



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2019

Turno de acceso general

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Área Temática: Ciencias y tecnologías químicas
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Título:

Producción de Biocombustibles y Bioproductos a partir de lignocelulosa y ácidos grasos volátiles

Resumen de la Memoria:

After obtaining the Master Degree on Environmental Science at University Jaume I of Castellón, Dr. Tomás-Pejó moved to Madrid to start her PhD studies at CIEMAT. During this period, her research line was focused on studying all the steps involved in lignocellulosic ethanol production process (pretreatment, saccharification or hydrolysis and fermentation). Besides, she studied different process strategies for ethanol production from wheat straw. During her PhD, the candidate concluded that the highest level of process integration is reached using the whole slurry in an SSCF process with the adapted *S. cerevisiae* strains. In the pre-doctoral stage, the candidate enjoyed 2 short research stays at the Technical University of Denmark and at Chalmers Technical University (Sweden). This fact boosted her research and made it competitive with very important research groups in the bioethanol field in Europe. The outcome of all her PhD studies was 10 publications (JCR).

During her first year of post-doctorate at CIEMAT, Dr. Tomás-Pejó studied bioethanol production processes at industrial scale in collaboration with private companies. Following, as post-doctoral researcher at Chalmers University of Technology (Sweden), her research line was extended to the utilization of recombinant xylose-fermenting yeast also at industrial scale. Besides, she was involved in a project for identifying the challenges faced during ethanol production processes at high gravity conditions. Furthermore, she gained a lot of experience in using laccase enzymes as biodetoxification agents to reduce the amount of inhibitors in lignocellulosic pretreated materials. This research project about laccase enzymes was an important milestone in her career and all the knowledge gained was crucial for supervising the first PhD Thesis at IMDEA Energy (defended in 2016).

Nowadays at IMDEA Energy, Dr. Tomás-Pejó is Senior Assistant Researcher and her research is mainly focused on fermentation technology to produce biofuels and bioproducts in lignocellulosic biorefineries. In this research line, the applicant was principal investigator of 3 projects, AMAROUT II, LIGNOYEAST (ENE2014-54912-R) and BIO_LIGWASTE (RTC-2016-5281-5) finished in December 2017, June 2018 and December 2019, respectively. Moreover, she also participates in a new research line related with the production of microbial oils for biofuels and bioproducts from volatile fatty acids that has also become an important pillar in her research. This fact shows the capacity of the applicant to extrapolate her knowledge to close-related areas for exploring new research lines. As matter of fact, Dr. Tomás-Pejó is currently leading 1 national project (ACMIBIO_AD-ENE2017-86864-C2-1-R) and she is principal investigator from IMDEA Energy of one international project (BIOGASMENA). Noteworthy, Dr. Tomás-Pejó was main proposer and is presently chairing the COST Action YEAST4BIO Non-conventional yeast for the production of bioproducts (2019-2023), which is already involving more than 90 scientists from 32 countries. This fact proves her strong leadership capacity and willingness to grow in different scientific aspects from laboratory research to project coordination.

Resumen del Currículum Vitae:

Dr. Tomás-Pejó received her PhD with International Mention from the Universidad Complutense of Madrid in 2009. After that, she worked as post-doctorate at CIEMAT for one year. After this period, she joined the Industrial Biotechnology Group at Chalmers University of Technology (Sweden) for 3 years. In 2014, she was awarded with a MARIE Courie-AMAROUT grant to join the Biotechnological Processes Unit at IMDEA Energy where she is now Assistant Senior Researcher.

The research trajectory of the applicant has a clear international character. She has stayed in total 3 years and a half abroad. She completed two 3-month stays during her PhD studies (at DTU-Denmark and Chalmers University-Sweden). Furthermore, she took up a post-doctoral research position for 35 months at Chalmers University. The applicant has close collaboration with international research groups working in similar research lines.

Product of her fruitful scientific career Dr. Tomás-Pejó has authored a total of 50 publications (3 in press and 3 under revision), 60% of them in Q1 journals in their respective fields. She is first or corresponding author of 24 papers and 18 were published independently of her PhD supervisor. Her h factor is 18 and her articles have been cited 3.286 times. The most cited paper has received 2.948 citations.

Dr Tomás-Pejó has co-authored close to 50 communications to conferences and workshops most of them international, 3 invited and 60% as oral presentations. Dr. Tomás-Pejó is co-inventor of 2 patents. She is Section Editor in Open Life Science Journal, member of the editorial board of the Journal FEMS Yeast Research and acts as reviewer of international journals. She has been member of the Evaluation Committee in 3 PhD defenses and Member of the Scientific Advisory Board of 4 International Conferences. Furthermore, she has teaching experience in PhD courses as well as seminars at graduate level. Dr. Tomás-Pejó is currently supervising 3 PhD students and supervised 1 PhD Thesis defended in July 2016.

She has participated in 16 European and National R&D projects. Dr. Tomás-Pejó was principal investigator of the project LIGNOYEAST



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(ENE2014-54912-R) finished in June 2018 and principal investigator from IMDEA Energy for the project BIO_LIGWASTE (RTC-2016-5281-5) finished in December 2019. She is currently PI of 1 national project (ACMIBIO_AD, ENE2017-86864-C2-1-R) and one international project (BIOGASMENA, ERANETMED2-72-026). Dr. Tomás-Pejó was main proposer and is presently chairing the COST Action YEAST4BIO Non-conventional yeast for the production of bioproducts (2019-2023), which is already involving more than 90 scientists from 32 countries. The applicant has also devoted efforts to disseminate research not only to scientists but also to general public as can be proved by her TV interview in the TV program, *Aquí en Madrid* and her participation in the Weblog *Energía y Sostenibilidad* and the European Researchers Nights.



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Título:

Peptide-based chemical tools for biological research: from sensors to biomaterials

Resumen de la Memoria:

During my scientific career I have acquired a singular training that combines peptide and organic synthesis, molecular recognition, luminescent sensors and bio/nanomaterials. In line with this experience at the crossroads of Nanomedicine and Chemical Biology, my current research lines apply a multidisciplinary approach to the development of smart nanostructured materials and sensors with biomedical applications.

I graduated in Chemistry in 2006 from the Universidade de Santiago de Compostela, and the in same year I started my PhD in the group of Profs. José L. Mascareñas and M. Eugenio Vázquez, funded by an FPU Fellowship. During this period, I worked on the design and synthesis of luminescent peptide probes for the detection of several important proteins related to cancer, obtaining my PhD in February 2012. My interest in lanthanide sensing and the work at the interface between Chemistry and Biology led me to carry out 2 research stays during my PhD (4 months each) in the groups of Prof. Thorfinnur Gunnlaugsson (Trinity College Dublin) and Prof. Scott K. Silverman (University of Illinois at Urbana-Champaign).

In 2012, I joined the group of Prof. Samuel I. Stupp at Northwestern University funded by the Postdoctoral Fellowship from the Fundación Barrié. There, largely as an independent researcher, I could explore my own ideas and opened a new research line in the group focused on metallized nanofibers with antimicrobial properties.

After my postdoc, I joined Medcom Advance as Research Officer. During my time in this company, I participated in the development of an optical device for the identification and quantification of pathogenic bacteria. I also gained considerable experience in industry, business and management.

In December 2015, I joined the group of Prof. Ramón A. Álvarez-Puebla at the Chemistry Technology Center as TECNIOspring & Marie Curie researcher, where I worked on the development of new SERS-based sensors for bacteria, cancer cells, and oncogenic proteins.

Thanks to the InTalent UDC-Inditex Programme (210 K), I joined the CICA at Universidade da Coruña as junior group leader in July 2017. This program has provided me with an independent laboratory and has also given me the opportunity to establish my own group.

In 2018, I was awarded two grants, one from the Spanish Research Agency (47 K) and one from the Galician Research Agency under the Oportunius Programme (50 K). In 2019 I was awarded an ERC Starting Grant from the European Research Council (1.49 M).

Resumen del Currículum Vitae:

In 2012, I obtained my PhD (Extraordinary PhD award) from Universidade de Santiago de Compostela under the supervision of Prof. José L. Mascareñas and Prof. M. Eugenio Vázquez. Following my PhD, I had an extended postdoctoral training including positions both in academia (Prof. Samuel I. Stupp at Northwestern University and Prof. Ramón A. Álvarez-Puebla at the Chemistry Technology Center) and industry (Medcom Advance). Since July 2017, I am a junior group leader at the Advanced Scientific Research Center (CICA) of the Universidade da Coruña. My current research interests are focused on the development of peptide-based sensors and materials. Since I joined the UDC, I have supervised 4 Bachelor s final year projects, 3 Master's theses, and 3 international students under the Erasmus+ Traineeship Programme. Currently I m supervising 2 PhD students (one of them awarded with an FPU fellowship).

My research output is characterized by publications in high impact journals, including 5 J. Am. Chem. Soc., 2 Angew. Chem. Int. Ed., Chem. Soc. Rev., and Chem. Sci., and in science and chemistry journals with broad audience, such as Chem. Commun. or 2 Sci. Rep.. I m the corresponding author in 3 of my publications. Furthermore, some of the results obtained during my PhD, at Medcom Advance, and at UDC have been protected by three patents, one of them granted in the US and licensed.

My research results have been presented in 30 national and international meetings, as oral communications (11, one of them as invited speaker) or posters (20). I have also participated as invited speaker in 3 seminar programs and in 2 science dissemination lectures.

Since the beginning of my research career I have been awarded with 10 fellowships in highly competitive calls from different national and regional funding agencies and non-profit organizations, such as the InTalent UDC-Inditex Programme (< 2% success rate), Incoming TECNIOspring (Marie Curie COFUND), Juan de la Cierva Incorporación (4th position in the Chemistry panel), Martí Franquès Research Programme (8% success rate), Fundación Barrié Postdoctoral fellowship (6.5% success rate), etc., securing funding in all the stages of my career.

During my research career I have participated in 17 national and international R&D grants, of which I am the PI in four of them, including an ERC Starting Grant. Since I joined the UDC I have secured more than 1.8 M .

I have collaborated as scientific referee for the Coordination and Evaluation Subdivision of the Spanish Research Agency since 2014, for the United States-Israel Binational Science Foundation since 2017, and as expert evaluator for the European Commission since 2017 (H2020 FET OPEN). I have also participated in the revision of scientific papers for Nanoscale Res. Lett., New J. Chem., J. Nanobiotechnology, RSC



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Adv., and ACS Biomater. Sci. Eng.



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Turno de acceso general

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Título:

Design of Non-Noble Metal Catalysts for Water Interconversion Reactions

Resumen de la Memoria:

A lo largo de mi carrera he participado en numerosos proyectos y líneas de investigación con un marcado carácter multidisciplinar. Mi tesis doctoral (ICMM) se centró en materiales con Magnetorresistencia Colosal, publicando 16 artículos. Realicé un postdoc en el ICMM en el cual abrí una línea de Almacenamiento de Hidrógeno, estudiando hidruros metálicos con alto contenido de hidrógeno. Fui responsable del montaje del laboratorio y la investigación dio lugar a 8 artículos. En paralelo trabajé en el diseño de electrodos de pilas de combustible de óxido sólido, compuestos magnéticos, transiciones de fase, orden de carga, etc (26 artículos).

En 2010 conseguí un contrato postdoctoral (Fulbright) en Rutgers University (USA). Estuve 4 años trabajando para proyectos de la NSF, US Army y AirForce. Mi trabajo se dividió en varias líneas: a) materiales magnetoeléctricos (20 artículos: Nature Commun., Adv. Mater., Angew. Chem. Int. Ed., JACS, Chem. Mater) b) superconductores con temperatura crítica elevada (Chem. Mater., Inorg. Chem.); c) catalizadores para water splitting (Energy Envir. Science, ACS Catalysis).

En 2014 fui contratada por el Niels Bohr Institute (Dinamarca) para montar un laboratorio de preparación de muestras para la nueva fuente de neutrones europea (ESS). Además, crecí monocristales en un "mirror furnace" (artículo PRB) y llevé mi línea de investigación independiente sobre sistemas magnetoeléctricos para entender las dinámicas en el acoplamiento magnetismo-polarización eléctrica (neutrones inelásticos). Colaboré con diferentes grupos del NBI, DTU y Univ. de Copenhague (Nature Comm.). En esta etapa supervisé varios estudiantes (fin de carrera, asignatura y proyecto fin de Master).

En 2015 me concedieron un contrato Juan de la Cierva en el Instituto de Catálisis y Petroleoquímica con Prof. J.L.G. Fierro y Dr. S. Rojas. Sigo trabajando en el grupo llevando mi propio proyecto de investigación: desarrollo de electrocatalizadores basados en óxidos mixtos para las reacciones electroquímicas O₂/H₂O, en particular para la electrólisis del H₂O. He publicado Nature Commun., Appl. Catal. B, ACS Appl. Mater. Interfaces y J. Power Sources. En este tema superviso estudiantes de prácticas, grado, máster, erasmus y SECAT-intro. Estos trabajos han sido presentados con charlas orales en conferencias internacionales (1 Key Note). Además en relación a mi tema de investigación pasé a la entrevista ERC-StG-2019 y este año estoy solicitando ERC-CG-2020 y Retos-JIN2019. Me han concedido como IP del CSIC un proyecto H2020-RIA sobre el tema (PROMET-H2).

Además de esta línea independiente participo en otras líneas: a) compuestos basados en carbones de alta área (tipo grafenos) con nitrógenos coordinados a metales de transición que son muy activos a la reacción de reducción de oxígeno de la pila de combustible. En esta investigación codirijo un estudiante de doctorado; he publicado Appl. Catal. B y J. Power Sources; congresos internacionales (1 Key Note); he co-escrito dos capítulos de libro; y tenemos un proyecto europeo H2020 sobre este tema; b) caracterizo nanopartículas de metales nobles como catalizadores de la reacción de oxidación de alcoholes para pilas donde el combustible sea un alcohol (artículo en Electrochim Acta); d) participo en un proyecto H2020 (FLEDGED) sobre catalizadores para la producción de dimetileter a partir de biomasa.

Resumen del Currículum Vitae:

87 artículos en revistas internacionales, primera autora de 39, entre primera y segunda de 56. Índice H=20. 1552 citas. 47 artículos en Q1 y 79 en Q1/Q2. He coescrito dos capítulos de libro. Destaco la relevancia de mi trabajo con 20 artículos de índice de impacto > 10: 1 Energy & Envir. Science (IF=33), Adv. Mater. (IF=25), JACS (IF= 15), 2 Nature Comm. (IF=14), 3 Appl. Catal. B (IF= 14), 4 Angew. Chem. Int. Ed. (IF= 12), ACS Catalysis (IF= 12), 6 Chem. Mater. (IF= 10). Portada de J. Solid State Chem. Artículo de alta relevancia en Angew. Chem. Int. Ed. He publicado con alto índice de impacto en los 3 países donde he trabajado.

53 contribuciones en congresos internacionales (10 orales, 2 Key Note), chairperson y 4 charlas invitadas en centros internacionales. Miembro del Comité Científico del CCESC 2018. Organización del COST Meeting D30/003/03 y PEGASUS H2020 Meeting. Editorial Board de Electrochem (EISSN 2673-3293), editora de dos Special Issues.

He participado en 47 proyectos de investigación (contando los proyectos en grandes instalaciones), destacando 8 del Plan Nacional Español; 3 EU-H2020; National Science Foundation USA (NSF); AirForce USA; US-Army; Danish Council of Independent Research y empresa NATCO-FOODS. He participado en 23 experimentos en grandes instalaciones (Sincrotrón y Fuentes de Neutrones: ILL, PSI, ORNL, ESRF, ISIS, etc) siendo IP de 19.

Respecto a mi capacidad para obtener recursos: IP del CSIC del proyecto H2020-RIA (PROMET-H2) de 6 millones de euros (350.000 euros destinados al CSIC); un contrato Posdoctoral en Centros Extranjeros 2009 (Número 2 de mi área. Mención Fulbright) y Juan de la Cierva MINECO 2013 (Número 2 de mi área) con financiación conjunta aproximada de 450.000 euros, además de los 19 proyectos en grandes instalaciones y beca FPI. Soy muy activa en la búsqueda de recursos, actualmente estoy en el proceso de Retos-JIN2019 y ERC-CG2020. Pasé a la entrevista de ERC-StG2019.

Internacionalidad de mi investigación: He trabajado 5 años en el extranjero, consiguiendo contratos prolongados en 3 países (España,



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Dinamarca y USA) en centros de alto prestigio internacional. He realizado 15 estancias cortas internacionales. He publicado con más de 100 investigadores de diversos países (USA, China, India, Alemania, etc).

Respecto a mi capacidad de liderazgo. He dirigido 5 prácticas fin de grado (UAM), 2 proyectos de Máster (UAM), becario SECAT, 1 proyecto de Master Erasmus (Aberdeen Univ.), asignatura, 1 proyecto de grado y master de la Universidad de Copenhague. Actualmente co-dirijo un estudiante de doctorado y un proyecto de grado. He abierto dos líneas de investigación: línea de almacenamiento de hidrógeno (ICMM) y línea de óxidos mixtos como catalizadores para electrólisis (ICP).

Docencia: Formación Profesorado de la Comunidad de Madrid; Técnicas de análisis y caracterización de materiales UIMP; Segundo Taller-Escuela Latinoamericano sobre Materia Condensada, Argentina. Formación CSIC.

Gestión i+D+i: Proyectos PEGASUS y PROMET-H2.

Evaluadora de Proyectos de la Comunidad de Madrid para Jóvenes Investigadores de la Universidad Autónoma.

Divulgación: Entrevista Radio Exterior, colaboración RNE5, British Council School, Semana de la ciencia, Día Internacional de la Mujer y la Niña en la Ciencia, Noche de los Investigadores, Bachillerato de excelencia, entrevista CienciaEs.com, artículos divulgación.



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Título:

RATIONAL DESIGN OF MULTIFUNCTIONAL MOLECULAR MATERIALS: FROM MOLECULAR MAGNETISM/SPINTRONICS TO HETEROGENEOUS CATALYSIS AND WATER REMEDIATION

Resumen de la Memoria:

My research career has been devoted to the rational design and study of the physicochemical properties of multifunctional molecular-based materials with potential applications of technological interest.

During my PhD, under the direction of Profs. F. Lloret and E. Pardo at the Institute of Molecular Science (ICMol), I acquired excellent experimental skills on the synthesis and physical characterization of Metal-Organic Frameworks (MOFs) as new examples of Multifunctional Molecular Magnetic Materials, together with a solid conceptual background in Molecular Magnetism. Among other achievements, I obtained unique examples of dynamic and/or luminescent magnetic MOFs.

After getting my PhD in 2012, I started my postdoctoral formation with a short stay (4 months) at The University of Manchester under the supervision of Prof. R. E. P. Winpenny. There, I broadened my formation on Coordination Chemistry and obtained my first achievements on the physical implementation of Quantum Information Processing (QIP) using molecular quantum bits (qubits). In 2013, I performed a postdoctoral stage (1 year) at Texas A&M University under the supervision of Prof. H.-C. Zhou. There, I greatly enlarged my knowledge on MOFs. I focused on the development of a design strategy, based on emerging post-synthetic methods, for the synthesis of MOFs with enhanced physical properties. In 2014, I got a contract from the EPSRC to work as Research Associate (2 months) at the UK National EPR Service, where I was mainly trained in the use of different c.w. and pulsed EPR spectrometers. After this short training period, I started my Marie Curie Fellowship within the research group of Prof. R. E. P. Winpenny. There, I focused on the preparation and detailed spectroscopic studies of supramolecular assemblies of qubits of increasing complexity, which have generated a breakthrough on the physical implementation of QIP. Among other results: (i) a modular design of molecular qubits to implement universal quantum gates and (ii) supramolecular arrays of molecular electron spin qubits with relevance for QIP.

Back to ICMol in April of 2016, I started to develop my own research lines as a postdoctoral researcher at the Coordination Chemistry Group of ICMol under the frame of different programs e.g. Atracción de Talento VLC-Campus and Juan de la Cierva-Incorporación. My research has focused on the rational design of novel MOFs and its use on different applications of technological interest. Some of the main achievements on different research lines I have obtained in this period are listed hereafter, which highlight my independent thinking, scientific maturity, capacity to attract funding and leadership: (i) MOFs as chemical nanoreactors of sub-nanometric metal clusters and supramolecular coordination compounds, (ii) understanding of host-guest interactions in tailored MOFs, (iii) expansion of PSMs and biomimicking molecular recognition processes with MOFs, and (iv) MOFs for the adsorption of contaminants from aquatic ecosystems. Currently, I am a Junior Leader-Retaining Fellow consolidating and opening new research lines within my host group. My interest and objectives in the mid-long term are the development of MTV-MOFs for water remediation and as mimics of bio-enzymatic catalytic processes, as well as apply with guarantees to the ERC-Consolidator Grant.

Resumen del Currículum Vitae:

I obtained my PhD with academic honours in 2012 at the Institute of Molecular Science (ICMol), under the direction of Profs. F. Lloret and E. Pardo. Then, I started with my postdoctoral formation at The University of Manchester (Prof. R. E. P. Winpenny). In 2013, I performed a postdoctoral stage at Texas A&M University (Prof. H.-C. Zhou). In 2014, I worked at the UK National EPR Service, and later on, I started my Marie-Curie Fellowship (Prof. R. E. P. Winpenny). Back to ICMol in April 2016, I started to develop my own research lines as postdoctoral researcher at the Coordination Chemistry Group under the frame of different programs e.g. Atracción de Talento VLC-Campus and Juan de la Cierva-Incorporación. Currently, I am a Junior Leader-Retaining Fellow consolidating and opening new research lines within my host group.

I am author of 86 articles 34 (40%) within the last four years in international well-indexed scientific journals first author in 20 and corresponding author in 22 (17 of them, 77%, during the last three years) with 2303 citations 272 average number of citations/year during postdoctoral period, a 28 h-index value and 53 i10-index. 74 of my publications (85%) are ranked in the first quartile (Q1) 41 in journals of impact factor (IF) > 6 and 29 with IF > 10. Some of these articles have been classified as Hot/VIP and, in some cases, they have illustrated several covers of prestigious journals i.e. Chem, J. Mater. Chem. A (2) and Chem. Eur. J. (4). I am also author of an invited book chapter, under reviewing. I have participated in 37 national and international scientific meetings (14 oral presentations) and I have given 7 invited lectures in different highly-ranked universities. I am author of 2 patents (P201730226 and P201831167) another one is under patent process. I have also significantly contributed to the development of 2 patents in my Marie Curie (WO2015145144 and 1517273.7). I have directed 2 PhD thesis and 2 more are on-going. I have also supervised 6 Masters final projects and 6 final degree projects. I have lectured 213 hours of Chemistry in different degrees of the University of Valencia. I have also participated in assessment committees Master and degree final projects. I have participated in the organization of symposiums, small conferences and exhibitions. My expertise



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has been recognized since I regularly participate as reviewer in international well-indexed scientific journals.

I have been awarded with 5 research projects as principal investigator (PI), from La Caixa Foundation (Junior Leader-Retaining Fellowship), BBVA Foundation (2018 Leonardo Grants for Researchers and Cultural Creators), MICINN ("Juan de la Cierva-Incorporación 2017"), University of Valencia ("Atracción de Talento VLC-Campus") and the European Commission (Marie Curie IEF-2013). Overall, I have consolidated ca. 659 k as PI. I have participated in 18 research projects at national e.g. 7 MICINN and 2 EPSRC and international level (including collaborative networks) e.g. COST MOLSPIN, Long Term Project at the ESRF and Network of European Associated Laboratories . I have been selected for the Step 2 of the ERC Starting Grant twice (ERC-StG-2017 and 2019). Recently, I have applied for more funding as PI with two research projects, from Generalitat Valenciana (SEJI 2020) and MICINN (Generación de Conocimiento).



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Título:

Development of novel membranes with improved performance for their application in molecular separations of industrial relevance

Resumen de la Memoria:

One of my main areas of expertise is the development of novel hybrid membranes by the addition of fillers with superior properties into polymer matrices. During my PhD (FPU programme, 2007-2010) at Universidad de Zaragoza I worked with layered zeolites and titanosilicates for their application in gas separation. The outcomes of my work led to 9 publications, 6 of them as first author. At Imperial College London, ICL, (3rd best in Chem. Eng. in UK and 9th worldwide - QS ranking) I worked in a world-leading group in the field of membranes with Prof Livingston (Oct. 2011- May 2013) in 2 European projects under the FP7-Marie-Sklodowska Curie ITN programme and a project funded by British Petroleum. During my post-doc I did some worked on the preparation of mixed matrix membranes (MMMs); synthesising silica within the pores of polyimide asymmetric membranes in-situ, and developing polyamide thin film nanocomposite membranes with MOFs for their application in organic solvent nanofiltration (OSN). The latter was done in collaboration with the group in Zaragoza and led to the publication of a scientific paper in JACS (IF=14.695) in 2013 that so far has received 345 citations (Google Scholar Dec. 2019).

Later, during my post-doc at University of Manchester, UoM, birthplace of graphene membranes, and after securing in Sept. 2014 a Lectureship position (4th in UK and 22nd worldwide - QS ranking) I have continued my work on MMMs using graphene and other 2D derivatives. I currently lead a group of 6 PhD students and 1 postdoc working on preventing physical aging and swelling/plasticisation in membranes, endowing them with anti-fouling properties and increased fluxes for aqueous filtrations and preventing pore wetting in membrane distillation. I am corresponding and last author of 8 papers (all in Q1 of Chem.Eng.) from my work as independent researcher with an increasing trajectory of citations, so far 1143 citations (GS Dec. 2019).

Another on-going line in my research is the formation of thin films for molecular separations. Membranes at laboratory scale are often prepared as thick freestanding films, however, in order to achieve reasonable fluxes when operating at industrial scale, the thickness of these selective layers must be reduced as much as possible. This is done by forming the thin film on top of a highly porous support that provides them with mechanical strength. Nevertheless, polymeric thin films do not often behave like their thick counterparts and their preparation is often challenging, especially when forming hybrids. During my post-doc at ICL I worked on polyamide thin film composite membranes by interfacial polymerization and produced for the first time ultrathin organophilic films (~35nm thick) with a highly permeable polymer (PIM-1). This work was published in Adv. Funct. Mater. (IF=15.621) in 2014 and studied for the first time the concept of intrinsic and extrinsic microporosity in (OSN) membranes. So far has received 122 citations (GS Dec. 2019).

At UoM I also work on thin films of PIM-1 in collaboration with the father of this highly permeable polymer, Prof Budd, exploring routes for preventing aging and improving its permselective properties for pervaporation and gas separation. So far 2 papers have been published in the pre-eminent journal in the membrane field (J. Membr. Sci. IF=7.015).

Resumen del Currículum Vitae:

I am co-author of 37 publications. My work is published in leading international journals including Advanced Functional Materials (Impact factor, IF = 15.621), Journal of the American Chemical Society (IF = 14.695), Journal of Membrane Science (IF = 7.015) and Chemical Engineering Journal (IF = 8.355). I am corresponding and last author of 8 scientific papers. My papers have received 1153 citations and have an h Index of 17 (Google Scholar Dec 2019) with an increasing trajectory of citations. The momentum and impact of my work is demonstrated by the 16 papers published since 2018 to date (Dec 2019).

Co-author of a total of 37 publications (32 scientific papers, 1 review, 1 Book chapter, 4 conference papers)

87% of these publications are in SCI journals (32 publications). Out of these 32 publications more than 90% are in the first quartile (Q1) in the fields of Chemical Engineering, Materials Science and Chemistry

9 publications as first author

8 publications as corresponding author and also last author. All in Q1 of Chemical Engineering

1153 total citations (Google Scholar Dec 2019).

h-index of 17 (Google Scholar Dec. 2019)

h10-index of 21 (Google Scholar Dec. 2019)

I am PI in an EPSRC-New Investigator Award project worth £259,623 and a Royal Society Project worth £11,750. I am co-I in a large project funded by Airbus/Innovate UK (£830,000). A FLAG ERA JTC 2019 project with partners in Spain and Italy worth £313,043 has been recently awarded in which I am co-I (PI in the UK).

I obtained my PhD from The University of Zaragoza in Spain in 2010 and worked as postdoc at Imperial College London (Oct 2011-May



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2013). I have been visiting researcher at the University of Minnesota, Heinrich Heine University Dusseldorf, and TUDelft, and I have presented my work in more than 40 international conferences.

The spin-out company Graphene Water Technologies LTD has been recently founded in my research group through the Eli and Britt Harari Graphene Enterprise Award 2016, which aims at boosting the technology transfer of graphene from the lab to industrial products.



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2019

Turno de acceso general

Nombre: PALOMO RUIZ, MARIA DEL VALLE

Referencia: RYC2019-027489-I

Área Temática: Ciencias y tecnologías químicas

Correo Electrónico: valle_palomo@hotmail.com

Título:

Desarrollo de biosensores y química biológica en el descubrimiento de fármacos para enfermedades neurodegenerativas

Resumen de la Memoria:

My research has been focused on the development of chemical tools to treat and understand neurodegenerative diseases. During my PhD Thesis I developed a series of neuroprotective and neurogenic compounds based on the inhibition of GSK3, an enzyme involved in these disorders. Working on a chemical genetic approach, I synthesized inhibitors with different chemical structures and distinct mechanism of action. These compounds resulted to be very powerful pharmacological agents, demonstrated in the industrial exploitation of 2 of the patents presented in my PhD, that are currently licensed to pharmaceutical companies. Furthermore, given their chemical and biological properties, these agents have helped to decipher the role of this important kinase in different diseases. The scientific impact of this stage can be measured through the 19 publications in high ranked journals (J. Med. Chem, J Biol Psy., ACS Chem. Neurosci) 4 as first author and 6 as second. I have also received 4 prestigious awards, the Ramón Madroño award of the Spanish Society of Therapeutic Chemistry, the Lilly award for my CV, the Extraordinary Award for my PhD and an Innovation award by Madri+d foundation for one of the patents. The translational impact is reflected in the 4 presented patents, 2 of them licensed. Finally, I participated in outreach activities like Week of science in years 2009-2012.

In 2013 I started my postdoctoral period for which I obtained 2 consecutive research fellowships (Caja Madrid (1 year) and Ramón Areces (2 years)) at The Scripps Research Institute in La Jolla to work with Quantum Dot nanoparticles and peptides. I focused on the creation of luminescent sensors of key enzymes for diseases such as exopeptidases and on the design and synthesis of biomimetic nanoparticles. I established fruitful collaborations with international researchers in the field that are still active. As a result of this stage I published 8 scientific articles in high impact journals (ACS Nano, J. Am. Chem. Soc., J. Clin. Invest., Chem Mater), 2 of them as first author. I presented my work in international conferences receiving 2 Poster awards. I also supervised 1 undergrad student and a master student.

The third stage of my research career starts in 2016 when I moved back to Spain with Juan de la Cierva-Incorporación fellowship, that supports the beginning of independent research work through its own funding for a modest project. During this time, I started merging my scientific knowledge from my PhD and my Postdoc in order to establish myself as a group in chemical biology, using Quantum Dots as sensors to unravel the molecular mechanisms of neurodegenerative diseases and as an innovative platform to test potential drug candidates. In 2018 I obtained la Caixa Junior Leader Retaining fellowship, and since August 2018 I manage my own group. I hired a predoctoral student that later obtained an FPU fellowship, have awarded three additional grant as IP, and participate in excellence research CiberNed consortium. In this period I published 7 research papers (J. Med Chem, Mol. Neurodegener) Finally, in December 2018 I received an award by the Royal National Academy of Pharmacy presenting an unpublished research work as corresponding author. I have directed 5 master students and 3 graduate students and currently in my group I manage 5 people, including 2 funded PhD students.

Resumen del Currículum Vitae:

The most relevant features of my scientific career are detailed below:

- BSc in Chemistry at UAM (Madrid) in 2008, obtaining the BSc extraordinary award (#1 of 121 students).
- 4 year fellowship from the Spanish National Research Council (Jae-Pre-CSIC) to conduct the PhD at the Medicinal Chemistry Institute (IQM-CSIC). I joined Ana Martínez's research group with the aim of developing new drug candidates with neurogenic and neuroprotective properties.
- Master's degree in Organic Chemistry in UAM university of Madrid 2008-2010
- PhD in Organic Chemistry receiving the Official University's extraordinary award for PhD Thesis of 2011/2012 academic year (1 per 10 PhD students with the highest score).
- Ramón Madroño award from the Spanish society of Medicinal Chemistry for my project GSK3 inhibitors in neuroprotection and neurogenesis (2011).
- Lilly foundation award for PhD students for my PhD research results and CV (2011).
- 2 international predoctoral research short stays in Karlsruhe (Germany) and London (UK)
- I obtained two consecutive postdoctoral fellowships (Caja Madrid foundation (1 year, 2013) and Ramón Areces (2 years 2013-2015)) to join Prof. Dawson's research group at the Scripps Research Institute (La Jolla, US) to expand my research knowledge in nanoparticle characterization, functionalization and peptide synthesis and ligation.
- I performed a short postdoctoral stay at Prof. Mattoussi research lab at FSU.
- 2 poster awards for the work presented in Posters, and 1 invited oral communication.
- Juan de la Cierva- Incorporación fellowship (2015) from the Spanish ministry of Economy to continue my research at the Centre for Biological Research (CIB-CSIC) in Madrid, where I am based since April 2016.



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-Junior Leader - Retaining grant of la Caixa to establish my own research group. Currently I am working on projects that combine pioneer techniques in chemical biology, bioimaging and sensors with nanoparticles with human models of neurodegenerative diseases.
-Awarded by the Royal National Academy of Pharmacy in December 2018 for an unpublished and anonymous research project participating as corresponding author.
-Second grant as co-PI from Ramón Areces foundation (128k)
-Third grant as PI, Caixa Impulse (70k)
-Grant Ayudas Europa from Ministerio to apply for European funding (9k)
-I am a selected Topic Editor for the Q1 journal Antibiotics
-From 2018 I have secured 512k for my research projects through 4 research grants as PI

I participated in 34 publications (8 as first, 6 as second author; 8 without my PhD supervisor), 28 published in D1 (19) and Q1 (10). (1 ACS Nano, 4 J. Med. Chem, 3 J. Am. Chem. Soc., 5 ACS Chem. Neurosci., 1 Biol. Psychiatry, 1 J. Clin. Inv, 1 Chem. Mater, 1 Mol. Neurodegener., 2 Neuropharmacology, 1 Bioconjugate Chem., 1 Sci. Rep., etc) I have presented 11 oral communications at international conferences or symposia and 41 communications as posters. I have been awarded 10 awards and 8 research fellowships/grants to date.

I have also been involved in outreach activities including Week of Science at CSIC (2018, 2017, 2016, 2011, 2010, 2009), training of teachers (2016), and giving talks in schools in the frame of girl and woman in science framework. I am reviewer of prestigious journals such as Journal of Medicinal Chemistry and Molecules.



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2019

Turno de acceso general

Nombre: COLOMER UTRERA, IGNACIO
Referencia: RYC2019-026674-I
Área Temática: Ciencias y tecnologías químicas
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Título:

New catalytic tools in organic chemistry: applications in synthesis, systems chemistry and the origin of life

Resumen de la Memoria:

I am an emerging scientist with more than 12 years of broad experience at the interface of organic, medicinal, electro and supramolecular chemistry. During my career I have shown great potential to achieve challenging research objectives, which guarantees a high level of expertise in the proposed research topic.

During my PhD (2008-2012) I developed new methods for the asymmetric synthesis of organic molecules using the chiral sulfinyl group as stereoselective inductor. Important building blocks that are present both in natural products or bioactive species could be accessed using these methods (1,4-diols, 1,4-aminoalcohols, allylic amines). This work was funded by a prestigious FPU fellowship by the Spanish Government and resulted in 8 publications in top journals, including a review article in the highest impact factor journal for general chemistry (Chem. Rev., 2017, 117, 14201). I had the opportunity to improve my research experience with several short stays at different top-world universities (UC Berkeley, Stanford) where I approached novel enantioselective polycyclizations. Within the group of Prof. Toste I developed the first enantioselective gold-catalyzed 5-endo-dig cyclization of enynes (J. Am. Chem. Soc., 2012, 134, 2742). Alternatively my background was enriched in medicinal chemistry, participating in several projects targeting HIV or in the European Lead Factory (Eur. J. Med. Chem., 2015, 106, 34; Chem. Commun., 2016, 52, 7209).

In 2014 I joined the University of Oxford as a Marie Curie Fellow, where I was the leader of a new research program studying Metal-free oxidants in organic synthesis, using both electrochemistry and hypervalent iodine reagents. This work resulted in valuable methods with applications in the synthesis of natural products and bioactive molecules (Angew. Chem., Int. Ed., 2016, 55, 4748; J. Am. Chem. Soc., 2016, 138, 8855; J. Am. Chem. Soc., 2019, 141, 6489).

In 2016 I joined the group of Prof. Fletcher at Oxford within an ERC-CoG to study synthetic replication in connection with the area of systems chemistry and the origin of life. Among the main achievements I developed the first transient (non thermodynamic stable) synthetic replicator and the study of its behaviour in complex phenomena, such as competition and selection (Nat. Commun., 2018, 9, 2239; Nat. Commun., 2019, 10, 1011; Nat. Commun., 2020, 11, 176).

In 2018 I started my independent career, first as a Juan de la Cierva fellow at the Universidad Autónoma de Madrid, followed by my appointment as a Junior Group Leader at IMDEA-Nanociencia. During this brief period my group has focused on 2 research lines:

1) The use of Hexafluoroisopropanol (HFIP) as a privileged solvent in the selective synthesis and functionalization of organic molecules with medical and biological interest. A review with over 120 citations (Nature Rev. Chem., 2017, 1, 0088) and 2 contributions to be published very soon highlight the relevance of this project.

2) The long-term goal of building a synthetic protocell based on chemical reactivity principles. I have designed a collection of chemical reactions to build increasingly complex dynamic systems operating far-from-equilibrium. This proposal received funding from private (Junior Leader La Caixa, 305.000) and public institutions (CAM Talent Attraction, 415.000), reflecting the hot-topic challenge of this project.

Resumen del Currículum Vitae:

I am currently a Junior Group Leader at IMDEA-Nanociencia (Spain), where I lead a group focused in the development of new chemical reactions for the synthesis and functionalization of organic compounds with medical or biological interest.

I earned my PhD in 2012 from Universidad Complutense (Spain) under the supervision of Prof. Fernández de la Pradilla at the Spanish Research Council (CSIC), where I acquired my organic chemistry proficiency, developing new methods for the asymmetric synthesis of useful building blocks (1,4-diols, aminoalcohols or allylic amines). I consolidated my scientific skills visiting many top-world institutions, including: - U.C. Berkeley (USA), with Prof. Toste I improved my knowledge in metal-catalysed reactions, using chiral gold complexes. - Stanford University (USA), exploring novel organocatalytic methods for the enantioselective creation of C-halogen bonds. - University of Leeds (UK), in collaboration with Prof. Adam Nelson, I improved my expertise in medicinal chemistry, within the European Lead Factory, a project funded by the EU to create the largest library of compounds to be screened.



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From 2014 I was a Marie Curie Fellow working with Prof. Donohoe at the University of Oxford (UK), where I mastered my skills in organic chemistry, catalysis, metal-free processes and natural product total synthesis. I also initiated a collaboration in the field of electrochemistry with Prof. Richard Compton. In 2016, I took a Postdoctoral position in the group of Prof. Fletcher at Oxford (UK), starting a challenging project that involved prebiotic and supramolecular chemistry.

In 2018 I joined the Universidad Autónoma de Madrid with a very competitive Juan de la Cierva fellowship (incorporación) to develop my independent research. Since 2019 I am Junior Group Leader at IMDEA-Nanociencia. During my brief independent career I have raised up more than 700.000 as a PI of scientific projects under national and international calls, including: Junior Leader La Caixa or CAM Talent Attraction. Moreover, my proposal Non-equilibrium organic chemistry (NEO-CHEM) has been positively evaluated in the first step of the ERC-StG program and I was invited for a personal interview.

I am qualified as "Profesor Contratado Doctor" by ANECA, with an extended record supervising Master, PhD and postdoctoral students, that have continued their career at relevant institutions. I have participated in more than 10 national and international scientific projects, including ERC-StG and ERC-CoG.

I am the author of 1 book chapter and 23 high-quality scientific articles (+ 3 submitted), including Nature Commun. (3), J. Am. Chem. Soc. (3), Angew. Chem. Int. Ed. (1), Nature Rev. Chem. (1), Chem. Rev. (1), Org. Lett. (5) or Chem. Commun. (2), with more than 600 citations and an h-index = 14. I have participated in more than 20 national and international conferences. Just in 2019 I gave 4 invited lectures and I am currently involved in chairing and organizing next Systems Chemistry Gordon Research Seminar in 2020.

I have received several competitive Spanish and European fellowships and prizes: -2007 Best undergraduate student award -2008 FPU PhD Fellowship, -2012 Lilly-PhD Award, -2014 Marie Curie Fellowship, -2017 Juan de la Cierva Fellowship, -2019 Junior Leader Grant-La Caixa, -2020 CAM-Talent Attraction grant -2020 Chem. Commun. emerging scientist.



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2019

Turno de acceso general

Nombre: GUIADO BARRIOS, GREGORIO
Referencia: RYC2019-026693-I
Área Temática: Ciencias y tecnologías químicas
Correo Electrónico: guisado@uji.es

Título:

Synthesis and development of ligands, complexation studies and applications in homogeneous Catalysis and molecular recognition

Resumen de la Memoria:

Gregorio Guisado Barrios graduated in Chemistry, University of Burgos (2003). He worked at the Forschungszentrum Jülich (FZJ) Germany in (2004), as Laboratory Assistant under the supervision of Dr. Jean M. Séquaris, in the physicochemical characterization of the soil organic matter form, which is relevant in the transport, and immobilization of pollutants.

He was awarded his Ph.D. (2010) under direction of Dr. David T. Richens at the St Andrews University (UK) funded by (EPSRC). His research was focused on the synthesis of biomimetic polypyridyl metal complexes based on first row transition metals for the challenging selective catalytic hydrocarbon oxygenation reactions. At the same university he joined the group of Prof. Paul J. C. Kamer as postdoctoral researcher working in the development of artificial metalloenzymes involving the functionalization of proteins and cyclic peptides with phosphine moieties for the incorporation of late transition metals, coordination studies and asymmetric catalysis (2008-2009, funded by EU, FP6-2003-NEST-B3 15471).

Subsequently, he joined Prof. Guy Bertrand's group (currently at University of California San Diego, US) as a Postdoctoral Researcher (2010-2012, US Funding) to work on the synthesis of mesoionic carbene ligands (MICs) obtained via click chemistry (ACIE 2010, WOS highly cited article & WO 2011139704A2, international patent). The study of its applications was carried out in collaboration with Prof. Robert H. Grubbs (Nobel Prize in Chemistry 2005) at Caltech, US.

In 2012, he moved to the University Jaume I (UJI) Spain, to join the group of Prof. Eduardo Peris, first as UJI-Postdoctoral Researcher, then as "Juan de la Cierva" Fellow (Formación-2015-2017) & (Incorporación-2017-2019) and more recently as MICIU-JIN-Fellow.

At this institution, his research has involved the synthesis of N-heterocyclic carbene ligands (NHCs) and (MICs), to prepare polymetallic complexes and supramolecular self-assembled coordination cages, for catalytic applications, molecular recognition and host-guest chemistry. He has secured funding as a PI, i.e. (MICIU-JIN) (2019-2022), Generalitat Valenciana-Emergentes (2015-2017), MEC-D-JCastillejo (2016) and MEC-D-IJDC (2017-2019). In addition, he established collaboration with Dr. I. Bezuidenhout University of Witwatersrand, through a postgraduate training program sponsored by South African Government, NRF (2014-2017). We, along with Prof. Guy Bertrand (UCSD) established an international collaboration focused on the synthesis and stabilization of (MICs) based metal complexes such as gold(III)-hydride (JACS, highlighted on JACS spotlights), as well as in the preparation of catalysts for additive-free alkyne dimerization and hydrothiolation reactions.

The candidate has a mature scientific background with a broad experience in the fields of ligand synthesis, organometallic chemistry, catalysis, self-assembly and supramolecular host-guest chemistry. He has demonstrated an extraordinary capacity to work independently, establishing independent collaborations, supervising graduate students from different nationalities and securing funding from different agencies. Moreover, his role as secretary and treasurer of GEQO has reinforced his management and problem-solving skills, which are fundamental to become a research leader.

Resumen del Currículum Vitae:

Gregorio Guisado-Barrios graduated in Chemistry in 2003 at the University of Burgos, Spain. In 2004, he worked at the Institute of Chemistry and Dynamics of Geosphere, Forschungszentrum Jülich, Germany as Laboratory Assistant, under supervision of Dr. Jean M. Séquaris. He was awarded his Ph.D (2010) at St Andrews University (Scotland, UK) under the supervision of Dr. David T. Richens. At the same institution he also worked as Postdoctoral Research Fellow in the group of Prof. Paul J. C. Kamer. Then he joined Prof. Guy Bertrand's group, now at University of California San Diego (US) as a Postdoctoral Researcher. In 2012 he joined Prof. Eduardo Peris' group at the Institute of Advance Materials (INAM)- Jaume I University (UJI), first as UJI-postdoctoral researcher, then as

"Juan de la Cierva-Fellow". During this period, he was awarded with the "José Castillejo Mobility Fellowship 2016" to carry out a (3) months research stay in the group of Prof. Vincent Lavallo, University of California Riverside (US). He is currently working at the same institution as JIN-Fellow funded by (MICIU- Retos de Investigación-JIN).



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2019

Turno de acceso general

Nombre: GIMENEZ MARQUES, MONICA
Referencia: RYC2019-027902-I
Área Temática: Ciencias y tecnologías químicas
Correo Electrónico: monica.gimenez-marques@uv.es

Título:

Nanostructured flexible MOFs and responsive hybrid core@shell nanoparticles

Resumen de la Memoria:

Dr. Mónica Giménez Marqués has an educational background in chemistry with expertise in different research areas as a result of the diverse and very productive positions she has held. Her research career started with a 9-month undergraduate research project to study molecular magnetic materials in Prof. J. Reedijk's group in Leiden, resulting in 2 publications. After graduating at the University of Valencia (UV), she gained an Early Stage Researcher Fellowship from the MAGMANET excellent network to carry out her MSc with Prof. J. R. Galán-Mascarós at the UV. This project was devoted to magneto-chiral effects, single-molecule magnets and polyoxometallates, resulting in 1 publication (Angew. Chem. Int. Ed.).

She carried out her PhD under the supervision of Prof. E. Coronado and Dr. G. Mínguez Espallargas, funded with a FPU National fellowship (and a V Segles Fellowship declined), where she worked in the preparation of magnetic responsive materials, from spin-crossover nanoparticles to magnetic metal-organic frameworks (MOFs), giving rise to 12 publications in high impact journals such as Nature Commun., J. Am. Chem. Soc. and Chemical Science and resulting finalist in the Research Awards « SusChem » for Young Chemists (2013).

After her PhD defense (Nov. 2013), she moved her interests towards different uses of MOFs, and developed 2 projects in the very distinct fields of biomedicine and catalysis. From January 2014 to April 2015, she held a post-doctoral position at the Institut Lavoisier de Versailles (France), under the supervision of Prof. Christian Serre and Prof. Patrick Couvreur to study the biomedical use of MOFs.

In 2015, she gained a Marie-Sklodowska Curie Individual Fellowship to work at the Institut des Matériaux Poreux de Paris (France) where she studied the rational design of heterometallic MOFs for their use in heterogeneous catalysis, with a research stay in Prof. Hermenegildo García's group at ITQ.

Recently she was awarded a Juan de la Cierva Incorporation Fellowship (selected 1st in the Chemical area in 2016) and the prestigious Junior Leader Incorporation program from La Caixa which has served to establish her independent career. She is leading a research line devoted to MOF hybrid structures at Instituto de Ciencia Molecular.

Note three career breaks for maternity leaves.

Resumen del Currículum Vitae:

Dr. Mónica Giménez Marqués (34 years old) is an experienced researcher with a background in Chemistry and Nanoscience. The high quality of her achievements is denoted by 1 international granted patent and 32 published articles (4 as corresponding author) in high impact journals (31 in Q1, average impact factor 8.3, h-index = 14). She has participated in 29 international congresses, presenting 16 oral communications (7 as invited speaker).

She is currently co-director of 3 PhD and 2 MSc students (+6 MSc and 6 final degree research projects in the past). She is collaborating in teaching activities in the Univ. of Valencia at Degree and Master levels. She has participated as an evaluator in the Marie-Sklodowska Curie Actions and in different Final Degree and MSc committees, and performed reviewer tasks for journals including Angew. Chem., J. Am. Chem. Soc. and Chem. Commun. In addition, she performs activities dedicated to the transfer and exploitation of results with Technological Centres and companies. Finally, she has participated in the Organizing committee of 1 National conference, 2 Jornadas de la Mujer Investigadora and contributed in different Scientific Festivals (Pint of Science, Researchers Night and Fête de la Science).

Mónica has received several distinctions such as the Young Talent Award 2018 (category of Science) in the Valencia Region, the Scientific Award Ciudad de Algemés (2019) and was selected to attend the prestigious 67th Meeting of Nobel Laureates in Lindau (2017).

She has conducted her research lines in Severo Ochoa and María de Maeztu Centres and Units of excellence such as the Instituto de Ciencia Molecular (ICMol), Instituto de Tecnología Química (ITQ) and Instituto Catalán de Investigaciones Químicas (ICIQ). She has also developed part of her career in International centers such as Leiden University (The Netherlands), Karlsruhe Institute for Technology (Germany) and Institut Lavoisier de Versailles, École Normale Supérieure and École Supérieure de Physique et de Chimie Industrielles (France), creating a network of collaborations. She is leading a partner group in collaborative projects that are currently under preparation



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for competitive calls for European (RIA call FNR-16-2020), National (Retos-colaboración) and regional calls (Proyectos Estratégicos en colaboración-AVI).

Mónica has obtained, as Principal Investigator, financial support from competitive Regional (VALi+d program), National (Europa Investigación and Juan de la Cierva Incorporation) and European calls (Marie-Sklodovska Curie Individual Fellowship) and obtained funding to access synchrotron facilities. Finally, Mónica has been awarded a competitive project Junior Leader Incoming from La Caixa Foundation to establish her independent career.



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2019

Turno de acceso general

Nombre: POLO , ESTER
Referencia: RYC2019-028238-I
Área Temática: Ciencias y tecnologías químicas
Correo Electrónico: ester.polo@usc.es

Título:

Synthetic biomimetic cell-derived nanostructures

Resumen de la Memoria:

Since 2007, I have been involved in a variety of multidisciplinary projects in the field of nanoscience working in the design and development of functional nanostructured materials for life science applications. Particularly, my PhD (2013) research focused on the development of several nanoparticle-based biosensors for the detection of cancer markers (ACS Nano 2011, Chem.Comm. 2013) was carried out at the Institute of Nanoscience of Aragon (UZ, Spain). I worked extensively on nanomaterial synthesis, and surface functionalization with molecules of biological relevance. Moreover, I had the opportunity to participate in other research projects (based on the knowledge transfer from academia to industry, in order to develop innovative products in the Life Science field).

During my postdoctoral stage at CBNI, UCD (Ireland, 2013-2017) I acquired an extended knowledge in the area of bionano-interactions. In 2016 I got promoted to senior researcher. I worked on characterizing in molecular detail the information encoded at the surface of nanostructures in a realistic environment, in order to understand the link between the presentation of certain endogenous molecules and their biological outcomes. Applying the principles of physical chemistry to understanding fundamental biological processes, such as understanding the role of the bionano-interface in determining NP interactions with cellular membranes and biological barriers, and correlating this with their ultimate biological fate, behavior and signaling pathways. This led to the development of platforms for screening the exposed sequences on the NP surface under different biological scenarios (Nat. Nanotechnol. 2015, Nat. Commun. 2016) and underlying the different parameters that can affect the relationship between the design and structure of the NPs and its biological properties (JACS 2017, ACS Nano 2017, ACIE 2017). I participated in the management of different EU projects involved in nanosafety and nanomedicine, working with high-quality academic centers, industry and regulatory entities such as EMEA, FDA. Due to the involvement in these projects, I developed the basic knowledge in project management, and the ability to initiate independent research both with the scope of my project but also to support fellow researchers and PhD students.

Afterward, I moved to CIQUS (USC, Spain 2017) and I got awarded with a JdC-Incorporacion fellowship (IJC-2016-30706) to develop smart and more efficient delivery nanosystems for different theranostic applications (Appl. Mater. Today 2019, ACIE 2019, J. Control. Release 2019, Adv. Biosyst. 2020). Clearly one of the most important challenges of nanochemistry is to mimic the multicompartmental architecture of cells and the complexity and dynamism of the cellular membrane and thus, being capable of implementing their surface properties on nanomedicines. The combination of nanochemistry, surface engineering, and chemical biology allows me to develop novel semi-artificial bio-nanostructures (biomimetic nanosystems) that combine cell components and inorganic NPs to create functional nano bio-inorganic assemblies with physical (e.g., inorganic NPs) and biomimetic capabilities. This new research line aims to provide a universal tool that will allow engineering a novel class of versatile stimuli response drug delivery nanosystems based on synthetic nanocells.

Resumen del Currículum Vitae:

Overall, I have published > 32 articles: 27 peer-reviewed scientific publications (average IF 9.09; > 90% Q1; h-index 15) and 5 book chapters (Nat. Nanotechnol. (1x), Nano Today (1x), JACS (1x), ACS Nano (4x), Ang. Chem. Int. Ed. (2x), Nat. Commun. (2x), ACS Appl. Mater & Interfaces (1x), Nanoscale (2x), Chem. Comm. (1x), Appl. Mater. Today (1x), J. Control. Release. (1x), etc.). I have participated in more than 15 projects funded by EU, national and regional agencies. I have also had my own funding (CiQUS Fellowship, JdC-I, Grupo de Referencia Competitiva de la Xunta de Galicia (ED431C 2018/26)). I have contributed to more than 25 national and international conferences. I would also highlight the production of one licensed patent (commercial product <http://www.heatsens.com/>), my contributions towards getting funding, as well as my role as PhD student's supervisor (5 students to date). I have been guest editor of MDPI Materials and MDPI Biosensors, and I am also a regular reviewer of several journals in the area of materials science such as ACS Nano, Langmuir, Journal of Nanobiotechnology, Bioconjugate Chemistry, Journal of Inorganic Biochemistry, WIREs Nanomedicine & Nanobiotechnology.

2006: I graduated in Biochemistry from the University of Zaragoza.

2007: Master's degree in Molecular and Cellular Biology from the University of Zaragoza.

2008-2013: PhD studies at Institute of Nanoscience of Aragon (INA, UZ), under the supervision of Prof. J. M. de la Fuente and Prof. J. Santamaría; my PhD research focused on the fabrication of nanoparticle (NP)-biomolecule nanoconjugates for the development of novel NP-based biosensors for ultralow/fast detection of cancer markers (PATENT PCT/ES2013/070549 which led to translation research in the product HEATSSENS and exploitation within Nanoimmunotech SL).



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2013-2017: Postdoctoral research fellowship at CBNI (Center for BioNano Interactions, University College Dublin) where I worked as a senior researcher in the group of Prof. K. A. Dawson. My postdoctoral research focused on the development of new wet-chemistry platforms that allow the study and in situ characterization of NPs under relevant biological media and thereby, improve our understanding of the interactions between NPs and cellular membranes and biological barriers. At CBNI, I also actively participated in different EU projects (3 FP7 projects, 1 H2020 project and 2 Marie Curie Actions). At CNBI, I directly supervised 3 PhD students, master students and undergraduate students.

Since 04/2017: I was an International Campus Vida CiQUS Research Fellow and since 06/2018, a Juan de la Cierva-Incorporación Fellow (IJC-2016-30706) hosted by the Bionanotools laboratory of the CiQUS at USC. In this multidisciplinary group that works at the interface of materials science, chemical-biology and medicine, I have had the opportunity of starting my own research line (with 2 PhD students) with a focus on next-generation smart biomimetic cell-derived nanomaterials, mimicking natural cellular structures. I also hold teaching duties at Physics degree, Physics master's degree and CiQUS master's degree at USC. I was awarded recently with a project funded by the Xunta de Galicia (200k) in which I am co-PI. I have participated in many workshops, scientific meetings, open-door days and different dissemination activities organized by CiQUS and USC.



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Turno de acceso general

Nombre: MOLINA ONTORIA, AGUSTIN
Referencia: RYC2019-027939-I
Área Temática: Ciencias y tecnologías químicas
Correo Electrónico: agustin.molina@imdea.org

Título:

Agustín Molina Ontoria

Resumen de la Memoria:

The scientific research developed along my career has been centered on multidisciplinary research areas which involve organic/inorganic chemistry, molecular electronics and materials science and, more specifically, on the design, synthesis and characterization of new and groundbreaking advanced materials for their application in the fields of organic molecular wires, chemical sensing, single-molecule junctions and photovoltaic solar cells. The high quality scientific research work I achieved throughout my scientific career is reflected in the significant exponential increase in the excellence and quantity of the scientific results obtained in the last years. To date, my scientific career can be divided in three stages:

a. Initial stage, which includes: i) my first contact with scientific research as undergraduate student at Autónoma University of Madrid; ii) as PhD student at Complutense University of Madrid under the direction of Prof. Nazario Martín, which was an essential part of my learning process, and iii) a short-stay at ICMol in Valencia as post-doc.

b. Consolidated stage. As post-doc at University of Texas at El Paso (United States) in the group of Prof. Luís Echegoyen, where I consolidated all the knowledge learned during my initial stage and also proving my independency as scientific researcher. My leadership was successfully demonstrated through the introduction of organic photovoltaics research area in the Chemistry Department of the University of Texas at El Paso.

c. An Advanced stage in which I was awarded with a Marie Curie fellowship as part of the EU-funded project AMAROUT II-EUROPE at IMDEA Nanoscience (Madrid), where my leadership is being successfully confirmed as team leader in perovskites solar cells, a hot topic currently in science and a new research area at IMDEA Nanoscience. Furthermore, I have the opportunity of co-supervising a PhD student and currently I am co-supervising a second one. This, in combination with my skills as an organic synthetic chemist acquired during my PhD studies in one of the most prestigious research groups in Spain, and my knowledge on organic solar cells by working in the skillful preparation of OPV devices, paved the way to new and exciting scientific venues. In particular, to the development of innovative materials from smart molecules for photovoltaic applications, with the ultimate goal of approaching this technology closer to its commercial application.

Resumen del Currículum Vitae:

Agustín Molina Ontoria has published 40 peer-reviewed articles in international journals of high impact factor (e. g. Nat. Mater., Energy Environ. Sci., JACS, Angew. Chem. Int. Ed., Nano Lett., Adv. Energy Mater., Chem Commun., etc) and an European Patent (PCT/IB2016/057475), receiving 1012 (scopus), 964 (WOS) and more than 1171 (google scholar) citations with an h-index of 21 (Scopus), 20 (WOS) and 21 (google scholar). He is corresponding author of 10 publications and signed 8 publications as first author. He has attended to 32 national and international congresses, presenting 18 oral communications (7 invited talks). To date, he has participated in a total of 17 projects (National and International). He has co-supervised 1 PhD student, 4 MSc students, 6 undergraduate students, and he is currently co-supervising 1 PhD student (defending in 2020). In addition, he collaborates regularly as referee for high impact factor journals of American Chemical Society, Royal Society of Chemistry and Elsevier (ACS applied Materials and Interfaces, Nanoscale, Dyes and Pigments). He has taught on organic photovoltaics at the Master of Nanoscience and Molecular Nanotechnology held at the University of Alicante. Additionally, he was part of the organization of the 16th International Symposium on Novel Aromatic Compounds (ISNA-16), which was held at the Complutense University of Madrid. He also belonged to the organization committee of a symposium Optoelectronic Organic Materials for Energy Conversion at the XXXVI Biannual meeting of the Spanish Royal Society of Chemistry, and he was also the secretary of the First International Course of the Complutense University of Madrid (July, 2017) entitled Current Milestones in Nanoscience: New Materials and Energy Sources. He was secretary and one of the organizers of two meetings (National and International) corresponding to the thematic network of excellence (CTQ2016-81911-REDT) "Organic Optoelectronic Materials for Energy". He is currently involved in the organization committee of the 16th International Conference on Organic Electronics (ICOE2020) which will be held in Madrid. In 2017, he obtained the Lecturer professor and Assistant professor official credentials from the Regional and National Agencies for the Education Quality (ANECA). Currently, he is part of the work team of the thematic network of excellence "Materiales disruptivos para fotovoltaica" (RED2018-102815-T).



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Turno de acceso general

Nombre: MONDRAGON MARTINEZ, LAURA

Referencia: RYC2019-026522-I

Área Temática: Ciencias y tecnologías químicas

Correo Electrónico: mondrago80@hotmail.com

Título:

Diseño, síntesis y validación de nuevas moléculas y nanomedicinas para el tratamiento del cáncer y otras enfermedades: desde hipótesis hasta su validación in vivo con modelos animales.

Resumen de la Memoria:

During my research career I have achieved a highly inter- and multidisciplinary research that comprises all the necessary steps for the discovery, development and validation of new therapeutic molecules and in cell delivery tools for therapeutic use prior their clinical validation. My expertise includes the fields of medicinal chemistry (chemical libraries screening and lead compounds optimizations), chemical synthesis (peptides, polymers, silica and metal nanoparticles), cell biology (toxicity-biological activity studies, CRISPR-Cas9 gene editing, lentivirus), animal models experimentation (lymphoma mice models characterization and new therapies validation) and oncoimmunology (in vivo validation of new therapies including chemotherapeutics and microbiota changes). As a result, I was able to develop innovative and novel research, leading to a wide and diverse scientific production and technology transfer activities.

Starting from my PhD in the medicinal chemistry (CIPF, Valencia), I gained experience in the selection, synthesis and structure-activity optimization of new molecules (and their polymer-drug conjugates) able to inhibit apoptotic cell death. I also pursued 3 short-stays in world-wide cell biology laboratories in Denmark, USA and France. I continued my formation as post-doctorate in drug delivery systems and supramolecular chemistry (IDM-UPV, Valencia) where I acquired the necessary chemical synthesis skills for silica mesoporous nanoparticles (SMPs) synthesis and functionalization for drug delivery and detection purposes. I also provided new insights for SMPs biological applications and their validation as drug delivery systems in different ex vivo models. During this period I took part in the development of 4 patents and the licencing of 3 of the to a private company.

For my 2nd post-doctorate (INSERM 1065, Nice, France) I totally shifted the focus of my research into animal model experimentation. I characterized the phenotype and the immune system of a transgenic mouse model overexpressing the glycolytic protein GAPDH in the T cell lineage to prove the role of glycolysis in T cell maturation and lymphoma development. I matched the phenotype observed in those mice with the human disease angioimmunoblastic T cell lymphoma. Besides, I learned how to develop immune cell transplants, lentiviral gene therapy with human stem cells and to develop new therapies for lymphoma treatment all employing in vivo mice models. In order to enlarge my experience in animal model experimentation, I pursued a 3rd post-doctorate (INSERM 1138, Paris, France) in the field of oncoimmunology where I helped developing new therapies able to stimulate an antineoplastic immune response and to study the influence of gut microbiota in chemotherapy efficiency. Likewise, I acquired an expertise in CRISPR-Cas9 technology for determining the molecular mechanism of action of antiapoptotic proteins in lung cancer development.

At present, I am pursuing my 4th post-doctorate (ICN2 and VHIR, Barcelona) in the field of supramolecular chemistry. I currently synthesize Au/Ag and CeO₂ nanocrystals (NCs) for drug delivery and therapeutic purposes followed by pharmacodynamics and pharmacokinetics studies employing mice and rat in vivo models to validate them as therapeutic tools for the treatment of different types of cancer including lymphoma.

Resumen del Currículum Vitae:

Dr. Laura Mondragón research experience is highly multidisciplinary and comprises the necessary steps for the discovery, development and validation of new therapeutic molecules and drug delivery tools prior their clinical validation. Her expertise includes medicinal chemistry (chemical libraries screening and lead compounds optimizations), chemical synthesis (peptides, polymers, silica and metal nanoparticles), cell biology (drug and nanomedicine toxicity-activity studies, cell death, metabolic behavior, transfections/infections with lentivirus and CRISPR Cas9 technique in the context of cancer), animal models experimentation (lymphoma mice models characterization, colony management and therapies development) and oncoimmunology (in vivo validation of drugs able to exert a protective antineoplastic immune response).

The main aspects of her research are briefly described:

A) RESEARCH RECORD: It comprises 39 articles (12 as 1st or co-first author), 3 chapter books and 5 reviews in journals such as Cancer Cell, Cell Research, Angewandte Int Ed, Chemistry, Science and Cell Metabolism among others and more than 1920 citations (H-index 20). She is also co-author of 4 patents (3 of them licenced) and more than 30 contributions to international conferences and workshops.



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B) FUNDINGS: For her PhD she received a Formación de Personal Investigador (FPI) fellowship (Spanish Government) and 3 short-stay grants (Spanish Government) (2005-2009); her postdoctorates were funded by: Juan de la Cierva 2012 (declined to pursue a post-doctorate in France) and CIBER-BBN contracts (Spanish Government), VALI+D post-doctoral program (Generalitat Valenciana), Fondation pour la Recherche Médicale (FRM), European Research Council (ERC) post-doctoral contract, Aides jeunes chercheurs Ville de Nice and, currently, Beatriu de Pinos contract (AGAUR, Catalan Government, COFUND European program).

C) PARTICIPATION IN RESEARCH PROJECTS AND TECHNOLOGY TRANSFER: During her scientific career she has participated in projects including: 1 ERC Advanced Grant, 1 European Project, 2 National Competitive Projects, 1 ARC foundation and 3 projects funded by Private Companies (Salvat Laboratories, Lytix Biopharma, Pharma Mar in USA) not only scientifically but also in their design, writing and justification of hypothesis processes.

D) MOBILITY: Since the beginning of her career she has worked in highly international recognized research laboratories: 3 as PhD student and 2 as post-doctorate in France, Denmark and USA.

E) MENTORING: She is currently supervising a PhD student and she has supervised 2 final degree projects (one of them being completely designed, written and supervised by her).

Her MAJOR SCIENTIFIC ACHIEVEMENTS in her career have been: (1) Design and synthesis of the 1st silica mesoporous nanoparticle able to target senescent cells (Agostini, Mondragón et al. *Angewandte Int ed* and PATENT n. WO2014037596), currently being developed by Senolytic Therapeutics; (2) Characterization of the best in vivo mice model for the study of Angioimmunoblastic T Cell Lymphoma and design of the first efficient therapy for the treatment of this disease (Mondragón et al. *Cancer Cell*, 36(3):268-291) and (3) Development and validation of Apaf-1 chemical inhibitors for transplant organ preservation (3 patents licenced to Salvat Laboratories) and currently in clinical trials.



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Turno de acceso general

Nombre: PEREZ GUAITA, DAVID
Referencia: RYC2019-026556-I
Área Temática: Ciencias y tecnologías químicas
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Título:

TRANSLATIONAL RESEARCH ON CLINICAL SPECTROSCOPY

Resumen de la Memoria:

Coming from a background of analytical chemistry, my research has focused on developing vibrational spectroscopic techniques to address a wide range of bioanalytical problems spanning the clinical and biological fields. Clinical Spectroscopy is a multidisciplinary field which involves research in chemistry, optics and statistics to provide applications in the biomedical context. I have enjoyed a broad range of research opportunities, enabling me to develop my ability to conduct high-quality research. My contribution to the field of vibrational spectroscopy has advanced knowledge in 4 central themes:

- i) Sample processing for IR analysis: Improving clinical spectroscopy methods by using sample pre-treatment techniques. This research aims to increase the performance of clinical spectroscopy methods by introducing minimal pre-processing steps.
- ii) Chemometrics and data fusion: Application of novel chemometric datamining algorithms. Development of methods for fusing data from different modalities, including infrared (IR) and Mass Spectrometry and the multimodal imaging of IR and Raman, which has opened the door to further comprehensive studies.
- iii) Infrared and Raman micro- and nano- imaging. Images of cells and tissues using Raman and IR. Use of Atomic Force Microscope (AFM) coupled with IR and Tip Enhanced Raman Spectroscopy (TERS).
- iv) Translational research. Development of methods for biofluid analysis, and most notably diagnosis of Malaria in developing countries and quantification of clinical parameters for bio-fluids at the hospital level and in the point-of-care context. Field trials in Papua New Guinea and Thailand using portable instrumentation.

Scientific Output: As an early career researcher, 5 years after completion of my PhD, I have authored 53 journal articles and 2 chapters in indexed scientific journals: 29 (55%) as first or corresponding author, 35 (66%) of the articles published in the first Quartile (Q1) of their respective field. These works have been cited 742 times (Jan, 2020); h-index is 17; h-10 index: 30 [Google Scholar] and I obtained a granted US patent, as a named inventor, with another provisional to be issued.

International Research and Collaboration: I have worked in several international laboratories including

Spain, France, Germany, Australia and Ireland. I also hold collaborations with other international bodies, including:

Synchrotron Thailand (Chemometric workshop expected in June 2020), Soleil French Synchrotron, Monash University Malaysia (Chemometrics workshop in June 2018) and the Jagiellonian University (Krakow, Poland)

Synchrotron: I Participated in 12 experiments (2014-2020), two as PI.

Mentorship: Supervisor of a PhD Thesis in Australia (Monash Univ., prev.2018-2021) and 1 honour/Msc Projects (Other starting Feb, 2020).

Leadership in the public and private sector: As a Principal Investigator (PI), my projects have obtained 250K on funding from institutions in Europe, Australia and Asia. I have lead trial studies to developing countries (PNG and Thailand) and organization of 2 synchrotron experiment as unique PI.

Translational Research: Biotech Resources (BTR) is a spin-off company which has raised 1.8 million dollars and has licenced my patent from Monash University to commercialise the technology. I participated in the foundation of BTR and I am a minor share-holder and a consultant scientist.

Resumen del Currículum Vitae:

SCIENTIFIC CONTRIBUTIONS: As an early career researcher, 5 years after completion of my PhD, I have a track record in analytical chemistry specialising in chemometrics and vibrational spectroscopic techniques. The median impact factor for Analytical Chemistry in the Journal of Citations reports (JCR, 2018) is 2.2. The average impact factor of my articles is 5.1.

Since 2017, when I gained independence as a senior port-doc, I have published 3 articles in Anal. Chem. (IF=6.3), 3 in Anal. Chim. Acta. (IF=5.2) and 1 on Talanta (IF=4.9) as a first author or corresponding author. In this time, I also published a review on malaria research in Chemical reviews (IF=53) and a Patent. I also have participated in more than 20 international conferences with poster contributions and in 3 as an invited speaker.

INTERNATIONAL ACTIVITY: I have demonstrated scientific independence and a capability to work in an international environment, having worked in laboratories in The University of Strasbourg (France, 9 months), University of Valencia (Spain, 5 months), University of Reims-Champagne Ardennes (France, 6 months), University of Ulm (Germany, 4 months), Monash University (Australia, 4 years and a half) and in my current position at Technological University Dublin (Ireland). I have a strong track record of successful collaborations and have published studies during all the research stays. As a principal investigator (PI), I have obtained funding from Spanish, European and Australian institutions and have organised chemometric workshops in Australia (2017), Thailand (2016), and Indonesia (2018).



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LEADERSHIP: As a Principal Investigator, my projects have obtained 250K Euros in funding from institutions in Europe, Australia and Asia. I am also an active member of the CLIRSPEC society for clinical spectroscopy and I have participated in the Faraday Discussion Meeting about clinical spectroscopy in 2016. I have performed two trial studies for the diagnosis of malaria in Thailand (2015) and Papua New Guinea (2017).

My varied research opportunities have enabled me to develop a wide range of leadership skills. i) project management, ii) supervision of one (ongoing) PhD student and one honours (Msc) students, and iii) the ability to form collaborations needed for a multidisciplinary projects, as evidenced by my collaborations in Europe, Asia and in Australia, including the Monash Centre for Biospectroscopy, Australian Synchrotron, the SOLEIL synchrotron (France), the TU Dublin (Ireland), La Fe Hospital (Spain), School of Science in Monash Malaysia (Malaysia), Leitat Technologies (Spain) and CSIC (Barcelona).

Translational Research: Biotech Resources (BTR), is a company which has engaged with Monash University to exploit the patents. I am a consultant scientist and a minor share-holder of Biotech Resources (BTR), and since 2015, I have been working closely with the BTR CEO, Peter Jordan, to commercialise the research in the near future.

FUTURE RESEARCH: My long term goal is to translate vibrational spectroscopy to the clinical set up in hospitals and Point-of-Care field (Smart-homes) by applying i) Microfluidics, ii) miniaturised internal reflection elements and c) tailored data mining techniques.



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Turno de acceso general

Nombre: GIMBERT SURIÑACH, CAROLINA
Referencia: RYC2019-027423-I
Área Temática: Ciencias y tecnologías químicas
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Título:

Catalysis for solar fuel production: mechanisms and devices

Resumen de la Memoria:

Dr. Gimbert started her research career studying organocatalytic systems for sustainable industrial processes relevant to the pharmaceutical sector. Among the most important ones are those dedicated to the synthesis of polyfluorinated phosphines used in recyclable organic-fluorinated biphasic system and the description of a straightforward synthesis of benzothiazines, heterocyclic compounds with antifungal activity.

During her first international postdoctoral position at the UNSW, she worked with mimetic metal-based molecular catalysts active for industrially relevant reactions. It is important to highlight the work she did in the proton reduction field, particularly in the study of a family of iron dimer catalysts resembling hydrogenase enzymes. In addition, she contributed to projects involving transition metal complexes such as ruthenium, rhodium and palladium as potential catalysts for useful organic reactions.

It was during the latter postdoctoral position that she decided to direct her research career towards the study of catalytic processes for sustainable energy schemes. This is one of the reasons why she took a position at ICIQ, dedicated to the design of a prototype cell for hydrogen production. She was in charge of the reductive half-cell of the device, that is, the development of a photocathode. She designed new proton reduction catalysts based on earth abundant materials such as nickel and cobalt and their use in photochemical systems, active in aqueous conditions, a new topic in the host research group.

The same research line continued and evolved towards material science. Besides the synthesis of new active molecular catalyst, she studied and characterized their interactions with conductive and semiconductor materials such as quantum dots, graphene, carbon nanotubes, silicon or metallic oxides. The multidisciplinary nature of this kind of research allowed her to start collaborations with experts in other fields working in internationally recognized research centres such as XAS at the ANL, where she did two international postdoctoral stays for synchrotron radiation experiments as well as photovoltaics at ICFO, which she visited in several occasions to perform experiments. Other examples of successful collaborations are the works she did with silicon based semiconductors together with a group in the Soochow University, the construction of a multi-layered photoanode with groups of IMDEA, and U. Ferrara, or a photocathode in collaboration with IREC.

During the whole research career, she has had influence of many disciplines including organic/inorganic chemistry, electrochemistry, photochemistry or different spectroscopies. In most of the works, the study of sustainable and environmentally friendly catalytic processes and their mechanism of action has become a fundamental part of the research.

Her current research interests are focused on exploiting molecular catalysis for artificial photosynthesis schemes, with particular emphasis on the reduction of the carbon dioxide molecule to produce fuels. In this direction, she has started two collaborative projects with Prof. B. V. Lotsch in Max Planck Institute-Stuttgart and Prof. L. Billon in UPPA, Pau.

Resumen del Currículum Vitae:

Dr. Gimbert obtained a European PhD (2008) in the Universitat Autònoma de Barcelona (UAB) under the supervision of Prof. M. Moreno-Mañas and Prof. A. Vallribera. During her PhD thesis she worked on the field of organocatalysis mediated by phosphines as well as in the synthesis of heterocyclic compounds with pharmaceutical applications. In 2007 she did a pre-doctoral stay in the research group of Prof. J. A. Gladysz in the Institut für Organische Chemie of the Friedrich-Alexander Universität Erlangen-Nürnberg in Germany, where she worked for four months on the synthesis of polyfluorinated phosphines and their use in recyclable biphasic catalytic systems. The research during the PhD produced 4 publications.

From September 2008 to July 2009 she took an assistant professor position in the chemistry department of the UAB, where she undertook teaching tasks in the chemistry, biology and biotechnology degrees at different levels. Immediately after that she moved to the University of New South Wales (UNSW) in Australia for a post-doctoral stay with A/Prof. S. B. Colbran. During this first post-doctoral position she studied catalysts of industrially relevant reactions such as the reduction of protons to generate hydrogen fuel. She also worked on transition metal complexes and their applications in catalysis. This second stage produced 7 publications, two of them as corresponding author.

It was from this point that she directed her career to the study of catalysts and methodologies for sustainable energy schemes. In this direction, she joined the team of Prof. A. Llobet in the Institut Català d'Investigació Química in 2012 as a project researcher for one year to develop a photoelectrochemical cell for the production of solar fuels. In 2013 she was awarded a competitive "Beatriu de Pinós-B" postdoctoral fellowship to continue with the development of efficient hydrogen evolution catalysts and their use in photocatalysis using quantum dots or molecular photosensitizers. During this period, she did a postdoctoral stay in the Argonne National Laboratory in USA to



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perform X-ray Absorption Spectroscopy (XAS) measurements. Overall this postdoctoral position led to 12 publications, three as corresponding author.

In 2015 she was promoted to scientific coordinator. Since then, she started leading research lines in the topics of water oxidation and water/carbon dioxide reduction catalysts designed to be incorporated in photoelectrochemical water splitting cells and the study of their mechanistic aspects. As a results of this independent research work, her studies have been published in 17 high impact journals, four as corresponding author.

She has co-supervised two PhD thesis and one master thesis. She has been awarded one competitive project by the Barcelona Institute of Science and Technology (BIST) and one by the Deutscher Akademischer Austauschdienst (DAAD), in both cases as principal investigator. She is also leader of two funded projects to perform experiments at ALBA synchrotron and co-leader of ICIQ participation in the European project eSCALED. She received the Mothers of Science award by BIST in 2018.

Overall, her work has been published in 39 peer-reviewed scientific papers and two book chapters, which have received more than 850 citations accounting for a h-index = 13 (WoS). She has given oral presentations in 10 conferences and scientific meetings, four of them as an invited speaker.



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Turno de acceso general

Nombre: MOSQUERA MOSQUERA, JESUS

Referencia: RYC2019-027842-I

Área Temática: Ciencias y tecnologías químicas

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Título:

Supramolecular approaches to regulate biological systems

Resumen de la Memoria:

The simplest living organism is composed of myriad chemical subsystems, each consisting of structurally complex biomolecules that interact in many ways; the properties of life emerge from these dense connections. The field of supramolecular chemistry has advanced over the past three decades and that success has allowed for a dramatic expansion in the understanding of these biological systems. Gaining control over these supramolecular interactions is the key for understanding and targeting biological processes in diseases, and may allow to even control the cell and tissue behaviors.

My principal research line has been focused on the study of new supramolecular approaches to regulate biological systems. A summary of the specific topics which I have explored is featured below:

Synthetic transcription factors. Transcription is the first step of gene expression and is the main point of cell regulation. The proteins that are in charge of control the expression of specific, individual genes are called transcription factors (TFs). During my PhD, I designed synthetic versions of TFs that could mimic the DNA binding properties of natural TFs could open new ways of manipulating gene expression at will. Particular attention was given to the design of synthetic systems that their DNA binding can be modulated using stimulus.

Supramolecular containers. Supramolecular containers (SCs) are chemical structures that offer well-defined inner voids where guest molecules can be trapped. These capsules have attracted significant attention due to their wide-ranging applications including guest sequestration, catalysis, and stabilization of reactive species. They are considered functional mimics of biological molecules like protein receptors and enzymes; thus they are ideal candidates to interact with biological systems. In my first postdoc (University of Cambridge), I developed new methods to endow water-insoluble SCs with water solubility and stability, and I also synthesized SCs that can interact with large biomolecules as peptides.

Gold Nanoparticles. Due to their intrinsic low cytotoxicity, easy customization in terms of size and surface decoration, and the possibility of using their plasmonic properties for unleashing conditional biological responses; gold nanoparticles constitute one of the most remarkable products derived from nanotechnology research for biological applications. In my second postdoc (CIC biomaGUNE), I took advantage on my previous experience on the synthesis of supramolecular containers to design a container that can be used as chemical stimulus to achieve the spatio/temporal control of the cell uptake of gold nanoparticles.

Supramolecular polymers. The lack of an optimum extracellular matrix, which closely mimics the in vivo microenvironments to promote differentiation of stem cells, is the main limitation towards the use of stem cells to replace any organ in the human body. In my current postdoc (Eindhoven University of Technology), I am using supramolecular polymers to design an artificial extracellular matrix for stem cell expansion towards organoids. Supramolecular polymers are dynamic structures that can actively be adapted by the cell, inducing both depolymerization and reassembly to continuously support the growing organoids.

Resumen del Currículum Vitae:

Dr. Mosquera concluded his studies in Chemistry at the Universidad de Santiago de Compostela with distinction (awarded with Premio Extraordinario de Carrera) in 2009. In 2014, he finished his PhD at the same university by which he received the Premio Extraordinario de Tesis Doctoral. He has taken part in nine R&D projects and accumulated a total of 37 months of international mobility in two different countries.

Intending to gain the broadest possible knowledge, Dr. Mosquera has worked in many different areas, including chemical biology, supramolecular containers, plasmonic nanoparticles, and polymers. His career has been conducted in four prestigious research institutes (CIQUS, University of Cambridge, CIC biomaGUNE and Eindhoven University of Technology), which has allowed him to obtain an extensive international network.

He has published 33 articles in which he is first (co-)author of 16. Almost two-thirds of his research works have been published in high impact factor (IF > 9) journals, e.g. Nat. Commun. (2), J. Am. Chem. Soc. (5), Angew. Chem. (5), Chem. Sci. (5). He has supervised three master students and taken part in several teaching activities. He has also attended 13 scientific conferences (6 orals and two of them as



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invited speaker) and has been invited speaker in international research institutions.

In the last five years, Dr. Mosquera has been awarded with four fellowships (total value >300K) in (inter)national competitive calls (Ramón Areces, Juan de la Cierva formación and incorporación, and Marie Skłodowska-Curie IF) and published 24 articles. He has been developing his research line, which has led to the publication of 3 papers as corresponding author. Additionally, he took two paternity leaves in 2016 and 2019.

Finally, Dr. Mosquera has recently received the award Ángeles Alvariño for each scientific career and is a finalist in the prestigious Max Planck Research Group Leader.