



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2017

Turno de acceso general

Nombre: ASTALS GARCIA, SERGI
Referencia: RYC-2017-22372
Área Científica: Tecnología Química
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Título:

Biotecnología Ambiental

Resumen de la Memoria:

I have more than 10 years of research and translation experience in the field of environmental biotechnology, including: 2.5 year as Bachelor, Master and casual Research Assistant contracts (University of Barcelona), 4 years as PhD student (University of Barcelona), 3 years as post-doc (The University of Queensland, Australia), and 1 year as Research Fellow (The University of Queensland).

During my research career I have made a notable contribution to the knowledge, dissemination and full-scale implementation of environmental biotechnologies through participation in 17 publicly funded projects and 18 research projects with industry partners. Out of these research activities, I have generated 36 publications in ISI journals, 2 book chapters, 4 publication in non-ISI journals, and over 40 conference communications. These communications have received 1089 citations (Scopus 4/1/18). I yield a h-index of 17 (Scopus 4/1/18) and a field-weight citation impact of 2.5 (Scival 4/1/18). I have supervised 10 BSc and MSc thesis and 1 PhD thesis. I am currently supervising 2 PhD students.

2007-2009: In February 2007 I joined, as Research Assistant, the Environmental Biotechnology research group of the UB (lead by Prof Joan Mata-Alvarez). During my master degree in Environmental Engineering (2008-09), I continued involved with Mata-Alvarez's research group working on two EU projects (AGROBIOGAS, RE&-WISE) and one Spanish project (PROBIOGAS). In September 2009, I was awarded a PhD grant by the Spanish Ministry of Science and Innovation.

2009-2013: My PhD thesis entitled "Optimization and modelling of advanced anaerobic digestion process" was primarily devoted to identify and model waste interactions occurring during anaerobic co-digestion. My PhD work included research carried out during two research visits: 1 month at Centre for Technical Research and Studies of Gipuzkoa (University of Navarra, Spain) and 6 months at Advanced Water Management Centre (The University of Queensland). My PhD consisted of 7 peer-reviewed publications. To date, these publication have 405 citations (source: Scopus 4/1/18).

2014 to Present: In January 2014 I joined the anaerobic technology and resource recovery research group of the Advanced Water Management Centre (lead by Prof Damien Batstone) to develop cost-effective treatment technologies for agri-industries. In 2015, I was awarded a University of Queensland Development Fellowship to support the development of my own research line. In 2016, I was awarded a DECRA Fellowship (248,000€ over 3 years), a scheme designed to foster development of the most promising early career researchers in Australia. In 2017, due to my outstanding performance, I was promoted by The University of Queensland to Research Fellow.

Resumen del Currículum Vitae:

EDUCATION

Bachelor degree in Chemical Engineering, University of Barcelona (October 2009)
Master degree in Environmental Engineering, University of Barcelona (May 2009)
PhD degree in Environmental Science and Technology, University of Barcelona (July 2013)

CURRENT PROFESSIONAL SITUATION

ARC DECRA Research Fellow, The University of Queensland (May 2017 - ongoing)

PUBLICATION IN ISI JOURNALS

Publications: 36 (source: Scopus 4/1/2018)
Citations: 1089 (source: Scopus 4/1/2018)
h-index: 17 (source: Scopus 4/1/2018)
Field-weight citation impact: 2.48 (source: SciVal 4/1/2018)
Publications in Q1 journals: 30 (source: Web of Science 4/1/2018)
Top 1% most cited publications: 3 (source: SciVal 4/1/2018)
Top 10% most cited publications: 20 (source: SciVal 4/1/2018)



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OTHER TYPE OF PUBLICATIONS

Publication in non-ISI journals: 4

Book chapters: 2

Conference communications: 41

PARTICIPATION IN RESEARCH ACTIVITIES

Participation in competitive R&D projects: 19 (6 as principal investigator)

Participation in non-competitive R&D projects: 18 (3 as principal investigator)

Organisation on a conference organising committee: 8

TEACHING & SUPERVISION EXPERIENCE

University of Barcelona (2009-2012): 268 hours

University of Foggia (2011): 6 hours

University of Munich (2017): 6 hours

The University of Queensland (2017): 35 hours

Supervision of BSc students: 3

Supervision of MSc students: 7

Supervision of PhD students: 1

Supervision of visiting academics: 7



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Nombre: PUYOL SANTOS, DANIEL
Referencia: RYC-2017-22909
Área Científica: Tecnología Química
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Título:

RESOURCE RECOVERY FROM WASTE SOURCES: MY PERSONAL QUEST

Resumen de la Memoria:

My personal quest for a flexible environmental technology to recover resources and energy from waste sources within a circular Bioeconomy perspective began in 2004. Four places have been key in my personal development as a scientific researcher, and in each of them I step-by-step achieved the necessary capabilities for being a strong-decision maker, innovative and successful scientific leader. I acquired engineering basis and scientific skills and abilities at the University Autónoma de Madrid, where I obtained both my BS and PhD degrees. The deepened knowledge and the ability to perform value judgments on biochemical mechanisms on bacteria (which are key for my personal training and development in environmental biotechnology) were achieved during my stay in the University of Arizona, where I was supervised by a world-recognized leader in this matter (Prof. Jim A Field). I acquired the capacity for leading a complex and strong research team during my stay in the Advanced Water Management Centre of the University of Queensland, acting as Project Manager and research supervisor. Finally, I developed and demonstrated the competences for obtaining research funding and leading research lines during my last stage at the University Rey Juan Carlos, where I am currently acting as principal investigator in three research projects, being as the main reference in my Department in Environmental Biotechnology.

Resumen del Currículum Vitae:

My CV numbers are summarized as follows:

- Scientific leader of 2 research lines in the University Rey Juan Carlos
- 85 months of active post-doctoral researcher (36 international)
- Participation in 17 private and public research projects, 4 of which as PI and 2 of which as PM
- 1 patent (under review)
- Supervisor of 1 postdoc, 1 PhD, 8 MS, 20 BS Thesis and 6 casual researchers. Mentor of 2 PhD and 2 BS students
- 1 book edited (to be published in 2018), 40 research papers in scientific journals (37 peer-reviewed, 21 in Q1), 6 more ongoing (all in Q1); 9 book chapters; and 9 scientific-technical reports
- 53 presentations in research conferences (mostly international).
- Granted with three competitive research fellowships (including a postdoctoral Fulbright grant), 1 research award and 1 conference presentation award.
- Associate Editor of 1 peer-reviewed journal. Guest Associate Editor of 2 peer-reviewed journals



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Nombre: GIL MATELLANES, MARIA VICTORIA

Referencia: RYC-2017-21937

Área Científica: Tecnología Química

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Título:

Technologies of biomass utilization: energy production and CO2 mitigation

Resumen de la Memoria:

The main research line throughout my research career may be entitled "Technologies of biomass utilization: energy production and CO2 mitigation". My research has focused on the sustainable management of resources, such as organic wastes and biomass, by recycling them as compost and by producing renewable energy, through anaerobic digestion and thermochemical conversion methods (combustion, gasification). The CO2 capture, as a technology to achieve the full environmental benefit of using renewable energy sources, has also been a main topic in my research.

My research work on the management of organic wastes involves the study of the composting process and the characterization of organic matter from wastes. In the context of the management of biomass materials, I have worked on the evaluation of the availability and distribution of residual biomass aimed to the location of biomass power plants, and on the improvement of the feeding techniques in boilers by studying the mechanical durability and combustion characteristics of pellets from biomass.

Related to the production of renewable energy, my work on anaerobic digestion has focused on the dry fermentation of solid biowastes to produce biogas and stabilized product. Regarding the combustion of biomass for energy production, I have worked on the study of the thermal behaviour, kinetic analysis and prediction models of coal and biomass/coal blends using thermogravimetry. Moreover, I have worked on the hydrogen production by means of the co-gasification of coal and biomass in a high-pressure reactor for producing a H2-rich gas stream.

On CO2 capture by the oxycombustion technology, I have worked on the study of the ignition temperature, burnout and NO emissions after the oxy-fuel combustion with steam addition of coal and coal/biomass blends in an entrained flow reactor, and on the study of the kinetic models for the oxy-fuel combustion of coal and coal/biomass chars. My research work on the capture of CO2 using solid adsorbents has focused on the application of the response surface methodology as an efficient tool for optimizing the synthesis of biomass-based carbon adsorbents and the adsorption process. This work includes dynamic studies on pre-combustion and post-combustion CO2 adsorption, and CO2 capture from bio-hydrogen and biogas streams.

During my stay in the Catalysis Group of the NTNU (Norway) in 2012, I worked on the study of catalytic processes applied to the energy field, acquiring theoretical and experimental skills in the synthesis and characterization of heterogeneous catalysts. After my return to INCAR, I continued investigating on this topic -production of H2 by the catalytic sorption enhanced steam reforming (SESR) process- transferring the technology knowledge acquired during my stay at NTNU. Thus, I started a research line in the group on the production of hydrogen with high yield and purity by the SESR of biomass-derived compounds in both fixed and fluidized bed reactors. From September 2015, when I started a two-year postdoctoral contract at NTNU, I also worked on the fast-hydrolysis of biomass and the catalytic hydrodeoxygenation, to produce hydrocarbon products for use as transportation fuels. Finally, in September 2017, I returned to the PrEM Group at INCAR-CSIC, where I have started to develop a new research line focused on biogas valorisation.

Resumen del Currículum Vitae:

BEng Agricultural Engineering, MSc Environmental Sciences, MEng Renewable Energies. I pursued my PhD studies in the Chemical Engineering Group at the University of León, with funding from two competitive predoctoral fellowships granted by the University of León and by the Junta de Castilla y León, respectively. During my predoctoral stage, I completed a short research stay at the University of Essex (UK). At the University of León, I supervised several intern and end of degree project students, and I taught theory and laboratory (110 h). On 20th December 2007, I received my PhD degree with the distinction Cum Laude. After finishing my doctorate, I continued working as a postdoctoral fellow at the University of León for 13.5 months.

In February 2009, I joined the Energy Processes and Emission Reduction (PrEM) Group at INCAR-CSIC with a postdoctoral position. In July 2010, I was awarded a 3-year competitive fellowship from the JAEDoc Programme of CSIC aimed at the specialization of PhDs. After that, I continued working in the group as research fellow within the frame of R&D projects and contracts with industry until August 2015. During my postdoctoral period at INCAR-CSIC, I realized two postdoctoral stays: the first one in the Catalysis Group of the Department of Chemical Engineering at the NTNU in Norway (4 months), funded by a competitive postdoctoral fellowship from the Research Council of Norway (Yggdrasil mobility programme); and the second one in the Chemical Engineering Group of the Department of Applied Chemistry and Physics at the Universidad de León (7 months).

In September 2015, I joined the Catalysis Group of the NTNU (Norway), awarded by a 2-year postdoctoral contract financed by the Norwegian Research Council, under the supervision of Prof. D. Chen. There, I led the research of the project "Integrated H2BioOil for efficient biofuel production". In September 2017, I returned to INCAR-CSIC where I will be developing novel research on renewable energy. In total, I have completed 48.5 months (28 abroad) of post-doctoral stays outside INCAR-CSIC.

During my scientific career, I have participated in 30 research projects (3 international, 17 national and 10 contracts with industry). Derived



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from my research work, I have co-authored 55 scientific articles in peer-reviewed scientific journals (48 JCR; 83% Q1), with an author citation (h-index) of 24 (January 2018). I have published in high impact factor journals of relevance in the Chemical Engineering, Energy and Catalysis areas, such as Applied Catalysis B: Environmental, ChemSusChem, Applied Energy, Bioresource Technology and Chemical Engineering Journal. I have co-authored 1 book chapter and 3 scientific-technical reports. I have contributed with 46 communications to international (27) and national (19) conferences and workshops, as well as participated in the organization of 2 international scientific events. I have participated as chair in 2 international conferences and as abstracts reviewer in 1 international conference. I have also participated in the evaluation of 1 PhD thesis. As postdoc, I supervise younger researchers, lead the authorship of research articles, prepare funding proposals, attend conferences and workshops, work in collaboration with national and international research groups, and regularly collaborate as invited reviewer for high impact scientific journals.



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Referencia: RYC-2017-23618

Área Científica: Tecnología Química

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Título:

Design and Optimization of Electrochemical Technologies for Environmental Applications

Resumen de la Memoria:

My research career has been mainly dedicated to the design and optimization of electrochemical technologies for environmental applications, like wastewater treatment and energy storage/conversion. In these technologies, the nature of the electrodes is crucial, so the development of advanced electrode materials has been largely explored. I did my PhD Thesis on applied electrochemistry at the University of Alicante under a PhD program awarded with a Quality Distinction. During the first years (2004-2007) I studied and greatly progressed on the basics and feasible application of the electrochemical technology for the regeneration of spent carbon adsorbents and the abatement of pollutants in wastewater treatment. I designed and successfully used of a filter-press-like electrochemical cell adapted for the effective polarization of a bed of AC particles; and I proved that the electrochemical technology for AC regeneration constitutes a feasible alternative, with outstanding advantages, to the conventional ones

In the last part of my PhD (2008-2010) and my first post-doctoral stay at Kyotani Laboratory of Tohoku University (2010-2012), I pioneered the application of the electrochemical technology to modify the surface chemistry of carbon materials for their selective functionalization or to propose new oxidation-protection strategies for the optimization of electrochemical devices. It was then when I was funded by Nissan Motor Co. (in Japan), one of the World's largest automobile industries. I studied the selective functionalization of ZTC with quinone-like oxygen groups to synthesize the carbon material with the highest pseudocapacitance ever reported. This work first proved the benefits of the electrochemical technology to oxidize carbon materials and the impact of its application.

Next, in my second post-doctoral stay at the University of Málaga (2012-2015), I developed sustainable and inexpensive innovative synthetic routes by electrospinning and electrospaying technologies to process one of the most abundant polymers in nature, lignin, into outstanding electrodes for energy storage/conversion. The major impact of this work is probably the demonstration that, whenever it is suitable processed by electrospinning, biomass can be efficiently used to produce lower-cost and more sustainable electrodes for energy storage/conversion devices.

Finally, I returned to the University of Alicante (2015-2017), where I have consolidated my scientific career by leading the wastewater treatment research line of my group; participating in a H2020 project and leading a private company-funded research initiative on wastewater treatment. In this stage I have developed low-cost and high-stable electrocatalysts that are expected to cause a great impact in the field of environmental electrochemistry. I actively collaborate with the groups in Japan and Málaga and I have initiated new research lines and international collaborations.

Apart from these main lines, I have also studied the electro-adsorption of toxic pollutants; explored novel electrochemical processes (electrochemical reduction of nano-SiO₂ into nano-Si in molten electrolyte) and technologies (Lasser emission by electroluminescent conductive polymers); and initiated a research line to expand the applicability of microbial electrochemical technologies.

Resumen del Currículum Vitae:

In my research career, I have won, managed and led various competitive (Juan de la Cierva, Juan de la Cierva-Incorporación and Torres Quevedo) and private R&D projects (totaling 288.000 € among all I have been/am the PI), and funded by Nissan Motor Co. in Japan. Particularly, I remark my significant role on writing the projects, as well as on the activities for their scientific justification. I have participated in 19 research international/national projects/contracts, highlighting two European Projects. I collaborate as R&D consultant for a leading company in electrochemical technologies for wastewater treatment. During the course of these research activities I have gained much experience on supervising research activities (final year, master, and doctoral thesis projects) of up to 9 foreign/national students, remarking my co-direction of two PhD thesis. Moreover, I have actively participated in a fruitful collaboration with various prestigious international and national research groups/scientists.

In Industrial and intellectual property, my research has greatly contributed to the elaboration of 5 patents, 1 licensed by Nissan Company in Japan, and, at least, 1 patent in each of my research institutions. Moreover, I have actively participated in diverse activities of technology transfer, like the participation in Egética-Expoenergética 2011 and the INNOCASH Genoma program 2011, or the elaboration of various technology offers. Moreover, I elaborated a business plan "Green Carbon technologies" to bring the electrochemical regeneration technology to the market.

Among my productivity, I can highlight my participation in the production of 35 papers in international/national journals/books (56% as first author, 85% Q1 among JCR-indexed ones, 4 as corresponding author). My research articles have more than 500 citations and my h-index is 13. On the other hand, I have participated in ca. 80 international/national conferences, with communications in the most important events in the field, like the International Congress of Chemical Engineering of ANQUE; the World Congress of Chemical Engineering; the World Conference on Carbon and the Meeting of the International Society of Electrochemistry. I stress my paramount



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contribution to all this research and productivity in both experimental and writing tasks, being their principal author in most cases. The quality of my research has been greatly recognized by the scientific community, through high-IF (44% IF > 6 among JCR-indexed ones) and awarded articles; front and back covers of various journals; 4 keynotes and 6 invited talks in international/national conferences; or my invitation to evaluate articles and to edit scientific journals. Among various awards, I highlight the 5th Young Researcher Prize by the "Grupo Español del Carbón" (2011), for my work on the preparation and optimization of carbon materials by using the electrochemical technology, or the "Premios Nuevas Ideas Empresariales (2010)" to my business project on electrochemical regeneration, as the best project on Applied Science and Technology.

Finally, apart from all this contribution to the scientific community, I also emphasize my activities on research dissemination (press release, tv interview, several courses, "La Noche Europea de I@s Investigador@s", etc.) to make visible and bring my research to the society.