

Date of the CVA	24/10/2019
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Section A. PERSONAL DATA

Name and Surname	José María Montanero Fernández		
DNI	33978341G	Age	50
Researcher's identification number	Researcher ID	Z-5522-2019	
	Scopus Author ID	7003863116	
	ORCID	0000-0002-3906-5931	

A.1. Current professional situation

Institution	Universidad de Extremadura		
Dpt. / Centre	Ingeniería Mecánica, Energética y de los Materiales / Escuela de Ingenierías Industriales		
Address	Escuela de Ingenierías Industriales, Avda de Elvas s/n, 06006, Badajoz		
Phone	(+34) 924289600 - 86740	Email	jmm@unex.es
Professional category	Catedrático de Universidad	Start date	2009
UNESCO spec. code	220404 - Fluid mechanics		
Keywords	Mechanical aeronautics and naval engineering		

A.2. Academic education (Degrees, institutions, dates)

Bachelor/Master/PhD	University	Year
Doctor en Ciencias (Sección Físicas)	Departamento de Física UEx	1996
Grado en Ciencias Físicas	Facultad de Ciencias UEx	1994
Licenciado en Ciencias Físicas	Facultad de Ciencias UEx	1992

A.3. General quality indicators of scientific production

Sexenios de investigación: 4. Fecha del último concedido: 01/01/2017

Tesis doctorales dirigidas en los últimos 10 años (Doctoral Theses supervised in the last 10 years): 7

Citas totales (Sum of times cited): 2120 (Web of Science)

Promedio de citas al año durante los últimos 5 años, sin incluir el año actual (Average of citations per year over the last 5 years, without including the current year): 152 (Web of Science)

Total de publicaciones (Sum of publications): 132 (Web of Science)

Publicaciones totales en primer cuartil, Q1 (Number of publications in the first quartile, Q1): 80 (Web of Science)

Índice h (h-index): 25 (Web of Science)

Section B. SUMMARY OF THE CURRICULUM

I conducted my Doctoral Thesis in the field of kinetic theory of gases and granular media in the area of theoretical physics, and worked in that field until around 2005. During that period, I developed a Monte Carlo simulation method to simulate the flow of dense gases arbitrarily far from equilibrium, and collaborated in the extension of kinetic theory of gases to granular media. Looking for fields with more technological relevance, I became interested in problems of fluid dynamics dominated by surface tension, analyzing theoretically and experimentally capillary systems like liquid bridges, jets, drops, bubbles, emulsions, etc., both on the millimeter and micrometer scales. My early works about liquid bridges fell within the framework of microgravity, which motivated my stay at the Microgravity Research Center of Brussels University in 2007. Over the last 10 years, I have mainly focused on industrial and biotechnological applications related with microfluidics. More recently, we have initiated a research focusing on the simulation of fluid dynamics problems of biomedical interest. Because

I was the first PhD in the area of fluid mechanics at the University of Extremadura, I had the opportunity to form a young research group with international projection, which probably constitutes my greatest satisfaction as researcher. The continuous funding obtained from the Research National Program has allowed us to equip a laboratory specialized in microfluidics. The projects granted by the Junta de Extremadura have recently enabled the opening of a promising line of research in Bioengineering. Also, our group frequently conducts both numerical and experimental studies for companies and enterprises which have to deal with problems related to fluid dynamics.

Section C. MOST RELEVANT MERITS (ordered by typology)

C.1. Publications

- 1 **Scientific paper.** Luis Miguel Carrión; Miguel Ángel Herrada; José María Montanero. 2020. Influence of the dynamical free surface deformation on the stability of thermal convection in high-Prandtl-number liquid bridges *International Journal of Heat and Mass Transfer*. 146, pp.118831:1-118831:10.
- 2 **Scientific paper.** M. Rubio; et al. 2019. Complex behavior very close to the pinching of a liquid free surface *Physical Review Fluids*. 4, pp.021602:1-021602:8.
- 3 **Scientific paper.** A. Ponce-Torres; et al. 2019. Gaseous flow focusing for spinning micro and nanofibers *Polymers*. 178, pp.121623:1-121623:8.
- 4 **Scientific paper.** J. M. Montanero; A. Ponce-Torres. 2019. Review on the dynamics of isothermal liquid bridges *Applied Mechanics Reviews*. in press.
- 5 **Scientific paper.** A. Ponce-Torres; et al. 2018. On the validity of the Jeffreys model to describe the oscillations of a viscoelastic pendant drop *Journal of Non-Newtonian Fluid Mechanics*. 260, pp.69-75.
- 6 **Scientific paper.** A. M. Gañán-Calvo; et al. 2018. Review on the physics electrospray: from electrokinetics to the operating conditions of single and coaxial Taylor cone-jets, and AC electrospray *Journal of Aerosol Science*. 155, pp.32-56.
- 7 **Scientific paper.** M. Haynes; et al. 2018. Stabilization of axisymmetric liquid bridges through vibration-induced pressure fields *Journal of Colloids and Interface Science*. 513, pp.409-417.
- 8 **Scientific paper.** A. Ponce-Torres; et al. 2018. The steady cone-jet mode of electrospraying close to the minimum volume stability limit *Journal of Fluid Mechanics*. 857, pp.142-172.
- 9 **Scientific paper.** F. Cruz-Mazo; et al. 2017. Global stability of axisymmetric flow focusing *Journal of Fluid Mechanics*. 832, pp.329-344.
- 10 **Scientific paper.** A. Ponce-Torres; et al. 2017. Influence of the surface viscosity on the breakup of a surfactant-laden drop *Physical Review Letters*. 118, pp.024501:1-024501:5.
- 11 **Scientific paper.** L. M. Carrión; et al. 2017. Mean flow produced by small-amplitude vibrations of a liquid bridge with its free surface covered with an insoluble surfactant *Physical Review E*. 96, pp.033101:1-033101:12.
- 12 **Scientific paper.** P. C. Sousa; et al. 2017. Measurement of relaxation times in extensional flow of weakly viscoelastic polymer solutions *Rheological Acta*. 56, pp.11-20.
- 13 **Scientific paper.** A. Ponce-Torres; et al. 2017. Smooth printing of viscoelastic microfilms with a flow focusing ejector *Journal of Non-Newtonian Fluid Mechanics*. 249, pp.1-7.
- 14 **Scientific paper.** Noelia Rebollo-Muñoz; et al. 2016. A hybrid flow focusing nozzle design to produce micron and sub-micron capillary jets *International Journal of Mass Spectrometry*. 403, pp.32-38.
- 15 **Scientific paper.** M. A. Herrada; J. M. Montanero. 2016. A numerical method to study the dynamics of capillary fluid systems *Journal of Computational Physics*. 306, pp.137-147.
- 16 **Scientific paper.** Conrado Ferrera; Miguel Angel Herrada; José María Montanero. 2016. Analysis of a singular liquid bridge oscillation on board of the International Space Station *European Journal of Mechanics B/Fluids*. 57, pp.15-21.
- 17 **Scientific paper.** Alberto Ponce-Torres; Emilio José Vega; José María Montanero. 2016. Effects of surface-active impurities on the liquid bridge dynamics *Experiments in Fluids*. 57, pp.67:1-67:12.
- 18 **Scientific paper.** A. Ponce-Torres; et al. 2016. Linear and nonlinear dynamics of a insoluble surfactant-laden liquid bridge *Physics of Fluids*. 28, pp.112103:1-112103:20.

- 19 **Scientific paper.** F. Cruz-Mazo; J. M. Montanero; A. M. Gañán-Calvo. 2016. Monosized dripping mode of axisymmetric flow focusing *Physical Review E*. 94, pp.053122:1-053122:5.
- 20 **Scientific paper.** A. M. Gañán-Calvo; et al. 2016. The onset of electrospray: the universal scaling laws of the first ejection *Scientific Reports*. 6, pp.32357:1-32357:9.
- 21 **Scientific paper.** A. Ponce-Torres; et al. 2016. The production of viscoelastic capillary jets with gaseous flow focusing *Journal of Non-Newtonian Fluid Mechanics*. 229, pp.8-15.
- 22 **Scientific paper.** A. S. Mohamed; et al. 2015. Convective/absolute instability transition in a viscoelastic capillary jet subject to unrelaxed axial elastic tension *Physical Review E*. 92, pp.023006:1-023006:6.
- 23 **Scientific paper.** M. A. Herrada; et al. 2015. Stability of a rivulet flowing in a microchannel *International Journal of Multiphase Flow*. 69, pp.1-7.
- 24 **Scientific paper.** E. J. Vega; et al. 2014. A novel technique to produce metallic microdrops for additive manufacturing *International Journal of Advanced Manufacturing Technology*. <http://dx.doi.org/10.1007/s00170-013-5357-3>. 70, pp.1395-1402.
- 25 **Scientific paper.** E. J. Vega; et al. 2014. An experimental technique to produce micrometer waves on a cylindrical sub-millimeter free surface *Measurement Science and Technology*. 25, pp.075303:1-075303:7.
- 26 **Scientific paper.** C. Ferrera; et al. 2014. Dynamical response of liquid bridges to a step change in the mass force magnitude *Physics of Fluids*. 26, pp.012108:1-012108:11.
- 27 **Scientific paper.** M. A. Herrada; E. J. Vega; J. M. Montanero. 2014. Dynamics of an axisymmetric liquid bridge close to the minimum-volume stability limit *Physical Review E*. 90, pp.013015:1-013015:8.
- 28 **Scientific paper.** A. M. Gañán-Calvo; M. A. Herrada; J. M. Montanero. 2014. How does a shear boundary layer affect the stability of a capillary jet? *Physics of Fluids (Letters)*. 26, pp.061701:1-061701:7.
- 29 **Scientific paper.** E. J. Vega; et al. 2014. Production of microbubbles from axisymmetric flow focusing in the jetting regime for moderate Reynolds numbers *Physical Review E*. 89, pp.063012:1-063012:18.
- 30 **Scientific paper.** A. J. Acero; et al. 2013. A new flow focusing technique to produce very thin jets *Journal of Micromechanics and Microengineering*. 23, pp.065009:1-065009:10.
- 31 **Scientific paper.** Vega, E.J.; et al. 2013. A novel technique for producing metallic microjets and microdrops *Microfluidics and Nanofluidics*. Springer-Verlag. pp.1-11. ISSN 1613-4982.
- 32 **Scientific paper.** A. M. Gañán-Calvo; et al. 2013. Building functional materials for health care and pharmacy from microfluidic principles *Advanced Drug Delivery Reviews*. 65, pp.1447-1469.
- 33 **Scientific paper.** C Ferrera; et al. 2013. Dynamic behavior of electrified pendant drops *Physics of Fluids*. 25, pp.012104:1-012104:16.
- 34 **Scientific paper.** A. J. Acero; et al. 2013. Experimental analysis of the evolution of an electrified drop following high voltage switching *European Journal of Mechanics B/Fluids*. 38, pp.58-64.
- 35 **Scientific paper.** J. M. López-Herrera; et al. 2013. On the validity and applicability of the one-dimensional approximation in cone-jet electrospray *Journal of Aerosol Science*. 61, pp.60-69.
- 36 **Scientific paper.** A. M. Gañán-Calvo; N. Rebollo-Muñoz; J. M. Montanero. 2013. The minimum or natural rate of flow and droplet size ejected by Taylor cone-jets: physical symmetries and scaling laws *New Journal of Physics*. 15, pp.033035:1-033035:13.
- 37 **Scientific paper.** M. A. Herrada; A. M. Gañán-Calvo; J. M. Montanero. 2013. Theoretical investigation of a technique to produce microbubbles by a microfluidic T-junction *Physical Review E*. 88, pp.033027:1-033027:10.

C.2. Participation in R&D and Innovation projects

- 1 ESTUDIO FLUIDODINÁMICO DE AFECCIONES CARDIOVASCULARES Y LA DEPOSICIÓN DE FÁRMACOS EN EL TRACTO RESPIRATORIO Junta de Extremadura (IB16119). (Universidad de Extremadura (Dpto. de Ingeniería Mecánica, Energética y de los Materiales)). 01/06/2017-01/06/2020.

- 2 ESTUDIO DE LA PRODUCCIÓN Y CONTROL DE ESTRUCTURAS MICROFLUÍDICAS. APLICACIONES EN MEDICINA Y BIOTECNOLOGÍA Ministerio de Economía y Competitividad (DPI2016-78887-C3-2-R). José María Montanero Fernández. (Universidad de Extremadura (Dpto. de Ingeniería Mecánica, Energética y de los Materiales)). 01/01/2017-31/12/2019. 93.600 €.
- 3 GR15014, APOYO A LOS PLANES DE ACTUACIÓN DE LOS GRUPOS CATALOGADOS (Universidad de Extremadura (Dpto. de Ingeniería Mecánica, Energética y de los Materiales)). 01/01/2015-31/12/2017. 41.048 €.
- 4 TECNOLOGÍAS FACILITADORAS CLAVE PARA SALUD, ENERGÍA Y FABRICACIÓN Ministerio de Economía y Competitividad (DPI2013-46485-C3-2-R). (Universidad de Extremadura (Dpto. de Ingeniería Mecánica, Energética y de los Materiales)). 01/01/2014-31/12/2016. 83.490 €.
- 5 UNEX13-1 E-1542, ADQUISICIÓN DE CÁMARA DIGITAL DE ULTRA-ALTA VELOCIDAD CON GRAN RESOLUCIÓN PARA ANÁLISIS DE PROCESOS MECÁNICOS O FLUIDOMECAÑICOS Ayuda para la adquisición de infraestructura científica y tecnológica. Emilio José Vega Rodríguez. (Universidad de Extremadura (Dpto. de Ingeniería Mecánica, Energética y de los Materiales)). 01/01/2015-31/12/2015. 170.150 €.
- 6 APOYO A LOS PLANES DE ACTUACIÓN DE LOS GRUPOS CATALOGADOS Junta de Extremadura (GR10047). José María Montanero Fernández. (Universidad de Extremadura (Dpto. de Ingeniería Mecánica, Energética y de los Materiales)). 01/01/2011-31/12/2013. 157.661 €.
- 7 CONTROL AVANZADO Y APLICACIONES TECNOLÓGICAS MULTIDISCIPLINARES DE FLUJOS MULTIFÁSICOS EN LA MICRO/NANO-ESCALA. Ministerio de Educación y Ciencia (DPI2010-21103-C04-04). Jose María Montanero Fernández. (Universidad de Extremadura (Dpto. de Ingeniería Mecánica, Energética y de los Materiales)). 01/01/2011-31/12/2013. 131.890 €.
- 8 INFLUENCIA DE LAS TOLERANCIAS DE FABRICACIÓN EN LOS PARÁMETROS FLUIDODINÁMICOS DE MOTORES DIESEL Junta de Extremadura (PDT09A014). Joaquín Fernández Francos. (Universidad de Extremadura (Dpto. de Ingeniería Mecánica, Energética y de los Materiales)). 01/12/2009-01/12/2012. 109.000 €.
- 9 ADQUISICIÓN DE CÁMARA DIGITAL DE ULTRA-ALTA VELOCIDAD PARA ANÁLISIS DE PROCESOS DINÁMICOS Ministerio de Ciencia e Innovación (UNEX08-1E-004). José María Montanero Fernández. (Universidad de Extremadura (Dpto. de Ingeniería Mecánica, Energética y de los Materiales)). 01/01/2010-31/12/2010. 93.457 €.
- 10 AYUDAS PARA LA CONSOLIDACIÓN Y APOYO A LOS GRUPOS DE INVESTIGACIÓN INSCRITOS EN EL CATÁLOGO DE GRUPOS DE INVESTIGACIÓN DE EXTREMADURA. Junta de Extremadura (GRU09010). Joaquín Fernández Francos. (Universidad de Extremadura (Dpto. de Ingeniería Mecánica, Energética y de los Materiales)). 01/01/2009-31/12/2009. 30.899 €.

C.3. Participation in R&D and Innovation contracts

C.4. Patents

- 1 Alberto Ponce Torres; Emilio José Vega Rodríguez; José María Montanero Fernández; Alfonso Miguel Gañán Calvo. 201531844. Producción de chorros capilares viscoelásticos mediante enfocamiento gaseoso Spain. 14/06/2018. Universidad de Sevilla.
- 2 A. M. Gañán-Calvo; M. A. Herrada; J. M. Montanero. 201300494. Método y dispositivos para la producción de micro- y nano-burbujas Spain. 20/04/2015. Universidad de Sevilla.
- 3 A. M. Gañán-Calvo; M. A. Herrada; J. M. Montanero; M. G. Cabezas; E. J. Vega. 201200170. Procedimiento y dispositivo para microfabricación y microsoldadura Spain. 14/10/2014. Universidad de Extremadura.