



Part A. PERSONAL INFORMATION		CV date	10/12/2021
First name	ALEJANDRO		
Family name	CUETOS MENÉNDEZ		
Gender (*)	MALE	Birth date (dd/mm/yyyy)	20/07/1971
ID number	10.863.916G		
e-mail	ACUEMEN@UPO.ES	URL Web	
Open Researcher and Contributor ID (ORCID) (*)	0000-0003-2170-0535		

(*) Mandatory

A.1. Current position

Position	Prof. Titular Univer.		
Initial date	11/11/2011		
Institution	Universidad Pablo Olavide		
Department/Center	<u>Departamento Sistemas Físicos, Químicos y Naturales</u>		
Country	Spain	Teleph. number	954-978182
Key words	220401-Colloids; 220408- Liquids; 220510- Statistical Mechanics; 221018 Liquid State Physics; 221021 Phase Equilibrium; 221309 Liquid Crystals; 221311 Transport Phenomena; Cell Simulation		

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

Period	Position/Institution/Country/Interruption cause
01/03/2005-31/12/2007	Postdoctoral Researcher · Utrecht University
01/02/2008-28/09/2009	Postdoctoral Researcher (Juan de la Cierva Fellowship) · Universidad de Almería

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Doctor Universidad Pablo Olavide	Universidad Pablo de Olavide	2004
Licenciado en Ciencias Físicas	Universidad de Sevilla	1996

Part B. CV SUMMARY

Graduated in Physics from the University of Seville, and Doctor from the Pablo Olavide University. My postdoctoral experience includes periods at the University of Utrecht and at the University of Almería (as Juan de la Cierva researcher). Since 2009 I have been researcher and lecturer at the Pablo Olavide University. I have published more than 50 research articles in scientific journals. The thematic of my investigations is oriented to the theoretical study, and by means of computer simulation of properties of complex liquids and soft condensed matter. Along these lines, I have contributed to advances in the knowledge of non-spherical particle fluids, with the development of new research techniques. The methods that we have proposed for the study of discotic particle fluids are noteworthy. Our algorithms have made it possible to carry out a significant number of studies on these systems. Among the methodological advances to which I have contributed is the proposal of new simulation algorithms to be able to perform dynamic simulations using Monte Carlo techniques. The use of these techniques, known as Dynamic Monte Carlo (DMC) This has made it possible to carry out studies on the transport properties in systems with molecules with different forms and interaction potentials. Related to all of the above, the studies carried out in systems capable of forming biaxial nematic phases and the study of the dynamic properties in these phases are noteworthy. In recent years I have promoted a new line for the study by



simulation of the development of cell colonies. In this line of research I have taken advantage of my previous experience in non-spherical particle systems, introducing the modeling of cell growth and division processes. In the context of this line of research we have developed a computational model for the study of cell colonies. Until now, this model has been applied to two-dimensional and three-dimensional biofilms, as well as to the development of the eye of the fly, publishing the results obtained in high-impact journals. I have supervised a doctoral thesis defended in 2019 on the dynamic and structural properties of liquid crystals. He is currently directing an ongoing PhD thesis on simulation of bacterial biofilms. I have been Principal Investigator of three projects of the Plan Nacional I+D, of one project financed by the Junta de Andalucía and of several projects financed by the Pablo Olavide University. I have been Director of the Department of Physical, Chemical and Natural Systems at the Pablo Olavide University. At present, I am the director of a research group recognized by the Junta de Andalucía (Grupo PAIDI FQM205). I have recognized 3 six-year research periods (last 01/01/2020)

Number of sexenios: 3 (last 01/01/2020), **Índice h:** 17

Times Cited: 827; **Cites per year in the last five years:** 70 citas/año

Publicaciones totales en indexadas en JCR: 51 **Publicaciones totales en Q1:** 31

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications (Last ten years)

1 Book. *Chemical thermodynamics and kinetics for life and environmental sciences 100 solved problems.* Juan Antonio Anta, Sofía Calero y Alejandro Cuetos. Ediciones Pirámide. Madrid 2021. ISBN: 978-84-368-4395-8

2 Book. *Termodinámica y cinética química para ciencias de la vida y del medioambiente 100 problemas resueltos.* Juan Antonio Anta, Sofía Calero y Alejandro Cuetos. Ediciones Pirámide. Madrid 2020. ISBN: 978-84-368-4369-9

3 Article. F.A.G. Daza, A. M. Puertas, A. Cuetos and A. Patti. *Microrheology of colloidal suspensions via dynamic Monte Carlo simulations.* J. Colloid Interface Sci. **605**, 182-192 (2022), Doi: 10.1016/j.jcis.2021.07.088

4 Article. N. Morillo, B. Martínez-Haya and A. Cuetos. *Tailoring the phase diagram of discotic mesogens.* Soft Matter **17**, 8693-8704. Doi: 10.1039/d1sm00624j

5 Article. A. Patti and A. Cuetos. *Dynamics of colloidal cubes and cuboids in cylindrical nanopores.* Physics of Fluids **33**, 097103 (2021) Doi: 10.1063/5.0063152

6 Article. F. J. Lobo-Cabrera, T. Navarro, A. Iannini, F. Casares and A. Cuetos. *Quantitative relationships between growth, differentiation, and shape that control drosophila eye development and its variation.* Frontiers in cell and developmental biology **9**, 68193 (2021). Doi: 10.3389/fcell.2021.681933

7 Article. E. M. Rafael, L. T., D. Corbett, A. Cuetos, and A. Patti, *Dynamics of uniaxial-to-biaxial nematics switching in suspensions of hard cuboids,* Physics of Fluids **33**, 067115 (2021) <https://doi.org/10.1063/5.0054923>

8 Article. F. J. Lobo-Cabrera, A. Patti, F. Govantes, and A. Cuetos, *Polymer-induced microcolony compaction in early biofilms: A computer simulation study.* Phys. Rev. E **103**, 052407 (2021) <https://doi.org/10.1103/PhysRevE.103.052407>

9 Article. A. González García, R. Tuinier, G. de With and A. Cuetos. *Directional-dependent pockets drive columnar-columnar coexistence.* Soft Matter, DOI: 10.1039/D0SM00802H (2020)

10 Article. F. A. García Daza, A. Cuetos and A. Patti. *Dynamic Monte Carlo simulations of inhomogeneous colloidal suspensions.* Physical Review E. **102**, 013302 (2020)

11 Article. E. M. Rafael, D. Corbett, A. Cuetos and A. Patti. *Self-assembly of freely-rotating polydisperse cuboids: unveiling the boundaries of the biaxial nematic phase.* Soft Matter **16**, 5565-5570 (2020)

12 Article. A. Cuetos and A. Patti. *Dynamic of hard colloidal cuboids in nematic liquid crystals.* Physical Review E. **101**, 052702 (2020)

13 Article. A. Cuetos, N. Morillo and B. Martínez-Haya. *Coadsorption of Counterionic Colloids at Fluid Interfaces: A Coarse-Grained Simulation Study of Gibbs Monolayers.* Langmuir **36**, 2877-2855 (2020)



- 14 Article.** N. Morillo, A. Patti and A. Cuetos. *Brownian dynamics simulation of oblate and prolate colloidal particles in nematic liquid crystals*. J. Chem. Phys. **150**, 204905 (2019)
- 15 Article.** A. Cuetos, E.M. Rafael, D. Corbett, A. Patti. *Biaxial nematics of hard cuboids in a6 external field*. *Soft Matter* **15**, 1922-1926 (2019)
- 17 Article.** A. Cuetos, N. Morillo y A. Patti., *Fickian yet non-Gaussian diffusion is not ubiquitous in soft matter*. Phys. Rev. E **98**, 042129 (2018)
- 18 Article.** D. Corbett, A. Cuetos, M. Dennison y A. Patti. *Dynamic Monte Carlo algorithm for out-of-equilibrium processes in colloidal dispersions*. Phys. Chem Chem. Phys **20**, 15118-15127 (2018)
- 19 Article.** R. Domínguez-Acemel, F. Govantes y A. Cuetos. *Computer simulation study of early bacterial biofilm development*. Scientific Reports, **8**, 5340 (2018)
- 20 Article.** Alessandro Patti y Alejandro Cuetos, *Monte Carlo simulation of binary mixtures of hard colloidal cuboid*. Mol. Sim. **44**, 516-522 (2018)
- 21 Article.** Alejandro Cuetos; et al. *Phase behaviour of hard board-like particles*. *Soft Matter*,**13**, 4720-4732 (2017)
- 22 Article.** A. Patti; A Cuetos. *Equivalence of Brownian dynamics and dynamic Monte Carlo simulations in multicomponent colloidal suspensions*. Physical Review E. **92-2**, pp.022302-1-022302-9 (2015)
- 23 Article.** Puertas, Antonio M.; Javier de las Nieves, F.; Cuetos, Alejandro. *Computer simulations of charged colloids in confinement*. Journal of Colloid and Interface Science. **440**, pp.292-298. (2015)
- 24 Article.** Cuetos, Alejandro; Martinez-Haya, Bruno. *Liquid crystal phase diagram of soft repulsive rods and its mapping on the hard repulsive reference fluid*. Molecular Physics. **113**, pp.1137-1144 (2015)
- 25 Article.** Piedrahita, Mauricio; Cuetos, Alejandro; Martinez-Haya, Bruno. *Transport of spherical colloids in layered phases of binary mixtures with rod-like particles*. *Soft Matter*. 11-17, pp.3432-3440. (2015)
- 26 Article.** Gamez, Francisco; Acemel, Rafael D.; Cuetos, Alejandro. *Demixing and nematic behaviour of oblate hard spherocylinders and hard spheres mixtures: Monte Carlo simulation and Parsons-Lee theory*. Molecular Physics. **111**, pp.3136-3146. (2013)
- 27 Article.** G. Angulo, A. Cuetos, A. Rosspeintner, E. Vauthy. *Experimental Evidence of the Relevance of Orientational Correlations in Photoinduced Bimolecular Reactions in Solution*. Journal of Physical Chemistry a. **117**, pp.8814-8825 (2013)
- 28 Article.** Patti, A.; Cuetos, A. *Brownian dynamics and dynamic Monte Carlo simulations of isotropic and liquid crystal phases of anisotropic colloidal particles: A comparative study*. Physical Review E. **86**, pp.011403. (2012)
- 29 Article.** M., Matthieu, A. Cuetos, B. Martinez-Haya and M. Dijkstra. *Phase behavior of hard colloidal platelets using free energy calculations*. Journal of Chemical Physics. **134**, pp.094501. (2011)

C.3. Research projects

1.- Modelos computacionales/individual-based models para el estudio de comportamientos multicelulares. P20_00816. Proyectos i+d+i a Agentes del Sistema Andaluz del Conocimiento (PAIDI 2020), Consejería de Transformación Económica, Industria, Conocimiento y Universidades de la Junta de Andalucía/FEDER. PI: Alejandro Cuetos. 30.000 €. Duration: 04/10/2021-31/12/2022. Type of Participation: Principal Investigator.

2.- Descifrando las claves del cambio de estilo de vida bacteriano. PGC2018-097151-B-I00 . Call 2018 «Proyectos De I+D de Generación de Conocimiento, Ministerio De Ciencia, Innovación Y Universidades. IPs: Fernando Govantes Romero y **Alejandro Cuetos Menéndez** (Universidad Pablo de Olavide). 145.200,00 €. Duration 3 years (2019-2020). Type of Participation: Principal Investigator



3.- Consolidación del Centro de Cálculo Científico de la UPO mediante la ampliación y mejora del cluster de procesadores de alta capacidad para cálculo científico. UNPO15-CE-3208 MINECO. IP: Dr. **Alejandro Cuetos Menéndez**. (Universidad Pablo de Olavide). 01/01/2016- 31/12/2017. 19.935.700 €. Duration: 2 years. Type of Participation: Principal Investigator.

4.- Grant for Plan Propio de la Universidad Pablo Olavide for the Organization of Congreso XXI CONGRESO DE FISICA ESTADISTICA FISES17. Universidad Pablo Olavide. PI: Dr. **Alejandro Cuetos**. 1012 €. 1 año. Type of Participation: Responsable.

5. Sensores químicos y células solares basados en nanomateriales y porfirinas. Consejería de Economía, Innovación, Ciencia y Empleo. Junta de Andalucía.. IP: Dr. Jose María Pedrosa Poyato. (Universidad Pablo de Olavide). 159.894€. From 27/06/2014. Duration: 4 years. Type of Participation: Researcher, Team Member

6. Complejos supramoleculares de inclusión y de ensamblaje: un estudio mediante espectroscopía láser, espectrometría de masas y técnicas computacionales. CTQ2012-32345 MINECO (Plan Nacional i+D). IP: Dr. Bruno Martínez-Haya. 90.090 €. From 2013. Duration: 3 years. Type of Participation: Researcher, Team Member

7. Nuevas estructuras desde la auto-organización de moléculas discóticas. MAT2011-29464 MICINN (Plan Nacional i+D+i 2008-2011). IP: Dr. **Alejandro Cuetos Menéndez**. 11.999.57€. From 2012. Duration: 1 year. Type of Participation: Principal Investigator

8. El poder de las diferencias en ciencia coloidal: nuevas estructuras y fases en mezclas de partículas diferentes. PPI1101 Universidad Pablo Olavide (PPI1101). IP: Dr. **Alejandro Cuetos Menéndez**. Desde 09/09/2011. 4.000€. Duration: 2 years. Type of Participation: Principal Investigator

9. Fluidos iónicos y complejos confinados. Aplicaciones en ciencia coloidal y fotovoltaica. Consejería de Innovación; Junta de Andalucía. IP: Dr. Antonio Manuel Puertas López. Desde 2010. 207.923,68 €. Duration: 3 years. Type of Participation: Researcher, Team Member

C.5. Tesis Doctorales:

1.- Anisotropy & Self-Assembly. A Walk Through Intricate Free-Energy Landscapes J. Neftalí Morillo García. Fecha Defensa: 13/06/2019. Calificación: Sobresaliente Cum Laude. Programa de Doctorado: en Medio Ambiente y Sociedad (UPO). Financiación: Junta de Andalucía

2.- Simulaciones de adhesión en biofilms y tejidos celulares, Francisco Javier Lobo Cabrera. (Fecha prevista de defensa: 2022). Programa de doctorado: Biotecnología, Ingeniería y Tecnología Química (UPO)

C.6. Supervisión de trabajos Fin de grado y Fin de Máster:

1.- Título: Simulación mediante un modelo basado en agente de la estructura de biofilms bacterianos en función de condiciones ambientales. Estudiante: María de los Ángeles del Río Herrero. Trabajo Fin de Máster del Máster de Simulación Molecular. Universidad Internacional de Andalucía. 2018/2019.

2.- Título: Bioinformatics and computer simulation study of the surface properties of proteins involved in the adhesion of biofilms. Estudiante: Natalia Barahona Torres. Trabajo Fin de Grado. Universidad Pablo Olavide, 2015/16

3.- Título: Técnicas espectrofotométricas UV-vis y su viabilidad en el análisis del patrimonio histórico. Estudiante: Esther Soler Oliver. Trabajo Fin de Máster. Universidad Pablo Olavide, 2014/15

4.- Título: Comparación de las propiedades de transporte de cristales líquidos formados por esferocilindros prolatos y oblatos equivalentes en sus fases nemáticas. Estudiante: Francisco Rodrigo Garcia. Trabajo Fin de Máster. Universidad Pablo Olavide, 2013/14

5.- Título: Diseño y preparación de cócteles de anticuerpos para IHQ con fines diagnósticos. Estudiante: Francisco Jesús Espinosa Aranda. Trabajo Fin de Máster. Universidad Pablo Olavide, 2012/13