

## PERSONAL INFORMATION

**Surname, Name:** Serra Alfaro, José Manuel (JMS)  
**Passport No.:** 33459308-N  
**Citizenship:** Spanish  
**Date of Birth:** 13/08/1976  
**Researcher profile<sup>1</sup>:** ResearcherID: [K-7646-2014](https://orcid.org/0000-0001-9000-0001) || ResearchGate: [Jose\\_Serra2](https://www.researchgate.net/profile/Jose_Serra2)  
**Full professional profile:** <http://www.linkedin.com/pub/jose-manuel-serra/12/30a/996>

JMS activities are focused on the application of catalysis, materials science and engineering in:

- Understanding of mechanisms and fundamental physicochemical steps of industrial processes.
- Development of ceramic electrochemical cells components and electrocatalysts.
- Development of ceramic mixed ionic-electronic conducting membranes and advanced catalytic reactors.
- Process intensification and optimization in energy and chemistry industry.

JMS is co-author of more than 125 scientific articles and book chapters and 21 patents in the field of catalysis and energy (one of them a commercial product: a high-throughput reactor – SPIDER16). As group leader, he has been involved in several international projects (8) funded by FP7/Nordic or German Programmes either as task leader (1) or WP leader (7) in activities related to materials development, testing and prototyping. Part of his research is developed through industrial projects (9) with private funding.

### • EDUCATION AND FELLOWSHIPS

Research Professor at the Spanish National Research Council (CSIC). Graduated (1999) in Chemical Engineering at Polytechnical University of Valencia (UPV) and subsequent PhD (2004) at UPV on the field of industrial catalysis in collaboration with the Institut Français du Pétrole. He holds the PhD award of the Spanish Catalysis Society and UPV, the ExxonMobil Chemical European Science and Engineering Award 2005, Christian Friedrich Schönbein Medal 2009 for his contribution to Fuel Cells Science and the Young Scientist Award 2015 of the European Ceramic Society.

**2000 - 2004** **PhD in Chemical Engineering**, Polytechnic University of Valencia (UPV). Thesis entitled: "Combinatorial Catalysis: Development of new Techniques and Applications of Interest". Director: Prof. Avelino Corma. Developed at Institute of Chemical Technology (ITQ).

**1994 - 1999** **Graduate in MSc Chemical Engineering**, Engineering Faculty, Polytechnic University of Valencia

**2004 - 2006** **Postdoc Scholarship** granted by *Fundación Ramón Areces*, research developed at *Forschungszentrum Jülich* (Germany)

**2000 - 2004** **PhD Scholarship** granted by *Institut Français du Pétrole*, research developed at ITQ

### • CURRENT AND PREVIOUS POSITION(S)

JMS worked for two years as postdoctoral fellow at the Institute for Materials and Processes in Energy Systems (IEK-1, Forschungszentrum Jülich, Germany) on the development of nano-structured SOFC electrocatalysts and oxygen-transport membranes. In 2006 he joined again ITQ and in 2015 he was appointed as Professor at CSIC.

**2014-present** Research Professor at Institute of Chemical Technology (Spanish Research Council -CSIC-) located at UPV Campus. **Head of the research group *Energy Conversion and Storage***

**2011-present** Deputy Coordinator of the Subprogramme "Materials Science" and CSIC National Representative at the European Energy Research Alliance (EERA), Joint Programme on Advanced Materials and Processes for Energy Application (AMPEA). **2012-2014:** Senior Research Scientist at ITQ. Leader of Renewable Energy Lab.

**2006-2012** Tenured Researcher at ITQ (CSIC-UPV). Leader of research line: Fuel Cells and Gas Separation Membranes.

**2004-2006** Postdoc Fellow at *Forschungszentrum Jülich* (Institute for Energy Research, IEK-1)

### • SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

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<sup>1</sup> <http://www.researcherid.com/rid/C-8244-2009> ; [www.researchgate.net/profile/Jose\\_Serra2/#](http://www.researchgate.net/profile/Jose_Serra2/#)

JMS currently leads a research group at ITQ comprising of a multinational team: 5 PhD students (3 with excellence scholarships) and 3 post-doctoral research fellows.

**2013 – 2016** 5 PhD Students on-going. Three of them will be defended in 2016

**2009 – 2012** 1 PhD Students- University Extraordinary Award 2013 and International Mention. Materials Science Department/ Polytechnic University of Valencia, Spain

**2007 – 2010** 2 PhD Students- One awarded with the University Extraordinary Award 2012 and International Mention. Chemistry Department/ Polytechnic University of Valencia, Spain

**2001 – 2015** 16 Master Students, Polytechnic University of Valencia, Spain

**2007 – 2016** 7 Postdoc, ITQ, Polytechnic University of Valencia, Spain

#### • ORGANISATION OF SCIENTIFIC MEETINGS

- ✓ Chairman of three summer Schools “Ceramic membranes for green chemical production and clean power generation”, Valencia, September [2010](#), [2013](#) and [2015](#) (130 participants in each).
- ✓ Co-organizer of the Symposium “Materials for Membranes in Energy Applications” in E-MRS Fall Meeting in Warsaw, September 2009

#### • INSTITUTIONAL RESPONSIBILITIES

2014 – Member of the Chemistry Commission, CSIC, Spain

2011 – Deputy Coordinator of the Subprogramme "Materials Science" and CSIC National Representative at the European Energy Research Alliance (**EERA**), Joint Programme on Advanced Materials and Processes for Energy Application (**AMPEA**).

2009 – CSIC Representative at the European Energy Research Alliance (**EERA**), Joint Sub-Programme on **CO<sub>2</sub> Capture** for the Topic Gas Separation Membranes.

2007 – Research Group Leader, CSIC, Spain

2011 – 2014 Member of Committees for Tenured Researcher Selection, CSIC, Spain

#### • COMMISSIONS OF TRUST

- Opponent in seven PhD defences (3 abroad). 2 at University of Oslo, 1 at Denmark Technical University, 3 at UPV and 1 at Universidad Autonoma de Barcelona.
- Member of the advisory board of international projects.
  - 2013-2016 Norwegian Consortium: “ Biogas operated proton ceramic fuel cells with novel S-tolerant functional materials (BioPCFC)”
  - 2013-2016 Norwegian Consortium: “ OXCET: Functional oxides for clean energy technologies: fuel cells, gas separation membranes and electrolyzers”

#### • MEMBERSHIPS OF SCIENTIFIC SOCIETIES

2005 – Member, Spanish Catalysis Society (SECAT) and Spanish Group of Zeolites (GEZ)

2005 – Member, Spanish Ceramic and Glass Society (SECV)

2009 – Member, Association des Doctorants et Anciens Doctorants d'IFP (ADIFP)

2006 – Member, Agora Fundación Areces

2014 – Associate Member, The Institution of Chemical Engineers (IChemE)

2009 – Member, Spanish Technological Platform of H<sub>2</sub> and Fuel Cells

2010 – Member, Spanish Technological CO<sub>2</sub> Platform

#### • MAJOR COLLABORATIONS (active and consolidated)

Prof. Joe da Costa, *Advanced Gas-Separation Membranes*, The University of Queensland (Australia)

Prof. Ryan O'Hayre, *Proton conductors for fuel cells and H<sub>2</sub> membranes*, Colorado School of Mines (USA)

Prof. Truls Norby, *Proton conductors and water electrolysis*, University of Oslo (Norway)

Prof. Ronald Dittmeyer, *Advanced microreactor systems*, Karlsruhe Institute of Technology (Germany)

Dr. Chung-Yul Yoo, *Electrochemical reactors*, Korean Institute of Energy Research (Rep. of Korea)

Dr. Wilhelm Meulenber, *Fuel cells and oxygen transport membranes*, Research Center Jülich (Germany)

Dr. David Farruseng, *Heterogeneous catalysis and microporous materials*, IRCELYON, CNRS (France)

Prof. Eugene Kotomin, *Ab initio calculations*, Solid state research institute, Max Plank Institute (Germany)

Dr. Marcos Millán, *Gasification and supercritical oxidation*, Imperial College London (UK)

## Early achievements track-record

### Scientific or scholarly contributions

The areas where PI published the most are catalysis, solid oxide fuel cells, advanced materials, gas separation in ceramic ionic membranes and process engineering.

- Number of publications: 118  
(100 without PhD supervisor; 40 with international collaborators; 74 as corresponding author)
- Number of book chapters: 13
- Number of congress/conference contributions: 207 (32 invited)
- Number of patent applications: 21 (13 licensed to the industry, see selected patents below)

### Recognition and diffusion of scientific achievements.

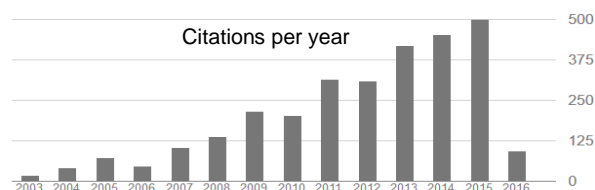
#### Google Scholar<sup>2</sup>:

h-index: 29                      Sum of the Times Cited: 3081

#### Scopus:

h-index: 26                      Sum of the Times Cited: 2360

h-index: 23\*                      Sum of the Times Cited: 1857\* (\*excluding self-citations)



### Selected 5 publications:

- S. Escolástico, C. Solís, C. Kjøseth, J. M. Serra\*, “Outstanding hydrogen permeation through CO<sub>2</sub>-stable dual phase ceramic membranes”, **Energy & Environmental Science** 7 (2014) 3636-3746 (doi: 10.1039/C4EE02066A), IF; 20.5, Citations: 14, Q1
- S. Baumann, J.M. Serra\*, P. Lobera, S. Escolástico, F. Schulze-Küppers, W. A. Meulenber, “Ultrahigh O<sub>2</sub> Permeation Flux Through Supported Ba<sub>0.5</sub>Sr<sub>0.5</sub>Co<sub>0.8</sub>Fe<sub>0.2</sub>O<sub>3-δ</sub> Membranes”, **Journal of Membrane Science** 377 (2011) 198-205 (doi: 10.1016/j.memsci.2011.04.050), IF:5.1, Citations: 145, Q1
- I. García-Torregrosa, M. P. Lobera, C. Solís, P. Atienzar, J. M. Serra\*, “Development of CO<sub>2</sub> Protective Layers by Spray Pyrolysis for Ceramic O<sub>2</sub> Membranes”, **Advanced Energy Materials** 1,4 (2011) 618-625, IF: 16.1, Citations: 10, Q1
- J. M. Serra\*, W. A. Meulenber, “Thin-film Proton BaZr<sub>0.85</sub>Y<sub>0.15</sub>O<sub>3</sub> Conducting Electrolytes: Towards an Intermediate Temperature Solid Oxide Fuel Cell Alternative”, **Journal of the American Ceramic Society**, 90 (7) (2007) 2082-2089, IF: 2.5 Citations: 66, Q1
- V.B. Vert, J.M. Serra\*, J.L. Jordá, “Electrochemical Characterisation of MBaCo<sub>3</sub>ZnO<sub>7</sub> (M = Y, Er, Tb) as SOFC cathode material with low thermal expansion coefficient”, **Electrochemical Communications** 12 (2010) 278-281, IF: 4.8 Citations: 38, Q1

### Selected patents:

- A. Corma, **J.M. Serra**, J. Hernández, “Automatic device and method for multiple catalytic testing”, **1999**, World Patent, WO0159463 (EP1273919, US2003040116) licensed to AMTEC GmbH. **Commercial Product**
- **J.M. Serra**, A. Corma, E. Guillon, “Catalyseur comprenant au moins une zeolithe 12MR, une zeolithe 10MR et un metal et son utilisation en transalkylation d’hydrocarbures alkylaromatiques”, **2004**, US2005234279, assignee is Institute Français du Petrole
- **J. M. Serra**, W. A. Meulenber, T. Schober, “Process to extract hydrogen gas from a mixture of hydrocarbon gases using two proton-conducting gas-tight layers”, **2006**, DE102006005194 assignee Forschungszentrum Jülich
- A. Corma, M. Moliner, M.J. Díaz, **J. M. Serra**, R. Castañeda, “New porous crystalline material zeolite ITQ-33, useful as or in catalysts for converting organic feedstocks, e.g. cracking or hydrocracking hydrocarbons or alkylating aromatics with olefins”, **2006**, US2009124484 (A1), licensed to ExxonMobil

<sup>2</sup> <http://scholar.google.es/citations?hl=es&user=-fPwcBwAAAAJ>;  
<http://www.scopus.com/authid/detail.uri?authorId=7201784530&origin=AuthorEval>

- G. Prieto, **J. M. Serra**, A. Martínez, J.L. Sanz, J. Caraballo, R. Arjona, “Process for the preparation of a multimetallic sulphide catalyst and its use for the production of higher alcohols through syngas catalytic conversion”, **2011**, assignee *ABENGOA*, US2012208904(A1) & US2012202898(A1)
- **J. M. Serra**, S. Escolástico, C. Kjøseth, P. K. Vestre, “Proton conducting ceramic membrane”, assignee Protia (Coorstek Membrane Science), **2013**, PCT/EP2014/060708

#### **Selected Invited lectures:**

- Plenary Lecturer, the Annual Meeting of the German Ceramic Soc. (DKG) – 24-26 March 2014, Clausthal-Zellerfeld (Germany)
- Plenary Lecturer, 14th Int. Conference of the European Ceramic Soc., 21-25 June, 2015, Toledo (Spain)
- Key Note Lecture, “Optimizing Solid Oxide Fuel Cell Performances by Combinatorial Designs”, Eurocombiat 2009: European Conference on Combinatorial Catalysis Research and High-Throughput Technologies, April 26-29, 2009 Gandia (Spain)
- Key Note Lecture, “In situ Hydrogen separation at high temperatures through highly-stable mixed proton conducting membranes”, 11th International Conference on Catalysis in Membrane Reactors, July 7th-11th, 2013, Porto (Portugal)
- Key Note Lecture, “Engineering future ion-transport membranes for gas separations in energy and chemistry applications”, 13<sup>th</sup> International Conference on Inorganic Membranes (ICIM2014), 6-9 July, 2014, Brisbane (Australia)

#### **Research Awards:**

- European Ceramic Society Young Scientist Award ([ECerS, 2015](#))
- Christian Friedrich Schönbein Contribution to Science Medal by the European Fuel Cell Forum (Luzern, Switzerland, **2009**)
- ExxonMobil Chemical European Science and Engineering [Award 2005](#). The contribution entitled “*Exploration of Multicomponent Perovskite-based Materials as Improved Electrocatalysts for Solid Oxide Fuel Cells, applying High-Throughput Experimentation and Predictive Modelling Techniques*”
- Best PhD thesis by the Spanish Catalysis Society (SECAT) **2005**
- Best PhD thesis by Polytechnic University Valencia (UPV) **2005**

#### **Leadership in research Consortia:**

Work-Package leader in different international project consortia:

- EC-FP7 [EFFIPRO](#): WP-leader on electrocatalyst design for proton conducting SOFC (2009 – 2012)
- EC-FP7 [NASA-OTM](#): WP-leader on the development of catalytic coatings for O<sub>2</sub> activation and catalytic reactions based on CH<sub>4</sub> conversion. (2009 – 2012)
- EC-FP7 [DEMOYS](#): Leader on the design, application and testing of activation coatings for plasma sprayed membranes for both O<sub>2</sub> and H<sub>2</sub> transport membranes. (2010-2013)
- EC-FP7 [GREEN-CC](#): WP-leader on the development of O<sub>2</sub> activation layer integrated in membranes for 4-end oxyfuel operation and cement industry. (2013-2017)
- EC-FP7 [ELECTRA](#): WP-leader on the development of cathode (steam electrode) in high-temperature electrolyzers (proton conducting SOEC) for syngas and hydrocarbon. (2014-2016)
- HGF Portfolio [MEM-BRAIN](#): Work Topic leader on H<sub>2</sub> transport membranes. Main efforts on the development of very stable high-performing materials and manufacture of asymmetric membranes. Next step: scaling to larger areas and test in pilot gasification plants. (2007-2013)
- PI and participant in large facilities characterisation projects; beamtime at Bessy I and PSI (since 2008)
- Coordinator of a Spanish National project on energy conversion and storage by the (electro)-synthesis of new liquid fuels. (2014-2016)
- Principal investigator in different industrial projects and submitted H2020 proposals.
- Past: Representative in large EU Integrated projects on Reactor and Catalysts design: TOPCOMBI (2004-2008) and COMBICAT (1999-2003)

**Cofounder of the Spin-off** company Kerionics S.L. ([www.kerionics.com](http://www.kerionics.com)). The company develops ceramic membrane modules for oxygen separation for medium-scale application in oxyfuel industrial processes (Glass, Frit/Glaze industry, Cement, Gasification, etc.). Kerionics was awarded with the II Prize of Group Dominguis Energy Services for energy sector (2015) and the IV Repsol Foundation award for initiatives in energy (2015). <http://www.fondoemprendedores.fundacionrepsol.com/en/>