



CURRICULUM VITAE (CVA)

IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

Part A. PERSONAL INFORMATION

CV date	23/01/2024
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First name	Francisco		
Family name	Castro Ruiz		
e-mail	Francisco.castro@uva.es	URL Web	
Open Researcher and Contributor ID (ORCID) (*)	0000-0002-7038-7517		

(*) Mandatory

A.1. Current position

Position	Catedrático de Universidad		
Initial date	1/02/1997		
Institution	Universidad de Valladolid		
Department/Center	Ingeniería Energética y Fluidomecánica	Escuela de ingenierías industriales	
Country	Spain	Teleph. number	983 423 365
Key words	Biomedical engineering, Ventilation, Turbomachinery		

A.2. Previous positions (research activity interruptions, art. 14.2.b))

Period	Position/Institution/Country/Interruption cause
1984-1987	Profesor ayudante/UPM/ Spain
1987-1989	Profesor Titular/UPM/ Spain
1990-1996	Profesor Titular/Universidad Valladolid/ Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Ingeniero Industrial	ETSII Universidad Politécnica de Madrid/ Spain	1983
Dr. Ingeniero Industrial	ETSII Universidad Politécnica de Madrid/ Spain	1987

Part B. CV SUMMARY (max. 5000 characters, including spaces)

- Total citations (Scopus): 1844
- 64 in JCR , 44 in Q1
- h-index: 25 (Scopus)
- 6 PhD Thesis supervised in the last 10 years,
- Six research sexenniaa

During my scientific career I have worked in the field of incompressible flow, both in experimental (PDA and PIV) and numerical CFD. I have worked mainly in the field of atomization (diesel sprays), ventilation, turbomachinery and cardiovascular flows. In the field of atomization, we developed an experimental methodology to study diesel jets by imaging. In the field of ventilation, I have worked experimentally and numerically in the ventilation of singular enclosures (mines, operating rooms, ...). In the field of turbomachines, a turbine has been designed for OWC plants that extract energy from waves. Finally, since 2005 I have been working on in vitro and in silico simulation of biological flows, in particular respiratory flow, and cardiovascular flows, such as flow in the nasal cavity, in bifurcations of coronary arteries, and in the atrium.



Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications

AUTHORS J. Anatol, M. García-Díaz, C. Barrios-Collado, J. A. Moneo-Fernández, Manuel Rubio, F. Castro-Ruiz, J. Sierra-Pallares

TÍTULO An assessment of the suitability of a Liebau pump in biomedical applications.

JOURNAL: Physics of Fluids Vol. 36, Article number 011908

Editorial: AIP Publishing

Year: 2024

AUTHORS J. Anatol, M. García-Díaz, C. Barrios-Collado, J. A. Moneo-Fernández, F. Castro-Ruiz, J. Sierra-Pallares

TÍTULO Experimental characterization of an asymmetric valveless pump based on soft robotics technology.

JOURNAL: Physics of Fluids Vol. 35, Article number 061904

Editorial: AIP Publishing

Year: 2023

AUTHORS J. Anatol, M. García-Díaz, C. Barrios-Collado, J. A. Moneo-Fernández, M. Horvath, T. Parra, F. Castro-Ruiz, E. T. Roche, J. Sierra-Pallares

TÍTULO Experimental study of an asymmetric valveless pump to elucidate insights into strategies for pediatric extravascular flow augmentation

JOURNAL: Scientific Reports Vol. 12, Article number: 22165

Editorial: Springer Nature

Year: 2022

AUTHORS Dueñas-Pamplona J, García J., Castro F., Muñoz-Paniagua J., Javier Goicolea, Sierra Pallares J.

TÍTULO Morphing the left atrium geometry: A deeper insight into blood stasis within the left atrial appendage

JOURNAL: Applied Mathematical Modelling Vol. 108, pp 27-45

Editorial: Elsevier

Year: 2022

AUTHORS Dueñas-Pamplona J, García J., Castro F., Muñoz-Paniagua J., Sierra Pallares J.

TÍTULO Estimation of degradation velocity of biocompatible damaged stents due to blood flow

JOURNAL: IEEE Transactions on Biomedical Engineering Vol. 68, Nº 12 pp 3525-2531

Editorial: IEEE

Year: 2021

AUTHORS Dueñas-Pamplona J., Sierra Pallares J., García J., Castro F., Muñoz-Paniagua J.

TÍTULO Boundary-Condition Analysis of an Idealized Left Atrium Model

JOURNAL: Annals of Biomedical Engineering Vol. 49, Nº 6, pp 1507-1520

Editorial: Biomedical Engineering Society

Year: 2021

AUTHORS Sierra Pallares J, García del Valle, Muñoz Paniagua, J, García García J, Méndez Bueno C, Castro Ruiz, F.

TÍTULO Shape optimization of a long-tapered R134a ejector mixing chamber

JOURNAL: Energy, Vol 165 pp422-438

Editorial: Elsevier

Year: 2018

AUTHORS Sierra Pallares J, Méndez C., García Carrascal P, Castro F

TÍTULO Spatial distribution of mean age and higher moments of unsteady and reactive tracers: Reconstruction of residence time distributions

JOURNAL: Applied Mathematical Modelling, Volume 46, pp 312-327

Editorial: Elsevier

Year: 2017

AUTHORS Garcia Garcia J, García Carrascal P, Castro Ruiz, F., Manuel Martin F, Fernández J.A.

TÍTULO Effects of bifurcation-specific and conventional stents on coronary bifurcation flow. An experimental and numerical study.

JOURNAL: Journal of Biomechanics, Vol. 54 pp 64-72

Editorial: Elsevier

Year: 2017

AUTHORS García Carrascal P., Garcia Garcia J., Sierra Pallares J, Castro Ruiz, F., Manuel Martin F.

TÍTULO Numerical study of blood clots influence on the flow pattern and platelet activation on a stented bifurcation model.

JOURNAL: Annals of Biomedical Engineering, Vol. 45, No. 5 pp1279- 1291

Editorial: Biomedical Engineering Society Springer

Year: 2017

AUTHORS : J. M. Villafruela, J. San José, F. Castro, A. Zarzuelo

TÍTULO: Airflow patterns through a sliding door during opening and foot traffic in operating rooms.



JOURNAL: Buildings and Environment Vol. 109 pp 190-198

Editorial: Elsevier

Year: 2016

AUTHORS García del Valle, J, Sierra Pallares J., García Carrascal, P., Castro Ruiz, F.

TITLE: An experimental and computational study of the flow pattern in a refrigerant ejector.

Validation of turbulence models and real-gas effects

JOURNAL: Applied Thermal Engineering Vol. 89, pp 795-811

Editorial: Elsevier

Year: 2015

C.2. Congress

Authors: Manuel García-Díaz , Francisco Castro-Ruiz, José Ángel Moneo-Fernández, César Barrios-Collado, Joaquín Anatol, Markus Horvath, Ellen T. Roche and José Sierra-Pallares

Title: An impedance pump for assisting failing fontan circulation

Congress: 27th Congress of the European Society of Biomechanics

Participation: Poster. City: Oporto, Portugal

Date: 26 al 29 de July 2022

Authors: Manuel García-Díaz , Francisco Castro-Ruiz, José Ángel Moneo-Fernández, César Barrios-Collado, Joaquín Anatol, Markus Horvath, Ellen T. Roche and José Sierra-Pallares,

Title: An impedance pump for assisting failing fontan circulation

Congress: 1st Spanish Fluid Mechanics Conference

Participation: Oral presentation City: Cádiz, España

Date: 19 al 22 de June 2022

Authors: J. Dueñas-Pamplona, J Garcia Garcia J. Sierra Pallares, J. Muñoz, F. Castro Ruiz

Title: Hacia un modelo predictivo del riesgo de trombosis en condiciones de fibrilación auricular.

Congress: X Reunión del Capítulo Español de la Sociedad Europea de Biomecánica (ESB)

Participation: Oral presentation City: Granada España

Date: 25 al 26 de October 2021

Authors: J. Dueñas-Pamplona, J Garcia Garcia J. Sierra Pallares, C. Mendez, J. Muñoz, Javier Goicolea, F. Castro Ruiz

Title: Computational framework to perform parametric CFD studies from a patient-specific left atrium.

Congress: XVIII Congress of the International Society of Biomechanics

Participation: Oral presentation City: Estocolmo Suecia

Date: 25 al 29 de July 2021

Authors: J. Dueñas-Pamplona, J Garcia Garcia J. Sierra Pallares, C. Mendez, J. Muñoz, Javier Goicolea, F. Castro Ruiz

Title: Lumped models and computational fluid dynamics to study hemodynamics within the left atrial appendage.

Congress: 26th Congress of the European Society of Biomechanics

Participation: Oral presentation City: Milan, Italia

Date: 11 al 14 de July 2021

Authors: J. Dueñas-Pamplona, J. Sierra Pallares, J Garcia Garcia, F. Castro Ruiz J. Muñoz Paniagua

Title: Exploring age probability distribution indices to predict thrombosis in atrial _brillation conditions.

Congress: 6th ECCOMAS Young Investigators Conference

Participation: Oral presentation City: Valencia, España

Date: 7 al 9 de July 2021

Authors: A. Pozo Alvarez, J Garcia Garcia, J. Muñoz Paniagua, F. Castro Ruiz, J. Sierra Pallares

Title: Computational fluid dynamics study of a left atrial appendage model.

Congress: 25th Congress of the European Society of Biomechanics

Participation: Oral presentation City: Viena, Austria

Date: 7-10 de July 2019

Authors: J. Sierra Pallares, J. Muñoz Paniagua, A. Pozo Alvarez, J Garcia Garcia, F. Castro

Title: Estimation of degradation velocity of biocompatible stents due to blood flow.

Congress: 25th Congress of the European Society of Biomechanics

Participation: Oral presentation

City: Viena, Austria

Date: 7-10 de July 2019

C.3. Research projects

Title: "Simulación de resonancia para una transición digital en la formación y el entrenamiento de técnicos en imagen y radiólogos (TDSim)"

Funding Entity: Ministerio de Ciencia e innovación TED2021-130090B-I00



Institutions: Universidad de Valladolid
Dates: January 2023 December 2024
Researcher in charge: Carlos Alberola Lopez
Number of researchers involved: 19
Amount: 205.275€

Title: "Modelado y simulación de dispositivos de asistencia intracorpóreos para niños univentriculares que hayan sido intervenidos mediante la cirugía de Fontan"

Funding Entity: Junta de Castilla y León VA182P20
Institutions: Universidad de Valladolid
Dates: January 2021 December 2023
Researcher in charge: José Benito Sierra Pallares
Number of researchers involved: 9
Amount: 172.000 €

Title: "Estudio fluidodinámico de la formación de trombos en la orejuela izquierda"

Funding Entity: Junta de Castilla y León
Institutions: Universidad de Valladolid
Dates: June 2018 September 2020
Researcher in charge: José Benito Sierra Pallares
Number of researchers involved: 6

Amount: 12.000 €

Title: "Flujo en arterias: modelos personalizados, fenómenos de difusión con stent biodegradable y zonas de acumulación de trombos"

Funding Entity: Ministerio de Economía, Industria y Competitividad DPI2017-83911-R
Institutions: Universidad de Valladolid, Universidad Politécnica de Madrid
Dates: January 2018 December 2021
Researcher in charge: Javier García García y José Benito Sierra Pallares
Number of researchers involved: 6
Amount: 60.500 €

Title: "Influencia del sistema de ventilación en la dispersión aérea de bioaerosoles exhalados por personas. Evaluación del riesgo de infección cruzada"

Funding Entity: Ministerio de Ciencia e Innovación DPI2014-55357-C2-1-R
Institutions: Universidad de Valladolid, Universidad de Córdoba
Dates: January 2015 December 2017
Researcher in charge: J.M. Villafruela
Number of researchers involved: 4
Amount: 37.994 €

Title: "Mixing features of swirling flows in combustors"

Funding Entity: Access to the supercomputers of the Spanish Supercomputing Network (RES - Red Española de Supercomputación). Ref.FI-2013-1-0001
Institutions: Universidad de Valladolid, BSC-CNS Barcelona Supercomputing Center, Universidad de Valencia
Dates: March 13 June 14
Researcher in charge: T. Parra
Number of researchers involved: 4
Amount: 22.860 €

Title: "Caracterización aerodinámica de flujos rotantes en quemadores"

Funding Entity: Ministerio de Ciencia e Innovación. ENE2011-25468
Institutions: Universidad de Valladolid
Dates: January 12 December 14
Researcher in charge: T. Parra
Number of researchers involved: 4
Amount: 30.000 €

C.4. Contracts, technological or transfer merits

Head of grupo de investigación de Excelencia de Castilla y León "Ingeniería de Fluidos"
Date: desde November 2007 a 2021.



Title: "Estudio 4d flow-evar: nueva tecnologia diagnostica de la endofugas tras reparacion endovascular del aneurisma de aorta abdominal mediante resonancia magnetica mejorada (4dflow) y velocimetria de imagenes de particulas." Gerencia Regional de Salud. GRS 2562/A/22.