

CURRICULUM VITAE ABREVIADO (CVA)

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

Part A. PERSONAL INFORMATION

First name	Juan Carlos		
Family name	Hernández Garrido		
Open Researcher and Contributor ID (ORCID) (*)	0000-0001-8499-0395		

(*) Mandatory

A.1. Current position

Position	Profesor Titular de Universidad		
Initial date	03/10/2019		
Institution	Universidad de Cádiz		
Department/Center	Materials Science, Metallurgy Engineering, and Inorganic Chemistry	Faculty of Science	
Country	Spain		
Key words	Heterogeneous Catalysis – Electron Microscopy - Nanomaterials		

A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
2007 - 2010	Research Associate / University of Cambridge / UK

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD in Chemistry	Universidad de Cádiz/Spain	2007
University Expert Title in “Catalytic Science and Technologies for a Sustainable Development”	Universidad de Cádiz/Spain	2007
Licensed in Chemistry	Universidad de Cádiz/Spain	2002

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

Dr. Hernández-Garrido is authoring 98 publications in prestigious journals with a total number of citations of 3409, with a total number of citations per year, during the last 5 years, of 380 citations. h-index = 32 (source: Scopus). 89% of its articles are cited in the first quartile (Q1): Science, Nature Nanotechnology, Nature Catalysis, JACS, Nano Letters, Chemistry of Materials or Angewandte Chemie. He is currently a frequent reviewer of scientific journals from various publishers such as Wiley-Vch, Elsevier Science bv, The Royal Society of Chemistry or The American Chemical Society. In addition, he has contributed to 2 book chapters. During the last 10 years, he has supervised 5 PhD Theses (3 in progress), 5 Master's Thesis and 5 Final Degree Projects. It has recognized 3 six-year research terms.

Dr. Hernández-Garrido began his research activity at the University of Cádiz in the structural and chemical characterization of catalytic nanomaterials based on cerium and zirconium oxides, using transmission electron microscopy techniques by both image mode (HREM - HAADF) and spectroscopic mode (EDX and EELS).

After obtaining his doctoral thesis in 2007, which was awarded the Outstanding Awards, he began his postdoctoral career at the Department of Materials Science and Metallurgy at the University of Cambridge (United Kingdom), focusing his research on seeking to extend the capacities of the most relevant developments in electron microscopy for the broadest and most versatile characterization of materials used in heterogeneous catalysis, with particular emphasis on those catalytic formulations that involve mixed oxides. In this sense, his contribution to the three-dimensional (3D) characterization of this type of materials through electron tomography technique is remarkable. During this period, Dr Hernández-Garrido had

the opportunity to participate in various research projects, in collaboration with companies (Sasol UK Ltd, Shell, BP, Rolls-Royce, among others) and with recognized research groups from different fields of Materials Science and Electron Microscopy, which has allowed him to deepen the applicability of the electron tomography technique as a powerful tool for the characterization of catalytic materials. With his return to the University of Cádiz because of a Juan de la Cierva Fellowship, in early 2010, he began to promote various lines of research focused on exploring the capabilities of transmission electron microscopy for materials based on monolith-type structured catalysts. With the achievement of a Ramón y Cajal research position in 2012, the development of this particular line of research was deepened, allowing both to expand the characterization capabilities of these catalytic devices to levels below the micrometer and, in addition, to help to position the University of Cádiz at the forefront of the characterization by electron microscopy of these materials, on which, in addition, research lines related to new methods of preparation of these devices should be included in which new manufacturing methodologies stand out, such as the case of additive manufacturing.

Likewise, Dr. Hernández-Garrido is one of the coordinators of the internationally recognized School of Transmission Electron Microscopy TEM-UCA, with more than 20 years old, configured as an advanced learning and training program in the field of electron microscopy of materials. Additionally, he has participated very actively in numerous research activities related to the transfer of knowledge to the industrial field: he is external consultant, has participated as co-author of 4 industrial patents and has directed various research projects with companies. He has also been the main promoter in the creation of a technology-based spin-off company, whose business idea and business project were awarded in 2010 by the University of Cádiz and the Junta de Andalucía.

Actively participates in evaluation activities in national (ANEP) and international (National Agency for Scientific and Technological Evaluation, Argentina) scientific and academic agencies. Since 2023, he is the Dean of the Faculty of Sciences, previously Vice-dean in the period 2019-2023.

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications

1. Ballesteros-Soberanas, J., Martín, N., Bacic, M. et al. **2024** A MOF-supported Pd₁–Au₁ dimer catalyses the semihydrogenation reaction of acetylene in ethylene with a nearly barrierless activation energy. *Nature Catalysis* 7, 452–463.
2. Quintana Gonzalez J.J., Medina-Olivera A.J., Manzorro R. et al. **2024** Defects engineering of Au@MoS₂ nanostructures for conventional and plasmon-enhanced hydrogen evolution reaction. *International Journal of Hydrogen Energy*, 51, pp. 371 - 382
3. Fornero E.L., Vecchiotti J., Boucinha Rodrigues M., Hernández-Garrido J.C., Bonivardi A.L. **2022**. Cooperative role of cobalt and gallium under the ethanol steam reforming on Co/CeGaOx. *International Journal of Hydrogen Energy*, 47 (41), pp. 18018 – 18031.
4. Garnes-Portolés F., Greco R., Oliver-Meseguer J, (...) Leyva-Pérez A. [7/10] **2021**. Regioirregular and catalytic Mizoroki–Heck reaction. *Nature Catalysis*, 4 (4), pp. 293-303.
5. Hungria A.B., Calvino J.J., Hernández-Garrido J.C. **2019**. HAADF-STEM Electron Tomography in Catalysis Research. *Topics in Catalysis*, 62 (12-16), pp. 808 - 821.
6. Tejeda-Serrano M., Cabrero-Antonino J.R., Mainar-Ruiz V., López-Haro M., Hernández-Garrido J.C., Calvino J.J., Leyva-Pérez A., Corma A. **2017**. Synthesis of Supported Planar Iron Oxide Nanoparticles and Their Chemo- and Stereoselectivity for Hydrogenation of Alkynes. *ACS Catalysis*. 7, pp.3721-3729.
7. Powell J.J., Thomas-McKay E., Thoree V., (...) Pele L.C. [8/25] **2015**. An endogenous nanomineral chaperones luminal antigen and peptidoglycan to intestinal immune cells. *Nature Nanotechnology*. 10-4, pp.361-369.
8. Hernández-Garrido J.C., Moreno M.S., Ducati C., Pérez L.A., Midgley P.A., Coronado E.A. **2014**. Exploring the benefits of electron tomography to characterize the precise morphology of core-shell Au@Ag nanoparticles and its implications on their plasmonic properties. *Nanoscale*. 6-21, pp.12696-12702.
9. Hernández-Garrido J.C., Gómez D.M., Gaona D., (...) Calvino J.J. [1/9] **2013**. Combined (S)TEM-FIB insight into the influence of the preparation method on the final surface

structure of a $\text{Co}_3\text{O}_4/\text{La}$ -modified- CeO_2 washcoated monolithic catalyst. *Journal of Physical Chemistry C*. 117-25, pp.13028- 13036.

10. Cargnello M., Delgado Jaén J.J., Hernández Garrido J.C., Bakhmutsky K., Montini T., Calvino Gámez J.J., Gorte R.J., Fornasiero P. **2012**. Exceptional activity for methane combustion over modular Pd@CeO_2 subunits on functionalized Al_2O_3 *Science*. 337-6095, pp.713-717.

C.2. Congress, indicating the modality of their participation (invited conference, oral presentation, poster)

Since 2001, I have given more than 75 contributions to conferences and scientific congresses in the areas of Materials Science, Electron Microscopy and Catalysis, both national and international, highlighting two as invited speaker (Warsaw, 2017 and Santa Fe, 2018) and one as a plenary speaker (San Carlos de Bariloche, 2016). Of special relevance are also the Conferences and Seminars oriented to the dissemination science and advanced training in electron microscopy techniques that I have also given during my research career, highlighting those taught in centers of excellence such as University of Oxford, University of Cambridge, University of Leeds or the Complutense University from Madrid.

Invited presentations at congresses of international relevance:

1. VI San Luis School and Conference on Surfaces, Interfaces and Catalysis, 2018, Santa Fe, Argentina
2. XVI International Conference on Electron Microscopy, 2017, Jachranka, Warsaw, Poland
3. 4th Argentine Microscopy Congress (SAMIC 2016), 2016, San Carlos de Bariloche, Argentina

Invited lectures in prestigious centers:

1. Jun 2, 2018 INTEC (CONICET - National University of the Coast), Argentina
2. Nov 10, 2009 University of Cambridge, UK
3. Jun 22, 2009 Royal Microscopy Society / University of Leeds, UK
4. Feb 23, 2009 University of Oxford, UK
5. Jan 31, 2008 University of Cambridge, UK

C.3. Research projects, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

1. Nanoestructuras Híbridas Sostenibles para Electrocatálisis y Catálisis Plasmónica. Ministerio de Ciencia e Innovación PID2022-140370NB-I00. PIs: Luc Lajaunie - Juan Carlos Hernández Garrido. 01/09/2023-31/08/2027. 187.500,00 €
2. COSY - Confined Molecular Systems: From a New Generation of Materials to the Stars. European Union. COST Action CA21101. Scientific Grant Holder (SGH): Juan Carlos Hernández Garrido. 27/09/2022 - 26/09/2026. 600.000,00 €
3. Diseño y fabricación de catalizadores estructurados de base metálica mediante síntesis aditiva (impresión 3D). Aplicación en procesos de valorización de CO_2 . Junta de Andalucía. P20-00918. PI: Juan Carlos Hernández Garrido. 05/10/2021- 31/03/2023. 98.550,00 €
4. Combinación de plasmónica y catálisis para el desarrollo de nanoestructuras basadas en MoS_2 para aplicaciones de energía limpia. Ministerio de Ciencia e Innovación. PID2019-107578GA-I00. PIs: Luc Lajaunie - Juan Carlos Hernández Garrido. 01/06/2020 – 30/05/2023. 96.800,00 €
5. ESTEM3 - Enabling Science and Technology through European Electron Microscopy SEP-210497246. H2020 EU. PI: Peter A. Van Aken (Max Plank Institute – Stuttgart). 01/01/2019 - 31/12/2022. 10.000.000,00 €
6. Innovative Materials and Techniques for the Conservation of the 20th Century Concrete-based Cultural Heritage. H2020 EU. PI: M. J. Mosquera (Universidad de Cádiz). 01/01/2018 – 21/12/2020. 6.916.287,50 €
7. Fases 2D ultrafinas sobre óxidos con morfología controlada: Plataforma de nanocatalizadores multicomponente con aplicaciones en protección del medio ambiente. Ministerio de Economía. MAT2017-87579-R. PIs. Miguel A. Cauqui López -José J. Calvino (Universidad de Cádiz). 01/01/2018 – 30/12/2021. 242.000 €

8. Desarrollo de Celdas Solares de Capa Fina a base de Semiconductores Dopados con Carbono. Agencia Nacional de Investigación y Desarrollo (Chile). PI: J. Matos Lale (Universidad de Concepción, Chile). 01/01/2016-31/12/2017. 190.764,52 €
9. Fases superficiales nanoestructuradas de óxidos de cerio: plataforma novedosa para catalizadores de procesos ligados a energía y protección ambiental. Ministerio de Economía y Competitividad. MAT2013-40823-R. PI: J.J. Calvino Gámez. (Universidad de Cádiz). 01/01/2014-31/12/2016. 294.898 €.
10. Enabling Science and Technology through European Electron Microscopy. 7th Framework Programme (EU). FP7-INFRASTRUCTURES-2012-1-312483. PI: E. Snoeck. (CNRS, France). 01/10/2012-30/09/2016. 7.500.000 €.
11. Tomografía electrónica avanzada para la caracterización de nanomateriales catalizadores. Ministerio de Economía y Competitividad. RyC-2012-10004. PI: Juan Carlos Hernández Garrido. 28/04/2014 – 27/04/2019. 40.000,00 €

C.4. Contracts, technological or transfer merits, Include patents and other industrial or intellectual property activities (contracts, licenses, agreements, etc.) in which you have collaborated. Indicate: a) the order of signature of authors; b) reference; c) title; d) priority countries; e) date; f) Entity and companies that exploit the patent or similar information, if any

R+D+I Contracts

1. Structural and chemical characterization at nanoscale of supported-noble metal catalyst. Solvay SA International Chemical Group; QID Nanotechnologies S.r.l. J.C. Hernández Garrido. 01/05/2012-P12M. 3.478,00 GBP.
2. The characterization of nano and sub-nano particles with particular focus to their catalytic properties QID Nanotechnologies S.r.l. J.C. Hernández Garrido. 01/01/2010- P12M. 10.000,00 €.
3. Three-dimensional characterization of catalytic supports for Fischer-Tropsch synthesis. Sasol Technology (UK) Ltd. J.C. Hernández Garrido. 15/01/2009-P12M.10.000,00 €

Patents

1. M.P. Yeste Siguenza; J.J. Calvino Gámez; J.A. Pérez Omil; J.C. Hernández Garrido; G. Blanco Montilla; D.C. Arias Duque. P201200799. Óxidos nanoestructurados de superficie controlada y con elevada capacidad de almacenamiento de oxígeno a baja temperatura. España. 04/06/2014. Universidad de Cádiz.
2. M.P. Yeste Siguenza; J.J. Calvino Gámez; J.A. Pérez Omil; J.C. Hernández Garrido; G. Blanco Montilla; D.C. Arias Duque. P201200794. Catalizadores nanoestructurados de superficie controlada sin metal noble, de bajo contenido en lantánidos y con elevada capacidad de almacenamiento de oxígeno a baja temperatura. España. 28/05/2014. Universidad de Cádiz.
3. Eloy del Río Sánchez; Miguel Ángel Cauqui López; José Juan Calvino Gámez; José Antonio Pérez Omil; Juan Carlos Hernández Garrido; Ana Belén Hungría Hernández. P201400314. Catalizador de oro soportado resistente térmicamente a fenómenos de desactivación bajo condiciones de operación. España. 10/04/2014. Universidad de Cádiz.
4. José Manuel Gatica Casas; Eloy Del Río Sánchez; José Juan Calvino Gámez; Juan Carlos Hernández Garrido; Manuel García Basallote; María Jesús Fernández-Trujillo Rey; José Antonio Pérez Omil; Miguel Ángel Cauqui López; Diana Gaona Soto; Serafín Bernal Márquez. P201300670. Metodología para la preparación de catalizadores de oro soportado de elevada carga y alta dispersión metálica mediante técnicas de impregnación a humedad incipiente partiendo de ácido tetracloroáurico como precursor. España. 13/07/2013. Universidad de Cádiz.