

Research topics

My research interests focus on design and preparation of nanostructured materials for energy conversion and storage applications. My background concerns synthesis and characterisation of nanomaterials of various morphologies and chemical compositions. Current research directions include the development of new electrolyte and electrode materials for proton and anion exchange membrane fuel cells and electrolysers. In particular, the group is dealing with the preparation and the design of nanostructured and nanofibrous materials, *e.g.* obtained by electrospinning, and new membrane-electrode assembly architectures. We are also developing techniques for metal deposition and surface functionalisation to prepare materials with improved properties relevant to the targeted applications.

Academic qualifications

2015 Accreditation to supervise research in Chemistry at University of Montpellier (France)

2006 PhD in Chemistry and Materials Science at University of Versailles St Quentin-en-Yvelines (France)

2001 Graduation in Chemistry at University of Milan (Italy) (eq. MSc)

Professional positions held

2009-present Lecturer at University of Montpellier (UM), Charles Gerhardt Institute Montpellier (ICGM) - Aggregates Interfaces Materials for Energy (AIME)

2007-2009 Research and teaching assistant at University of Lyon 1 (France) in the Multimaterials and Interfaces Laboratory (LMI)

2006-2007 Post-doctoral fellow at Materials Research Centre (FMF) in Freiburg (Germany) in collaboration with the University of East-Anglia (UK)

2002 Training period in Physical Chemistry Laboratory (LCP) at University of Paris Sud-11 (France) with industrial grant (Hexcel-Fabrics)

Research publications and dissemination

- 64 peer-reviewed publications, 5 book chapters, 4 proceedings, 2 patents, 1 edited book
- 125 communications in (inter)national conferences
- 26 invited presentations
- h-factor 24

Selected publications

- I. Jiménez-Morales, F. Haidar, S. Cavaliere, D. Jones, J. Rozière, Strong interaction between platinum nanoparticles and tantalum doped tin oxide nanofibers and its activation and stabilization effect for oxygen reduction reaction, *ACS Catalysis* **2020**, *10*, 10399-10411.
- J. Li, S. Brüller, D. C. Sabarirajan, N. Ranjbar-Sahraie, M. Tahar Sougrati, S. Cavaliere, D. Jones, I.V. Zenyuk, A. Zitolo, F. Jaouen, Designing the 3D architecture of PGM-free cathodes for H₂/air proton exchange membrane fuel cells, *ACS Appl. Energy Mater.* **2019**, *2*, 7211-7222.
- S. Giancola, M. Zatoń, A. Reyes-Carmona, M. Dupont, A. Donnadio, S. Cavaliere, J. Rozière, D. J. Jones, Composite short side chain PFSA membranes for PEM water electrolysis, *J. Membr. Sci.* **2019**, *570–571*, 69-76.
- G. Ercolano, F. Farina, S. Cavaliere, D. J. Jones, J. Rozière, Towards ultrathin Pt films on nanofibres by surface-limited electrodeposition for electrocatalytic applications, *J. Mater. Chem. A* **2017**, *5*, 3974-3980.
- S. Cavaliere, S. Subianto, I. Savych, D.J. Jones, J. Rozière, Electrospinning: designed architectures for energy conversion and storage devices, *Energy Environ. Sci.* **2011**, *4*, 4761-4785.

Distinctions and awards

- CNRS bronze medal **2017**
- Junior member of Institut Universitaire de France (IUF) (**2017-2022**)

Synergistic activities

Scientific responsibilities

- Work package leader in the research project SunCoChem: “Photoelectrocatalytic device for SUN-driven CO₂ conversion into green CHEMicals”. NMPB (H2020) (2020-2024)
- Principal investigator of the research project HYDROGEN: “Highly performing proton exchange membrane water electrolyzers with reinforced membranes for efficient hydrogen generation”. ERC Proof of Concept (2019-2021)
- Principal investigator of the research project FRAME: “Fibre reinforced membranes for PEM water electrolysis for reduced electrical resistance and gas permeability”. Carnot Institute Grant (2019-2021)
- Principal investigator of the research project SPINAM: “Electrospinning, a method to elaborate membrane-electrode assemblies for energy devices”. ERC Starting Grant (2013-2018)
- Participation in the research contract “Novel electrocatalyst supports” with Johnson Matthey Fuel Cells (2012-2015)
- Principal investigator of the research project “Novel fuel cell electrodes prepared by electrospinning”. Grant of the Scientific Council of the University of Montpellier 2 (2010-2011)
- Participation in 14 European projects (FP7, H2020) (2009-present) and 5 national projects (2013-present)
- Principal investigator for the PHC bilateral projects Italy/France Galileo (2011-2012) and New Zealand/France Dumont d’Urville (2017-2018)
- Participation in the COST action MP1206 (Electrospun nano-fibres for bio inspired composite materials and innovative industrial applications) (2013-2017)

Administrative tasks

- Elected member of the Board of Directors of the University of Montpellier (2018-present)
- Vice-president of the Commission of Section 31 of the Scientific Department of Chemistry (SDC) of the University of Montpellier (2017-present) and member of the HR commission at SDC (2020-present)
- Elected member of the CNRS Scientific Council (Institute of Chemistry) (2016-2018 and 2019-present)
- Member of the Doctoral College of Chemical Engineering at Politecnico di Torino (Italy) (2020-present)

Committee activity

- Organising and/or scientific committee of 6 international conferences: Progress in MEA materials for medium and high temperature polymer electrolyte fuel cells in La Grande Motte (France) (2010), 4th European PECF & H₂ Forum in Luzern (Switzerland) (2013), Electrolysis & Fuel Cell Discussions in La Grande Motte (France) (2015, 2019), Balard conference in Montpellier (France) (2018,2021).
- Organisation of 2 international conferences Electrospinning for Energy in Montpellier (France) (2016, 2018)
- Scientific advisory board of international conferences 6th European PEFC and Electrolyser Forum in Luzern (Switzerland) (2017) and C’Nano in Lyon (France) (2017).
- Proposal evaluator for funding agencies from France, Finland, European Research Council.
- Expert for CERIC-ERIC report on fuel cells and electrolysis technologies.

Editorial activities

- *Guest Editor of 5 Special Issues: Design and Development of Nanostructured Thin Films in Nanomaterials (2018), Electrospinning of Nanofibres for Energy Applications in Nanomaterials (2016), Electrolysis & Fuel Cell Discussions - Challenges towards zero platinum for oxygen reduction in International Journal of Hydrogen Energy (2016), Electrocatalyst supports for proton exchange membrane fuel cell and water electrolyzers in Catalysts (2021), Three dimensional highly porous nanofibrous electrospun ceramic structures Frontiers in Materials (2021).*
- Member of the editorial board of *Nanomaterials (2011-2013, 2019-present), Frontiers in Fuel Cells (2014-present)* and *SN Applied Sciences (2019-present)*.
- Referee for *Nature Energy, Energy & Environmental Science, Advanced Functional Materials, Chemical Reviews, Nanoscale, Chemical Communications, Journal of Power Sources, ACS Applied Materials et Interfaces, Applied Catalysis B, Journal of Materials Chemistry A, ChemElectroChem, Applied Surface Science, Fuel Cells, Ionics, Comptes Rendus Chimie, Textile Research Journal, Journal of Materials Research, Nanomaterials, Solid State Ionics, Electrochimica Acta.*