Engineering. Elsevier. 215, pp.118949. https://doi.org/10.1016/j.applthermaleng.2022.118949

10 **Scientific paper**. Diego Pulido-Iparraguirre; Loreto Valenzuela; J.J. Serrano-Aguilera; A. Fernández-García. 2018. Optimized design of a Linear Fresnel reflector for solar process heat applications. Renewable Energy. Elsevier. 131, pp.1089-1106. https://doi.org/10.1016/j.renene.2018.08.018

C.2. Conferences and meetings

1 Julián Serrano-Arrabal; J.J. Serrano-Aguilera; Alberto Sánchez-González. Influence of tower height on the optical efficiency of Dual-Tower plants. SolarPaces 2021. Conexio-PSE GmbH. 2021. Conference.

2 Sergio Alcalde-Morales; Loreto Valenzuela; J.J. Serrano-Aguilera. Numerical Investigation of a Trapezoidal Cavity Multi-tube Receiver for a Linear Fresnel Collector. SolarPaces 2021. Conexio-PSE GmbH. 2021. Conference.

3 Lucía Medina; J.J. Serrano-Aguilera; Francisco J. Blanco-Rodríguez; L. Parras. Numerical Simulation of the Buoyancy Flow between two Concentric Cylinders with Azimuthal Variable Heating. Heat Transfer Fluid Mechanics and Thermodynamics (ATE-HEFAT 2021). University of Pretoria. 2021. South African Republic. Conference.

4 J.J. Serrano-Aguilera; Francisco J. Blanco-Rodriguez; Luis Parras. Global stability map of the flow in a horizontal concentric cylinder forced by natural convection. 73rd Annual Meeting of the APS Division of Fluid Dynamics. American Physical Society. 2020. United States of America. Conference.

5 Diego Pulido Iparraguirre; Juan J. Serrano-Aguilera; Loreto Valenzuela. Optimizing design of a Linear Fresnel Reflector for process heat supply. EuroSun 2016. International Solar Energy Society. 2016. Spain. Participatory - oral communication. Conference.

6 J.J. Serrano-Aguilera; J.H. Hermenegildo García-Ortíz; A. Gallardo-Claros; L. Parras; C. del Pino. Experimental characterization of wingtip vortices using smoke flow visualizations. Workshop on Fluid Mechanics. Universidad de Cádiz. 2016. Spain. Participatory - oral communication. Workshop.

7 J.J. Serrano-Aguilera; L. Valenzuela. Transient validation of RELAP5 model with the DISS facility in Once Through operation mode. SolarPaces 2015. PSE AG. 2015. South African Republic. Participatory - oral communication. Conference.

8 Adrián Domínguez-Vázquez; J. Hermenegildo García-Ortíz; Juan José Serrano- Aguilera; Luis Parras; C. del Pino. Influence of Reynolds number on Theoretical Models for Trailing Vortices. Bifurcations and Instabilities in Fluids Dynamics. ESPI Paris Tech. 2015. France. Participatory - oral communication. Conference.

9 J.J. Serrano-Aguilera; L. Valenzuela; J. Fernández-Reche. Inverse MCRT Method for obtaining Solar Concentrators with Quasi-planar Flux Distribution. SolarPaces 2014. PSE AG. 2014. China. Participatory - oral communication. Conference.

10 J.J. Serrano; L. Parras; C. del Pino; F.J. Rubio-Hernández. Particle Image Velocimetry in a wide-gap Couette Rheometer: Study on a Shear-Thickening Fluid. The XVI International Congress on Rheology. The International Committee on Rheology (ICR). 2012. Portugal. Participatory - oral communication. Conference.

C.3. Research projects and contracts

1 **Project**. Numerical and experimental study of wingtip vortices of straight and deformed wings and their active control (ENEVEARD) - PID2021-124692OA-I00. Paloma Gutiérrez Castillo. (Universidad de Málaga). 01/09/2022-31/08/2025. 197.472 €.

2 **Project**. Desarrollo de un nuevo receptor en forma de Herradura para sistemas Termosolares: un diseño más barato y robusto (HERTERSOL) - (UMA18-FEDERJA-195). Serrano Aguilera 1. (Universidad de Málaga). 15/11/2019-15/04/2021. 75.000 €.

3 **Project**. Scientific and Technological Alliance for Guaranteeing the European Excellence in Concentrating Solar Thermal Energy (FP7-Energy); (European Project). FP7. Julián Blanco Gálvez. (Plataforma Solar de Almería). 01/02/2014-31/01/2018. 21.198.352 €. Team member. The applicant took part in the Work Package 11 (WP11 – Task 1.3): Linear Focusing STE Technologies. 41 Europeans Partners.

4 **Project**. ENE2014-56079-R, (DETECSOL) New developments to raise efficiency of Concentrating Solar Thermal technologies (Nuevos Desarrollos para una Tecnología Termosolar más Eficiente). RETOS (call 2014). Eduardo Zarza Moya. (Plataforma Solar de Almería). 01/01/2015-31/12/2017. 363.000 €. Team member.

5 **Project**. ENE2011-24777, Thermo-Hydraulic studies of Concentrated Solar system with Parabolic Troughs Collectors for Direct Steam Generation (Estudios Termo-Hidráulicos de Sistemas con Captadores Solares Cilindroparabólicos para la Generación Directa de Vapor). Proyectos de Investigación Fundamental no Orientada. Loreto Valenzuela Gutiérrez. (Plataforma Solar de Almería). 01/01/2012-31/12/2014. 41.140 €.

6 **Contract**. Realización de un trabajo consistente en el modelado térmico de una Estación de Depuración de Aguas Residuales Serrano Aguilera 1. (Universidad de Granada (Contract holder)). 22/07/2021-22/09/2021. 3.566,25 €.

C.4. Activities of technology / knowledge transfer and results exploitation

1 **Patent of invention**. Juan José Serrano Aguilera; Loreto Valenzuela Gutiérrez; Aránzazu Fernández García; Diego Pulido Iparraguirre. ES 2 782 149 A2. Captador Solar Lineal Fresnel Adaptable Spain. 16/03/2022. Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas.

2 **Patent of invention**. Juan José Serrano Aguilera; Luis Parras Anguita. ES 2 844 976 B2. Receptor de doble cavidad para colectores solares de foco lineal Spain. 09/12/2021. Universidad de Málaga.

3 **Patent of invention**. Juan José Serrano Aguilera; Luis Parras Anguita. ES 2 844 999 B2. Colector solar de foco lineal con receptor abierto en forma de herradura Spain. 22/01/2020. Universidad de Málaga.