AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: COSTA RIQUELME, RUBEN DARIO
Referencia: RYC-2016-20891
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: ruben.costa@fau.de

Título:

Diseño de materiales híbridos para dispositivos optoelectrónicos

Resumen de la Memoria:

El candidato obtuvo el título de Licenciado en Químicas por la Universidad de Valencia en 2006 siendo galardonado con cuatro premios - premio extraordinario de Licenciatura 2006, dos premios al mejor expediente de la región patrocinados por el gobierno de la Comunidad Valenciana y el Colegio de Químicos, y tercer premio al mejor expediente a nivel nacional-. Además, durante este periodo el candidato disfrutó de tres becas de introducción a la investigación - beca de introducción a la investigación para estudiantes del CSIC, beca del BSC y la beca de colaboración del Gobierno español. Además, durante este periodo fue coautor de dos artículos científicos.

Durante el periodo 2007-2010, el candidato realizó su tesis doctoral con el profesor Ortí y Dr. Bolink en el Instituto de Ciencia Molecular (IcMol) con la beca de formación de profesores de universidad (FPU). Él se centró en el diseño de complejos de coordinación luminiscentes con el objetivo de mejorar la estabilidad de las células electroquímicas emisoras de luz, que pasaron de una pocas horas a varios miles combinando el diseño de nuevos materiales con sistemas de encendido más eficientes. Sus resultados llamaron la atención de empresas líderes del sector, realizando una estancia pre-doctoral en Siemens (2009). Durante el doctorado el candidato publicó más de 30 publicaciones y participó en varios proyectos europeos, nacionales e industriales. Para cerrar esta etapa, su tesis doctoral obtuvo dos premios nacionales -Premio Extraordinario de Doctorado 2010 y el Premio Nanomatmol 2011 de la RSQE a la mejor tesis doctoral española en nanociencia-, además del prestigioso premio a las mejores tesis doctorales a nivel mundial □ 2011 IUPAC Prize for Young Chemists.

Entre el 2011 y 2013, el candidato se unió como Humboldt postdoc al grupo del profesor Guldi en la Universidad de Erlangen-Nuremberg (FAU). El candidato cambio de campo de investigación centrándose en el desarrollo de las células solares basadas en especies nanocarbonadas como el grafeno, nanotubos y nanocuernos. De hecho el candidato tuvo que montar un laboratorio de fotovoltaica durante el inicio de su postdoc, lo que le permitió ser mentor de varios estudiantes de máster (7). La mayoría de ellos se quedaron a realizar la tesis doctoral bajo su co-supervisión. Además, el candidato publicó > 10 publicaciones y recibió un premio -SUSCHEM. En la actualidad es co-director de 7 estudiantes de doctorado trabajando en el campo de la fotovoltaica.

En el 2014, se convirtió en jefe de grupo en la FAU. Su grupo se centra en el uso de materiales híbridos para sistemas sostenibles de iluminación, bio-sensores y bio-reactores. Una vez más, el candidato creó desde cero estos dos laboratorios con la ayuda de 3 estudiantes de master y de 3 doctorandos que están bajo su directa supervisión. El candidato ha conseguido establecerse siendo autor responsable de >25 publicaciones, 2 patentes y sus resultados han sido llevados a medios sociales como periódicos y noticas en varios idiomas. Además de ser reconocido dentro de los jóvenes líderes europeos con los premios: Premio a Jóvenes Investigadores □ RSQE; 2016, la medalla de plata del European Young Chemist Award 2016 - EuChemMS, y el LpS Scientific Award 2016.

En Abril del 2017, el candidato se unirá al IMDEA MATERIALES como miembro Senior liderando el grupo de materiales híbridos para optoelectrón

Resumen del Currículum Vitae:

Rubén D. Costa es jefe de grupo en la Universidad de Erlangen-Nuremberg (FAU) desde el 2014 y está establecido como experto en el campo de la optoelectrónica híbrida que se centra en sistemas fotovoltaicos y de iluminación. Esto se ve reflejado en sus parámetros de calidad científica: citas (>2200 sin las propias), contribuciones científicas (>90 dividido en 38 en el PhD (2006-2011), 11 como post-doc (2011-2013), >20 como co-líder del grupo de fotovoltaica en la FAU y >20 como líder del grupo de iluminación y bio-diagnosis en la FAU, patentes (2 sin supervisores), libros de autor y editor (2), índice h y m (h=28 y m=2.7 - ISI/WOS), premios/becas (16), y participaciones en conferencias/seminarios/exhibiciones industriales (>60 de las cuales >30 desde el
2014).

A lo largo de su carrera científica ha participado en un total de 14 proyectos - 6 como PI(>1M □) y 1 como co-PI (378k □) - que se corresponden con 5 proyectos internacionales financiados por la EU (>2 M□; 378k□ como co-PI), 5 proyectos nacionales financiados por la MINECO, Humboldt, Deutsche Forschungsgemeinschaft, Emerging Field Initiative y Gobierno de Madrid (>759 k□; 679k□ como PI), y 4 proyectos industriales (Siemens, CIBA, Organica, y Verband der Chemischen Industrie (>440k□; 340k□ como PI).

Dr. Costa es mentor de hasta 10 PhDs, de los cuales él co-dirije 7 PhDs (1 se graduó en Diciembre del 2014) y dirije 3 PhDs. Como prueba

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

del impacto de su investigación él ha publicado >30 artículos como autor de contacto y 2 patentes , ha sido invitado al especial issue Emerging Investigators 2017 en J. Mater. Chem. C, es editor invitado de special issues en Adv. Funct. Mater. y ChemPlusChem. Además, el candidato ha abierto un nuevo campo de investigación con el concepto BioLED. De hecho, esta invención le ha llevado a aparecer en periódicos nacionales e internacionales traducidos en varios idiomas, radio y televisión, numerosas revistas, etc.

En la actualidad se está negociando proyectos con Osram y BASF. Finalmente, ha sido premiado con el Premio a Jóvenes Investigadores RSQE; 2016, la medalla de plata del European Young Chemist Award 2016 - EuChemMS, y el LpS Scientific Award 2016. Estos premios le han reconocido como uno de los jóvenes líderes más prometedores en Europa. Además, a estos premios le siguen otros obtenidos durante su postdoc (post-doc VI Suschem-ES) y como PhD (Premio extraordinario de doctorado por la Universidad de Valencia, Premio a la mejor tesis doctoral 2011 por la IUPAC y Premio Nanomatmol de la RSQE).

Como último paso en su carrera científica, Dr. Costa ha sido reclutado como miembro
senior del IMDEA Materiales Instituto en el que fundará el grupo "organic/inorganic hybrid optoelectronics" con la ayuda del programa de atracción de talento de la comunidad de Madrid (Abril del 2017).

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: GIMENEZ LOPEZ, MARIA DEL CARMEN
Referencia: RYC-2016-20258
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: gimadelca@googlemail.com

Título:

Multifunctional metal-carbon hybrid nanostructures for spintronics and energy-related applications.

Resumen de la Memoria:

Dr. Gimenez is Assistant Professor in Materials Chemistry and recent recipient of an ERC Starting-Grant at Nottingham University. She has performed world-leading studies involving switchable-magnetic materials, surface-based supramolecular systems and more recently functional hybrid nanocarbons.

In 2001 she was awarded a four-year scholarship from the regional government for her doctorate studies under Prof. Coronado□s supervision. In his group she contributed to the understanding of molecular magnets and spin-crossover materials and made two major breakthroughs (first time observation of piezomagnetism in 3D cyanide-bridged bimetallic magnets and magneto-structural changes induced by solvent exchange in hydrogen-bonded crossover complexes). These results (12 publications in total) acquired wide international recognition: JACS 2005 and JACS 2008, one of them has been highlighted in the popular science magazine Chemistry World (Induced isomerisation causes iron to switch its spin state, May 2005).

Her first postdoctoral position was integrated in a UK Basic Technology project entitled □Supramolecular self-assembly of 1-10 nm templates for functional surfaces, quantum information processing and nanoelectronics□ under Prof. Champness supervision. The key achievements of this project included the first observation of random tiling in 2D-molecular networks, the first example of self-assembled monolayer of optically-active endofullerenes, and assembly of molecular magnets in 2D structures templated by molecular networks. Seven publications (five of which are in world□s leading journals: 1 Science (Highlighted in Nat. Nanotech., Nat. Chem. and American Mathematical Society), 2 Nat. Chem. (Featured in ScienceDaily), 1 Nat. Commun., and 1 Chem. Commun. (Hot-Paper)) resulted from this work.

In 2009 she was awarded a Marie Curie Intra-European Fellowship in Prof. Khlobystov□s group. Major achievements in this period are the control of the interactions between molecules and nanotubes and the development of a general methodology for confinement of complex molecular structures within nanotubes, forming unique novel types of hybrid nanomaterials with the potential for electronic applications. Six publications (Nat. Mater., JACS, Chem. Commun., Langmuir, PCCP and J. Phys. Chem.) resulted from this project.

During her independent career (first as Royal Society Fellow (2011□Present) and later as Assistant Professor (2015□Present)), she has made three major contributions in materials chemistry: 1) Development of a new methodology for functional nanomaterial and complex molecular structure confinement within carbon nanostructures (Angew. Chem. 2013); 2) Understanding the effects of the unprecedented confinement of nanoswitches in carbon nanocontainers (Nat. Commun. 2011); 3) Demonstrating the nanoscale importance of structural and electronic factors (Small 2015) for the development of carbon nanocontainers for magnetically and electrically active materials. In total twelve publications have been published during this period. She has used these findings as a springboard to formulate important concepts for the exploitation of confined nanoswitches in nanodevices for applications ranging from spintronics to memory capacitors and electrocatalysts (Adv. Mater. 2016), allowing her to secure very prestigious European funding (ERC StG, 1.7M□).

Resumen del Currículum Vitae:

Dr. Gimenez is Assistant Professor in Materials Chemistry at Nottingham University (2015) and recent recipient of an ERC Starting-Grant (2016□2021). After completing her PhD in 2006 at the University of Valencia under the supervision of Prof. Coronado, she moved to Nottingham to undertake postdoctoral studies in Prof. Champness group and subsequently that of Prof. Khlobystov as Marie Curie Intra-European Research Fellow (2009□2011). In 2011, she started her independent career as Royal Society Dorothy Hodgkin Research Fellow.

Dr. Gimenez□s track record confirms her as one of the most successful researchers in Europe for her age and a highly gifted scientist. The impact and quality of her research is evidenced by her strong publication record (38 publications), including 1 Science, 1 Nat. Mater., 2 Nat. Chem., 2 Nat. Commun., 3 JACS, 1 Angew. Chem., 1 Adv. Mater. and 2 book chapters) and an impressive citation metrics (1134 citations (citations/article = 33.5 and an h-index of 18 excluding self-citations). Her work has attracted phenomenal publicity: six of my articles have been covered in scientific popular press and/or highlighted in News & Views of different World□s leading journals, and three of them have been selected as Hot Papers in major peer reviewed international journals. The number of □highly cited□ publications is the best indicator of the impact of my work on the scientific community (5 publications with more than 77 citations, three of them (Science, Nat. Mater. and JACS) have been cited over 125 times by other authors).

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Her studies have included a number of ‘firsts’, including the first observation of piezomagnetism and pressure-induced linkage isomerisation of the cyanide anion in Prussian Blue analogues (JACS 2005 and JACS 2008); the first demonstrations of a molecular rhombus tiling (Science 2008, Nat. Chem. 2012), a supramolecular bilayer at a surface (Nat. Chem. 2011) and unusual nanoribbons inside carbon nanotubes (Nat. Mater. 2011); the encapsulation of single molecule magnets (Nat. Commun. 2011, 2, 47) and assembly on a surface (Nat. Commun. 2010, 1:75); and the controlled assembly of preformed magnetic nanoparticles inside hollow 1D-carbon nanostructures (Angew. Chem., 2013, 52, 2051).

Throughout her research career she has been granted different fellowships and awards: Spanish Ministry of Education and Science Undergraduate Fellow (Sept.1999–June 2000), Extraordinary award for highest Degree in Chemistry 2000, Regional Government Fellowship (2001–2005), Marie Curie Intra-European Research Fellowship (2009–2011), Royal Society DH Research Fellowship (2011–present) and ERC Starting Grant-NANOCOMP (2016–2021).

In recognition of her multidisciplinary achievements, she was awarded in 2012 with a very prestigious prize (Emerging Investigator Award 2012) by the Spanish Royal Society of Chemistry for outstanding and novel research (covered in Angew. Chem., 2012, 51, 51). In 2016 she became Emerging Talent SRUK/CERU Award finalist for the impact of her studies on the development of materials chemistry using carbon nanostructures. I am currently a member of the Royal Society International Exchanges Committee and Expert Evaluator of the Future and Emerging Technologies Programme (Horizon2020).

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: PRIETO SIMON, BEATRIZ
Referencia: RYC-2016-20984
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: uakala@hotmail.com

Título:

Bio-inspired sensing devices

Resumen de la Memoria:

My research has been devoted to advance the fields of nano- and biotechnology, and materials science, with special emphasis in the design of bio-inspired sensing platforms. During my PhD, I developed electrochemical enzyme sensors by modifying polysulfone membranes via phase inversion to reliably build electron mediator-modified dehydrogenase sensors, which are fundamental for a wide range of applications (e.g. detection of analytes of medical interest, such as lactate or glutamate). I was one of the first researchers to develop biosensors for mycotoxins (postdoctoral fellowship and Grant-in-Aid for research, Japan Society for the Promotion of Science), followed by a number of innovative approaches based on the same principles used today as diagnostic tools (e.g. commercial biosensors for ochratoxin A detection). I participated in some of the first studies on selecting DNA aptamers for toxins [Full EU patent, Ligand and method for detection of okadaic acid, 13305214.2-1401], and introducing new approaches to develop electrochemical aptasensors (e.g. based on enzyme inhibition induced by aptamer conformational switch) (Juan de la Cierva postdoctoral fellowship). My research focuses now on exploiting novel nanostructured materials, addressed functionalisation and new electrochemical techniques, to provide unique sensing platforms for the sensitive and selective multiplexed detection of analytes of interest in medical diagnosis, food safety and environmental monitoring [Australian Provisional Patent, Optical Biosensor, 2014900641/ PCT/AU2015/000118].

My current interests on exploring new tailor-designed bioreceptors and their site-specific immobilisation on novel nanostructured transducers is funded by the Australian Research Council through Linkage ($630,000 in total), and Discovery ($466,000) projects, as well as the Industrial Transformation Research Hub for Integrated Device for End-user Analysis at Low-levels ($3,700,000) and the Centre of Excellence in Convergent Bio-Nano Science and Technology, and also through industry contracts with SA Water, SA Research and Development Institute (SARDI), PregTech, Australian Wine Research Institute (AWRI), Alcolizer, etc. My research is continuously seeking new fabrication methods for nanostructured transducers, innovative transducer functionalisation strategies and detection techniques, such as those based on light-activated electrochemistry, to push the boundaries of the discipline, aiming to provide biosensors with superior analytical performance in terms of specificity, sensitivity, stability and analysis time. The soundness of my research is reflected in the support of industry partners, which has been essential for the successful development of biosensors for norovirus detection in oysters, disinfection by-products monitoring in drinking water and troponin I detection in serum samples, as a few examples.

Evidence for my national and international research standing recognising my high quality, innovative research includes significant research grants and fellowships, book chapter invitations, and recent speaking invitations (7th International Nanomedicine Conference, Coogee, Sydney, Australia, June 2016) and accepted oral conference presentations (Porous Semiconductors □ Science and Technology PSST 2016, Tarragona, March 2016; World Congress on Biosensors, Gothemburg, Sweden, May 2016).

Resumen del Currículum Vitae:

- Research scientist (PhD in Chemistry awarded in 2005) with more than 16 years of active research in the field of biosensors. Current research on bio-inspired nanostructured electrochemical biosensors.
- Broad international research experience in Spain, France, Japan, Greece, Romania, Mexico, New Zealand and Australia.
- Published 47 peer-reviewed publications since 2004 (18 of them with impact factors greater than 6) that have already generated over 970 citations (388 since 2015), with an h-index of 18 (Scopus).
- Successful competitive research income as chief investigator on competitive grant applications (Australian Research Linkage Projects, Australian Research Discovery Project, Australian Research Industrial Transformation Research Hub; over AU$4.8 M).
- Successful in establishing a broad collaborative network thanks to a comprehensive international experience, supported by awarded competitive fellowships, and to a strategic research planning addressed to provide solutions to real-world needs by means of transdisciplinary scientific research.
- Effective industry engagement (collaboration with SA Water, SA Research and Development Institute (SARDI), Australian Wine Research Institute (AWRI), TGR BioSciences, Alcolizer, PregTech) allowed by the significant contribution to the fields of biosensors, biomaterials and nanobiotechnology and the crossing over into areas such as medical diagnosis, environmental control and food safety.
- Growing international recognition as demonstrated by the invitation to serve on the editorial board of the top-ranked journal in biosensors □Biosensors & Bioelectronics□ (from 2008 to 2012).
- Active supervisor of internship and PhD students, and mentor of 4 research associates. Over the past eight years, I have supervised 10 PhD (5 completed as co-supervisor, 2 current as co-supervisor, and 3 current as principal supervisor), 1 masters by research (completed), and 10 honours research projects (completed).

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

- Lecturer experience at universities in Spain, Australia and France (officially accredited as Lecturer in Spain and Professor in France) with special interest in new education programs (Accreditation Program for Teacher Preparation in Higher Education, Teaching Unit of Innovation in Higher Education of the Autonomous University of Barcelona, UAB).
- Mentored by world-leading and distinguished scientists, including Prof. Isao Karube (pioneer of biosensors and key contributor to the development of biosensor technology), Prof. Nico Voelcker (Monash University, Melbourne, Australia), Prof. Jean-Louis Marty (Université de Perpignan Via Domitia, UPVD, France), Prof. Arben Merkoçi (ICREA Research Professor and head of the Nanobioelectronics & Biosensors Group at Catalan Institute of Nanotechnology, CSIC), Prof. Salvador Alegret (UAB), Prof. Miltiades Karayannis and Prof. Mamantos Prodromidis (University of Ioannina, Greece) and Prof. Josep Samitier (University of Barcelona).
- Strong interpersonal, negotiating, organisational and project management skills. Able to engage the industry and end-users and to coordinate research from the inception of a project to its fruition, leading a multidisciplinary research team. Dynamic, flexible and integrity-driven in response to changing research environments.

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: DELGADO LOPEZ, JOSE MANUEL
Referencia: RYC-2016-21042
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: jmdl@iact.ugr-csic.es

Título:

Nature-inspired nano-composites enabling smart technologies (nanoSMART)

Resumen de la Memoria:

My research is aimed at building a bridge between basic research and applied science, turning original knowledge into smart technologies. I am interested in understanding how higher organisms produce their specialized mineralized structures, with special emphasis on elucidating the mechanisms (i.e., nucleation and crystal growth) enabling the control over the final crystal size, morphology, polymorphism and mechanical properties. Based on the lessons learnt from nature, I am also focused on the development of novel organic-inorganic nano-composites with a higher level of performance and new functionalities.

During my career I have applied multidisciplinary approaches to deal with the following topics:
i) Synthesis of nanostructured metallic thin-films as novel materials for fuel cells (PhD thesis). We developed innovative methodologies for preparing nanostructured thin-films of catalytic metals (Ag, Au and Pt) and evaluated their catalytic efficiency with electrochemical method combined with advanced in-situ FTIR (ATR-SEIRAS), Raman (SERS) and probe microscopy (STM/AFM). The results were awarded with the prestigious XVI Prize San Alberto Magno (Real Sociedad Española de Química, Alicante).
ii) Synthesis and advanced characterization of multifunctional biomaterials. This topic supposed a turning point in my research career. Using nature as a source of inspiration to control material fabrication, I synthesized bone-like nano-composites with tailored properties, finding applications in dentistry (enamel remineralization, patent under exploitation) and medicine (targeted/controlled drug delivery and hard tissue repair).
iii) Understanding bone mineralization pathways by combining in situ SAXS/WAXTS and high-resolution imaging. A key aspect of my research in the last years has been the development of experimental (i.e. in situ SAXS and WAXTS) and modeling tools (i.e., Debye Function Analysis, DFA) to gain a better understanding of the specific role of the organic matrix in bone mineralization pathways. Using synchrotron Wide-angle X-Ray Total Scattering (WAXTS) and high-resolution AFM, I provided new insights on the role of organic molecules in controlling the crystallization of bionspired nanoapatites and proposed a plausible model to explain the peculiar platy morphology of bone apatite, induced by citrate, an important component of the bone organic matrix, until recently neglected. I received funds from the competitive international mobility program Talent-Hub to develop this research at the Institute of Crystallography (Italy).

In the near future, my goal is to start-up a multidisciplinary laboratory at the forefront of biomineralization and multifunctional biomaterials to keep advancing our understanding of how higher organisms produce their specialized mineralized structures (bone and teeth). An important part of the research effort will aim at turning the gained insights into cutting-edge technologies for tooth re-mineralization, sustainable agriculture, and targeted drug delivery. This research covers several key issues of the current strategic research and development route map laid out by the European Union (Horizon 2020) and Plan Estatal de Investigación Científica y Técnica y de Innovación 2013-2016 (MINEICO) and consequently it is very likely to be funded by national and international calls as well as by industrial partners

Resumen del Currículum Vitae:

A) Education

- 4-year Degree in Chemistry, University of Jaén (2002).
- PhD in Materials Science, University of Alicante (2008). Awarded with the XVI Prize San Alberto Magno (Real Sociedad Española de Química, Alicante) and special award of the PhD program in Material Science.
- Master of Science in Crystallography and Crystallization (UIMP, 2010).

B) Scientific contributions

- Total contributions: 51
- Peer-reviewed JCR-contributions: 41 [16 as a 1st author; 12 as 2nd, 7 last/corresponding]. Q1: 36. 2 Selected covers. Many of the papers have been published in journals with IF > 7, including Advanced Functional Materials (IF: 11.4), Chemistry of materials (IF: 9.4), Small (IF: 8.3) and ACS Applied Materials & Interphases (IF: 7.1).
- H-index = 18 with 620 citations (SCOPUS), appearing as first and/or corresponding author in many of the most cited papers (in 12 of the top 18).
- 4 book chapters (2 as main/corresponding author). The chapter Control Over Nanocrystalline Apatite Formation: What Can the X-Ray Total Scattering Approach Tell Us (J.M. Delgado-López* & A. Guagliardi, Springer, 2017) has been downloaded more than 50 times in only one month. Editor of one book.

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

- International patent as main inventor, currently under exploitation with extended international protection.
- Communications to national and international conferences: 74 [6 invited, 39 oral and 29 posters], being the presenting author of 1 invited (Gordon Research Conference) and 18 oral contributions.
- Other publications (NON-JCR contributions): 4

C) Research experience and international mobility/visibility

- 9 years of postdoctoral research, including more than two years of research experience abroad.
- Participation in R&D projects: 17 [3 EU, 6 National, 2 regionals, 1 Italian and 2 industrial contracts], being the PI of 3 micro-projects and 1 Talent-Hub (FP7-PEOPLE-2011-COFUND), allowing me to work in one of the most prominent centres for Crystallographic research in Europe from September 2015. It has also allowed to launch there a new project size-controlled HydroxyaPATIte for sustainable agriculture (HYPATIA) funded with 280 k (Cariplo Foundation), in which I am a leading partner.
- R&D projects at large-scale facilities (SLS, Switzerland, ESRF, France and Alba, Spain): 7, being the main proposer of 4.

D) International visibility

- Member of the editorial board of Acta Biomaterialia (Elsevier, since 2015) and editor of Scientific Reports (Nature Publishing Group, since 2016).
- Former associate editor of RSC Advances (Royal Society of Chemistry, 2015-2016).
- Discussion leader at the Gordon Research Seminar on Biomineralization, 2016.
- Convenor of a symposium (8b) of the Goldschmidt conference (https://goldschmidt.info/2017/ Paris, 2017).
- Reviewer of Advanced Functional Materials, Small, Acta Biomaterialia, RSC Advances, CrystEngComm, etc (https://publons.com/author/1010996/jose-manuel-delgado-lopez#profile), scientific projects (FONCyT, Argentina) and 3 thesis dissertations.

E) Lecturing, student supervision and outreach

- Lecturer at the University of Alicante, UIMP and International Schools on crystallization.
- Invited speaker in 9 seminars/schools organized in Spain, Italy and France.
- Supervisor of 2 master students and 1 graduate student in Italy.
- Organizing committee of 5 international schools (Spain) and 1 international summer school (Italy).
- TV documentary and participation in outreach workshops.

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: TORRENT MARTI, DANIEL
Referencia: RYC-2016-21188
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: dani.torrent.marti@gmail.com

Título:

Artificial Materials for the Control of Mechanical and Electromagnetic Energy

Resumen de la Memoria:

My research has been focused on the theoretical and experimental study of acoustic, elastic and electromagnetic wave propagation in complex media, as well as on the development of functional artificial materials for the control and localization of the energy carried out by these waves.
I defended my PhD work at the Polytechnic University of Valencia (Spain) in 2008, under the supervision of Prof. José Sánchez-Dehesa. In my thesis I developed one of the pioneering works on acoustic metamaterials, showing that these artificial structures could be used to build acoustic invisibility cloaks. I published seven papers in high impact factor journals (including one paper in Physical Review Letters) and I was awarded with the Extraordinary Doctorate Award by the UPV.
After my PhD work I obtained a postdoctoral fellowship by the Polytechnic University of Valencia in the framework of the program Capmus de Excelencia Internacional UPV, and during the period 2009-2013 I co-supervised the PhD work of two students at the UPV, also during this period I published more than twenty papers in high impact factor journals, including three Physical Review Letters and one Nature Scientific Reports. I also contributed actively to obtain two research projects funded by the U.S. Navy.
In March of 2014 I began to work at the University of Lille 1 (France) in the group of Prof. Bahram Djafari-Rouhani. During this period I developed a theory to study the propagation of elastic waves in micro or nano structured plates, and I also co-supervised the PhD work of a student. I published seven papers with this team, including one Nature Scientific Reports. I was also awarded by the Marie-Curie Fellowship, and I obtained a Junior Chair position at the University of Bordeaux, in the framework of the Labex AMADEUS. In this position I am the principal investigator of a research project with a budget of 460k devoted to the study of acoustic and electromagnetic materials. I supervise the work of three postdoctoral researchers.
As recognition for my leadership in the field of artificial materials, I was invited by the U.S. Office of Naval Research to submit a proposal of a research project, which is currently considered for being funded.
I have published 53 peer-reviewed papers and presented 11 invited talks, and I am the first author in 18 of my papers and in other 20 I have only one co-author. Also, I am the corresponding author in 7 of them. The Scopus database records for a total number of 1200 citations of my papers since 2006, and my h-index is 16 (1700 citations and h-index of 19 according to Google Scholar).

Resumen del Currículum Vitae:

I studied physics at the University of Valencia, where I obtained my Bachelor degree in 2002. After that I was working at the Applied Physics Department of the same university as a Technician of Research Support for one year. Next, I started my PhD in the Electronics Engineering Department of the Polytechnic University of Valencia, where I subsequently obtained a Ph.D. degree on July 25th 2008, for which I received the Extraordinary Doctorate Award.

Initially, my Ph.D. was funded by a Specialization Grant from the Valencia's Nanotechnology Centre, but after one year I obtained a FPI grant of the Spanish Ministry of Science and Innovation. After finishing my PhD I continued working at the Polytechnic University of Valencia, first as a researcher contracted by the program CONSOLIDER, funded by the Spanish Ministry of Science, and, after seven months, by the university as a post-doctoral researcher under the program Campus de Excelencia Internacional 2010 UPV. This last program had a duration of two years, after which I was contracted again as a researcher by the program Extraordinary sound absorption by metamaterials, funded by the U.S. Office of Naval Research. During this period in Valencia, I co-supervised the master thesis of three students and the PhD work of two of them.

I developed a research stay for three months (September 7th 2007 to December 7th 2007) at the U.S. Naval Research Laboratory, in Washington D.C., as a pre-doctoral student and from February 2nd to May 2nd 2011 at Institute Neel of the CNRS in Grenoble, France, as a post-doctoral researcher.
On March 1st, 2014, I was hired by Institute d'Electronique de Microélectronique et de Nanotechnologie (IEMN) of the CNRS in Villeneuve d'Ascq, France, in the framework of the ANR project METACTIF, and I joined the EPHONI group leaded by Professor Djafari-Rouhani. My role in this group was the development of the theory of elastic metamaterials for thin elastic plates, and I also co-supervised the work of a PhD student.

In February 2015, I was awarded by a Marie Curie Fellowship, which I had to withdrawn for being incompatible with the position that I

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

obtained as a Junior Chair at the University of Bordeaux.
From June 1st, 2015, I am working at the University of Bordeaux CNRS as a Junior Chair Researcher, in the framework of the AMADEus Cluster of Excellence. In this position I am the principal investigator of a three-years project with three postdoctoral researchers, where our main objective is the development of theoretical concepts and numerical method to explain the behavior of artificial electromagnetic and acoustic composites.

During my career I have contributed to the development of both theoretical and experimental tools to understand the propagation of acoustic, elastic and electromagnetic waves. My contributions to these fields goes beyond the purely theoretical domain, since I have designed and performed experiments for acoustic waves, ultrasound, high-frequency vibrations, microwaves and optical waves. I have developed therefore a truly multidisciplinary research, whose major achievement has been my current position in Bordeaux, where I am the leader of a small team made of three postdoctoral researchers, with which I continue my simultaneous work on mechanical and electromagnetic waves.

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: GUERRINI , LUCA
Referencia: RYC-2016-20331
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: luca.guerrini@ctqc.org

Título:

Development of nanophotonics-based device for sensing applications

Resumen de la Memoria:

The core research activity of Dr. Guerrini?s PhD focused on the controlled modification and optimal tuning of the chemicophysical properties of colloidal surfaces to be used as highly sensitive and selective plasmonic substrates for SERS-based sensing of organic pollutants. His work resulted in the publication of multiple highly cited articles (e.g. Langmuir 2006, and 2 Anal. Chem. 2009). As a junior postdoc, he further expanded his realm of interests to the engineering of optical sensors for environmental (Small 2012) and bio-applications. Notably, he gained strong expertise in the design of spherical nucleic acids. His research paved the way for the development of novel strategies which increased the recognition lexicon of traditional methods to detect DNA in its natural duplex state (e.g. Chem. Sci. 2012; JACS 2012). The high level of professional maturity and the ability to conceptualize and organize novel research lines were pivotal factors for his successful Marie Curie IEF proposal. In this next step of his career, he significantly deepened his skills and knowledge in the area of advanced nanofabrication technologies. This virtuously maximized the impact of his conducted research in the field of sensing, which has now broadened to the identification and quantification of other relevant targets, from environmental metallic pollutants (e.g. Nanoscale 20114; JPCL 2015) to oncoprotein biomarkers (e.g. JACS 2013) and bacteria in complex biological fluids (Adv. Mater. Tech. 2016). As a major accomplishment, his independent work on the direct SERS investigation of nucleic acids has been breaking ground in the area of DNA analysis, as reflected by several publications in high impact journals such as 3 communications in Angew. Chem., and other papers in JACS, ACS Nano and JPCL, all of them signed as a senior corresponding author.
Dr. Guerrini?s experience connects key areas of expertise in nanobiotechnology and photonics, which provides him with the ability of an interdisciplinary approach by combining an in‐depth understanding of physics background, profound chemical knowledge, advanced nanofabrication techniques, and the ability to unlock novel applications. As current Deputy Scientific Director of Medcom Advance (a spin-off created by Medcom Tech, ICREA and URV), he oversights and coordinates several company activities, such as i) the evaluation, planning and monitoring of current research programs and future scientific actions; ii) personnel management & recruitment; iii) representing the organization with external collaborators; and, iv) collaborating on patent and grant applications. Medcom Advance currently comprises 5 research officers, 7 PhD and 1 administrative employee, with an annual budget of approximately 700000 euro.
His current scientific interests are mainly focused on the design of ultrasensitive nanophotonics-based devices for diagnostic, with a special focus on cancer diagnosis and prediction. Dr. Guerrini?s future efforts will be devoted to tackle key challenges in the area of optical nanosensing, with special focus on: i) the design and fabrication of highly sensitive plasmonic nanoconstructs and their integration into advanced ?all optical? devices for biosensing and environmental monitoring, ii) use of optical technologies as unique tools to address basic questions in biology, catalysis and material science.

Resumen del Currículum Vitae:

Dr. Guerrini?s work has led to 45 peer reviewed publications in prestigious journals (4 more are currently submitted) and 3 book chapters. He signed 25 of them as first author and 16 as a senior corresponding author. As of 18/01/2017, Dr. Guerrini?s author-level metrics are:
Scopus: H-index = 18; Total citations= 986.
Google Scholar: H-index = 20; Total citations= 1216.
Finally, Dr Guerrini participated in 25 research projects (5 European, 18 national and 2 bilateral), leading 6 as a co-principal investigator. This clearly demonstrates his high-level experimental skills and creativity and his unusual capabilities for independent thinking and managing research. He also co-authored one patent (PCT/EP14382415.9. Licensed by Medcomtech SA, Spain).

Selected publications

-Angew. Chem. Int. Ed. (DOI:10.1002/anie.201611243). J. Morla-Folch; P. Gisbert-Quilis; M. Masetti; E. Garcia-Rico; R.A. Alvarez-Puebla,* L. Guerrini*
-ACS Nano 10, 2834 (2016). J. Morla-Folch; H. Xie; R.A. Alvarez-Puebla,* L. Guerrini*
-J. Phys. Chem. Lett. 7, 3037 (2016). J. Morla-Folch; R.A. Alvarez-Puebla,* L. Guerrini*
-Angew. Chem. Int. Ed. 54, 13650 (2015). J. Morla-Folch; H. Xie; P. Gisbert-Quilis; S. Gómez-de Pedro; N. Pazos-Perez; R.A. Alvarez-Puebla,* L. Guerrini.* Hot Topics in Chemistry&Materials Science, Wiley-VCH
-J. Am. Chem. Soc. 137, 469 (2015). M. Masetti; H. Xie; ?. Krpetić; M. Recanatini; R.A. Alvarez-Puebla,* L. Guerrini*
-Angew. Chem. Int. Ed. 54 , 1144 (2015). L. Guerrini;* ?. Krpetić; D. van Lierop; R.A. Alvarez-Puebla, D. Graham. Hot Topics in Chemistry and Materials Science, Wiley-VCH
-Nanoscale 6, 8368 (2014). L. Guerrini;* I. Rodriguez-Loureiro; M.A. Correa-Duarte; Y.H. Lee; X.Y. Ling; F.J. Garcia de Abajo, R.A. Alvarez-Puebla*

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

-J. Am. Chem. Soc. 135, 10314 (2013). L. Guerrini; E. Pazos; C.Penas; E.M. Vázquez; J.L. Mascarenas,* R.A. Alvarez-Puebla*
-Chem. Soc. Rev. 41, 7085 (2012). L. Guerrini, D. Graham*
-Chem. Sci. 3, 2262 (2012). L. Guerrini; F. McKenzie; A.W. Wark; K. Faulds, D. Graham*
-Small 8, 707 (2012). L. Guerrini; . Krpetic; I.A. Larmour; J. Reglinski; K. Faulds,D. Graham.*
-Anal. Chem. 81, 1418 (2009). L. Guerrini;* J.V. García-Ramos, C. Domingo, S. Sanchez-Cortes*
-Anal. Chem. 81, 953 (2009). L. Guerrini; J.V. García-Ramos; C. Domingo, S. Sanchez-Cortes*

Experience in supervising master students & doctoral theses. Dr. Guerrini has been actively involved in the formation of young scientists by supervising and mentoring master students (4 defended) and doctoral thesis (1 defended and 3 in progress).

Conferences & workshops. He had the opportunity to give 12 talks in conferences and summer schools and present 11 posters in various international conferences. He also participated as a co-author in 16 posters and 10 talks in several international conferences.

Funding. The excellence of Dr. Guerrini's credentials and the ability to generate original ideas were key factors in the successful application to the competitive Marie-Curie Intra-European Fellowship (PrioSERS FP7/2014 623527, total funding 141205). He is currently co-Principal Investigator in the VINNMER Marie Curie Academy Outgoing Grant with reference nº Vinnmer-2016-02082 (184280). DIs.

Participation in funded projects. He participated in 25 funded projects (5 European, 13 national and 2 bilateral projects), leading 6 as a co-principal investigator.

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: ALBELLA ECHAVE, PABLO
Referencia: RYC-2016-20831
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: albellap@gmail.com

Título:

New ways of controlling linear and non-linear light-matter interaction beyond plasmonics with potential applications in medicine, bio-nanosensing, nanoantennas, optical nanocircuits or nanocomputers.

Resumen de la Memoria:

My research interests and activities have been mainly devoted to the fields of nanophotonics and materials science. I aim to, not only give new light to the electromagnetic (EM) understanding and application of plasmonics but also to open new fascinating possibilities in the field. In my PhD I mainly focused on the study, design and development of new models to approach the EM response of a wide variety of heterogeneous systems at the nanoscale (optical nanoantennas, metamaterials and hybrid structures).

After finishing my Ph.D with the prize of outstanding Ph.D. thesis, I had the chance of leading a collaboration with experimental groups of the Army Research Lab and Duke University in USA, funded by the US Army Technology Center(USA-ITCA). The results of this collaboration led to winning another research prize that formalised the collaboration, still active with the aforementioned labs.

Later, I enrolled the group of Prof. Aizpurua at the CFM and DIPC in San Sebastian, as a postdoctoral FP7 fellow and I was also accredited as guest researcher of Nanogune, working in close collaboration with the experimental nanooptics group. My main research lied on the deep study of light-interaction with plasmonic nanostructures, this time paying attention not only to the theory behind it but also to the design of novel nanoantennas for testing its performance in real life applications. Most results that came out from this period and the new insights provided by the novel findings are paving the way for a variety of applications in bio- or ultrafast sensing, Surface Enhance Raman Spectroscopy or Fluorescence.

Immediately after this position I moved to Imperial College London, where I am working with Prof. S. Maier. Here, apart from leading several research projects aimed at finding new ways to create and control well-defined hotspots to enhance the actual sensing and spectroscopy applications, I proposed and successfully started a new research line on:all-dielectric nanoantennas as a new effort to find a novel and complementary alternative to plasmonics pursuing not only the enhancement of the EM responses (linear and non-linear), but also to guide and/or direct light efficiently and with minimal losses; always aiming at finding its direct application in biosensing, optical nanocircuits or nanocomputers, as well as customized metamaterials or energy storage (such as solar cells).This new research line has already led to the successful application of a UK research project grant, few high impact publications, highlights in scientific news and the co-supervision of one PhD thesis sponsored by an international Japanese oil company.

Highlight that, although I am primarily a theoretician, about half of my publications were published in collaboration with worldwide experimental groups. In fact, I do work in an EXPERIMENTAL group, showing my skills and interest not only in closely collaborating, bringing and discussing new ideas, but what is more important, facilitating the experimental realization of the theoretical ideas and models I propose. This can often be of extreme help when aiming at starting a new group, because it usually overcomes the lack of expensive equipment that the host centre may require to target high impact results and it is often demanded by experimental groups.

Resumen del Currículum Vitae:

I am author of over 45 peer-reviewed publications (3 more are currently under review), most of them in high impact journals, being some of them selected as the "editor's choice", journal cover or highlighted in http://nanotechweb.org. My research has so far attracted about 1500 citations in the past 5 years (h-index=18 and i10-index=25, GS Jan2017).My degree of authorship is clear as I am 1st author of most theoretical publications, and often 2nd or equal-to-1st contributing author when publications were done in collaboration with experimental groups (being in most cases the lead author of the theory part). Additionally, I am author of 2 book chapters and more than 80 contributions in International conferences and workshops (about 25 of which were oral presentations or invited seminars). My work has also been recognized with several national and international research prizes and nominations.

I have attracted so far funding from a number of different national and international agencies. In 2002, I obtained a Master fellowship from the UK Research Council. Later, I was awarded a 4years PhD FPI fellowship from the Spanish Ministry of Science. I was additionally funded in 4 times to be visiting researcher for 3 months in different worldwide universities, allowing me not only to start important collaborations (still ongoing) but also to envision new research projects.

I have actively participated in several projects as main researcher and I have been funded in several occasions by the European Science Foundation to start collaboration projects that have led to high impact publications. Also mention that I have taken part in few national (MEC and MICINN) projects and twice in a US Army International Technology CenterAtlantic project as main researcher. Moreover, I am

currently involved in a heavily funded project (metamaterials and control of electromagnetic Fields) by the Leverhulme trust (UK). I was successfully co-applicant of another UK Leverhulme Trust project (250k), based on the novel research line I started and lead since I joined Imperial College London. Also, in November 2014 I won the chance of officially supervising a PhD thesis (Mr. T.Shibanuma) sponsored by the Japanese JX Nippon Oil & Energy Corporation.

I am editor of Scientific Reports, guest editor of a special issue of journal of Nanomaterials and active referee of most relevant journals in his field (Nature Comms, Nano Lett., ACS Nano, ACS Photonics, ACS Omega, JPhysChem, Opex, etc) and external referee of heavily funded projects of the US Department of Energy Office of Science.

I have also taken part in the scientific organization of national and international scientific events, as well as selected as external member of 4 PhD thesis viva panels.

Finally mention that apart from research, I have always been involved in academic duties, not only in lecturing (several courses in Spain and UK) but also in tutoring and mentoring BSc, Erasmus and MSc students. My tasks also covered the design and supervision of research projects appropriate for these students. This academic activity was recognized by the Spanish ANECA, where I am accredited as:"Contratado Doctor and Ayudante Doctor".

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: ZANOLLI , ZEILA
Referencia: RYC-2016-19344
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: zeilazanolli@gmail.com

Título:

First principles engineering of novel nanomaterials for spintronics applications

Resumen de la Memoria:

The research challenges of the near and far future in electronics focus on the quest for new materials and novel device concepts to achieve low energy consumption, increased reliability and high device density. These can be obtained by designing active elements and interconnects whose operating principle is not (only) based on the electron charge but on the spin degree of freedom of the electron, i.e. developing new materials for spintronic applications. The investigation of nanoscopic materials requires atomistic parameter free (ab initio) simulations to accurately predict their properties and design new compounds.

The best materials for spintronics are magnetic semiconductors with high spin-orbit coupling (SOC). Conventional inorganic semiconductors and metals suffer from short spin diffusion lengths and result in spin devices with weak spin signals. It is crucial to design novel materials for spintronic applications, which is the main goal of this Project. Magnetism has been observed at the nanoscale thanks to reduced dimensionality, unsaturated surface atoms, defects, quantum confinement effects, and surface functionalization with magnetic molecules or metallic nanoclusters. The most promising systems include magnetic nanowires, carbon-based nanomaterials (nanotubes, nanoribbons, graphene,...), magnetoelectric multiferroics, hybrid organic-inorganic nanostructures, and Transition Metal Dichalcogenides (TMD). All present interesting features and many open problems.

Nanowires (NWs) of diluted magnetic semiconductors and diluted magnetic oxides can present room temperature ferromagnetism. However, the electronic structure and the nature of magnetism in these materials is still strongly debated. Carbon-based nanomaterials are characterized by spin diffusion lengths of up to 100 microns and high electron velocities, which are crucial features for channel materials in spin transistors. However, a large spin diffusion length comes at the price of small SOC, which limits the possibility of manipulating electrons via an external applied field. To achieve graphene-based devices one also needs to open its vanishing electronic gap either by fabricating nanoribbons or by placing graphene on a suitable substrate. Magnetism can be induced in carbon nanostructures by interaction with magnetic molecules or nanoclusters or a magnetic substrate. Combining C nanostructures with a material with high SOC can be exploited to increase the SOC of the hybrid system. TMD have high SOC arising from the d orbitals of the transition metal atom. Monolayers of TMD can be direct gap semiconductors and have magnetic properties related to edges and/or unsaturated bonds. Finally, graphene/TMD heterostructures could inherit high-mobility from graphene and a finite gap from TMD. I will address these issues using cutting-edge first principles computational techniques combining Density Functional Theory (DFT) and Non-Equilibrium Greens Function (NEGF) to compute electronic, magnetic and spin transport properties. For selected systems, I will also investigate spin transport for multiterminal devices in presence of external electric and/or magnetic field, in order to model realistic devices.

Resumen del Currículum Vitae:

Zeila Zanolli leads the Nanospintronics Group at RWTH Aachen, financed by a personal grant of the German Research Foundation (DFG). She is a Research Team Leader of the European Theoretical Spectroscopy Facility (ETSF) and coordinating several collaborative projects all over Europe (Oxford U, Lund U, FZJülich). In 2012□15 she was Marie Curie Intra-European Fellow at Forschungszentrum Jülich (Germany). Her research interests focus on the use of first principles techniques such as Density Functional Theory (DFT) and Non-Equilibrium Green□s Functions (NEGF) to engineer novel materials for nanoelectronics and spintronics applications. Investigated materials include carbon nanotubes, 2D layered materials (graphene, Transition Metal Dichalcogenides, BN), semiconductor nanowires, magnetoelectric multiferroics.

Dr. Zanolli received the Laurea degree in Theoretical Physics from the University of Bari (Italy) with maximum honours (summa cum Laude) in 2000. Funded by a grant of Bari University she undertook doctoral studies on the design, fabrication and characterization of Quantum Cascade Lasers (2000□04). In 2004 she joined the group of Prof. M-E Pistol (U Lund, Sweden) within the EC Training Network □Photon-Mediated Phenomena". In Lund Dr. Zanolli designed and implemented microphotoluminescence experiments on individual quantum dots and III-V nanowires. She simultaneously used DFT and beyond ground state techniques to explain her experimental results. In 2006 she moved to Université catholique de Louvain (Belgium) within the EC STREP project Nano2hybrids. She became expert of DFT and NEGF techniques to model structural, electronic, magnetic and quantum electron transport properties of C-based nanomaterials. She developed a method based on NEGF to model accurately magnetic point defects in 1D nanostructures. Her investigations contributed to three patents for benzene sensors. She discovered design rules to engineer multiferroic materials within the EC Project □OxIDes□ (2010-12) at ICMAB/CSIC (Barcelona) and at Liège University (Belgium).

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Dr. Zanolli published 2 book chapters and 31 papers (h-index 12, 700 cites) in international peer-reviewed journals of high impact factor among which 1 single author (Nature Sci Rep), 2 Nano Lett, 3 ACS Nano, 2 PhysRevLett. She is first or senior author of 17 articles; co-first of a review. Her results have been presented in 90 international conferences including 16 invited (APS March Meeting) and 42 contributed oral presentations. She has given 25 invited seminars in prestigious Universities and Research Centers.

She is recipient of 3 competitive fellowships (530keur) and several scientific prizes (seminar, poster, press releases, invited editorials). She regularly obtains computing time from PRACE/JARA-HPC and grants to support her participation to conferences. She is scientific organizer of 8 conferences (ETSF since 2012, NanoteC since 2015, "Theoretical Spectroscopy" symposium of the 2015 Psi-k conference) and secured funds (33keur) to finance them. She is external expert of the EC Horizon2020 (FET OPEN RIA) program and peer reviewer for many international research journals edited by Nature, APS, ACS. She conducts science dissemination activities: video-blogs, interviews of eminent scientists, and a personal scientific webpage.

Career breaks: 20 months for Pregnancy and Maternity in 2012/13 and 2015/16

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: MARTIN PEREZ, JAIME
Referencia: RYC-2016-20497
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: j.martin-perez@imperial.ac.uk

Título:

Hierarchical Polymer Nanostructures: From confinement effects to applications.

Resumen de la Memoria:

The coherent arrangement of nanoscale elements into hierarchical architectures has demonstrated to be a successful approach to produce materials of outstanding properties. As a matter of fact, this strategy is the one employed by Nature to design materials with unique functionalities, such as color-tunable skin of cephalopods and the the unwettable foils of lotus plant, etc. All these system have in common that nanosized soft (biomacromolecules-based) selements are rationally arranged in a hierarchical structure, and that coherent arrangement is responsible for the outstanding properties.

Likewise, my research has pursued to fabricate, study and employ small polymeric materials (polymeric micro- and nanoobjects) that can be arranged into hierarchical structures with the goal develop functional materials for a wide range of areas, from electronics, to optics, to energy harvesting.

The leitmotif of my research career has been, moreover, to seek for the improvement of material¿s properties via the fundamental understanding of the polymer behaviour at different length scales (nano, meso, micro and macro scales). The accomplishment of these objectives require a clear multidisciplinary effort as well as developments in a This research has required a multidisciplinary effort as well as scientific developments in a number of research areas, which have constituted the sub-lines I have addressed throughout my career. These include:

- The design and fabrication of polymer-based micro-/nanostructures by template-based approaches (2005-), namely polymer nanotubes, nanowires, ordered arrays of nanotubules, nanorods and nanopores, three-dimensional networks of periodically interconnected nanowires, and more.

- The development of novel templates for the fabricayion of the materials above (2010-2013). The need to extend the library of polymer nanostructures have led me to develop novel precursor templates, such as ultra-small nanoporous templates and three-dimensional nanoporous templates.

- The physicochemical study of low-dimensional polymer materials (confinement effects) (2007-). The optimization of the properties of any system requires to correlate its properties and the physicochemical behaviour of its constituting material (e.g. to stablish the structure-properties relationship). The properties of nanosized polymers are frequently different from those of their bulk counterparts; thereby, the physicochemical behaviour of the nanosized polymer is to be elucidated and understood in order to tune the properties of complex, hierarchical structures.

- The development of functional polymer micro-/nanostructures (2010-). In the last years, I have intended to draw on my polymer physicochemistry and materials-processing background to further develop novel classes of polymer-based functional nanostructures for photonics, electronics, thermoelectrics, tissue engineering, etc.

Resumen del Currículum Vitae:

I am currently Marie Sklodowska-Curie Independent Fellow at the Materials Department of Imperial College London (London, UK), where I conduct research on organic functional materials for electronics and photonics. Prior to this position, I held postdoctoral research associate positions at ICL (London, UK) and Instituto de Microelectronica de Madrid (IMM-CSIC) (Tres Cantos, Spain) as well as a FPU scholarship for PhD studies at Instituto de Ciencia y Tecnología de Polímeros (ICTP-CSIC) (Madrid, Spain).

The scientific results obtained in the periods above resulted so far in 35 scientific papers (h-index: 15),which include 31 papers in high-impact SCI journals such as Nature Communications, Physical Review Letters, Chemistry of Materials, Progres in Polymer Science, etc. Some of these paper were invited (e.g. in the 2017 Emerging Investigators Themed Issue of J. Mater. Chem. C). I am also co-author of a book chapter and co-inventor of an international patent (PCT/ES2015/070519); and my work has been acknowledged with some prices: 2nd prize for the best Doctoral Thesis in Polymer Science (RSEQ/RSEF, Polymer group).

From a teaching perspective, I have supervised a PhD thesis at ICTP-CSIC (Spain) and 2 Master Thesis at Imperial C. (UK). Moreover, I

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

regularly carry out teaching activities at Imperial College, such as thematic tutorials for undergraduates and Master Classes at the Doctoral Training Centre of Plastic Electronics.

I actively participate in international scientific organizations: I am member of the Community Board of Materials Horizons (RSC, IF=9.1, Q1); member of the Royal Society of Chemistry (UK), Materials Research Society (USA) and Real Sociedad Española de Química (Spain). Likewise, I am proactive in the organization of outreach events, grant evaluations (e.g. call: Young Research Teams 2015, Romanian National Authority), and PhD and Master examinations.

Apart from my Marie Curie Project, during the last years I have had competences in 5 large-scale projects, including 2 ERC grants (EU), a CONSOLIDER (Spain), a EPRSC grant (UK), etc.

I have driven an internationally-focused career, which has allowed me to build a solid, international collaborative network that include top-level researchers from Georgia Tech. (USA), Stanford U. (USA), Cornell U. (USA), Imperial C. (UK), Oxford U. (UK), Max-Plank (Germany), KAUST (Saudi Arabia), etc.

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: BENITO PEÑA, MARIA ELENA
Referencia: RYC-2016-19820
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: elenabp76@gmail.com

Título:

MATERIALES POLIMERICOS NANOESTRUCTURADOS Y BIOMATERIALES DE RECONOCIMIENTO

Resumen de la Memoria:

Mass production of optical sensing platforms requires implementation of new recognition elements and transduction schemes that provide high sensitivity, selectivity and multianalyte determinations. My research is focused in the FABRICATION OF CUTTING-EDGE MICRO/NANOSTRUCTURED POLYMERS AND BIOMATERIALS FOR SELECTIVE MOLECULAR RECOGNITION TOGETHER WITH THE IMPLEMENTATION OF NEW AMPLIFICATION STRATEGIES AND HIGH PERFORMANCE OPTOSENSING SYSTEMS:
(1) Development of smart recognition elements based on new chemical, biomimetic or biological materials.
The main groups of synthetic bespoke receptors that I was/am working with include: genetically engineered proteins and cells, molecularly imprinted polymers (MIPs), supramolecular and nanostructured receptors and biopolymers.
Moreover, different methodologies including computational chemistry, combinatorial chemistry and phage display we employ to discover or design new recognition elements for specific targets. In 2000, I began working in the design and preparation of MIPs for the analysis of antibiotics and their application in optosensing devices. Between 2000-2014, I consolidated my expertise on nanostructured polymers working on: (i) synthesis of MIP filaments and nano/microspheres; (ii) preparation of MIPs with functional monomers water-compatible; (iii) inclusion of signaling monomers on MIPs and their use on the development of label-free optical sensors. The availability of selective recognition elements that allow good sensing detection of specific targets is still a challenge; thus, during my postdoctoral period at Tufts (2009-2011), I successfully tackled my research interests to investigate new biological and biomimetic systems to generate selective engineered biorecognition elements: I became familiar with oligonucleotides-based sensors and the use of biotechnology for sensing purposes. Since 2011, we are also successfully exploring the optosensing capabilities, including SERS, of differently shaped gold nanoparticles (stars, rods spheres), coated with selective imprinted polymers. And since 2014, we are also producing engineered phages for being used in optosensing devices for small molecules monitoring.
(2) Development of novel signal amplification strategies.
My contribution to this objective includes: (i) molecular design and synthesis of fluorescent probes (antibiotics, recombinant proteins); (ii) synthesis and exploration of the suitability for sensing of novel fluorescent nanostructured materials (Gold NPs, QDs, polymeric micro/nanoparticles); (iii) use of these materials combined with optical techniques (TIRFM, RIfs or Simoa).
(3) Implementation of sensing platforms for simultaneous determination of several analytes and/or flow-through analysis.
From 2009 to 2011 I worked with Prof. David R. Walt, the inventor of the Fiber Optic Array Sensors and the Founding Scientist of Illumina, Inc. and Quanterix Co. My expertise expanded by working on projects that involved multiplexed detection of biomarkers and pathogens using randomly ordered arrays based on coded microspheres and fiber-optic platforms.
Thus, I am currently interested in using my expertise on microarray and multianalyte sensors in combination with my ability to create new nanostructured sensing materials, and readout mechanisms, to develop sensor platforms with the aim of encompassing a growing number of applications.

Resumen del Currículum Vitae:

1999-2000: Incorporación al grupo de la Prof. Moreno-Bondi (Dpto. Q. Analítica, Facultad Química, UCM) para trabajar en sensores para detección de herbicidas.
2000-2005: Comencé mi tesis doctoral dirigida por la Prof. Moreno-Bondi. En el 2000, obtuve una subvención con beca predoctoral (Proyecto V marco CREAM) y en 2001-2005 conseguí una beca predoctoral de la UCM (concurso nacional y competitivo). Durante ese periodo colaboré en tareas docentes del mismo departamento y participe en varios proyectos competitivos. La producción científica durante mi tesis doctoral supuso el comienzo de tres nuevas líneas de investigación en el grupo: polímeros de impronta molecular (MIPs), inmunoensayos y cromatografía líquida.
En 2005-2006 fui responsable de gestión en el Laboratorio de Análisis Químico Interlab S.A. Durante ese tiempo, mi función fue la de coordinación de un equipo de 5 técnicos especialistas, contribución en I+D+i (e.g. contrato con Repsol para determinación de PAHs en olefinas), cualificación del personal del área de cromatografía y validación de métodos para ENAC, entre otros.
En 2006-2008 regresé a la investigación mediante un contrato postdoctoral en el grupo del Prof. Orellana (Dpto. Q. Orgánica I, Facultad Química) donde pude aplicar e implementar los conocimientos en biosensores y polimeros improntados para la detección de fluoroquinolonas (1 review, 5 publicaciones, 1 capitulo) y fui colaborador docente. Durante este período, he trabajado como investigador visitante con el Prof. Sellergren en INFU (Dormund, Alemania) (2 paper). En 2008, también colaboré con el Prof. Haupt en UTC (Compiègne, Francia) (1 publicación).
En 2009-2011, trabajé en el laboratorio del Prof Walt de la Universidad de Tufts (EE.UU.) bajo una beca MEC-Fecyt-Fullbright posdoctoral. Allí, pude abordar con éxito proyectos basados en nuevos ámbitos de la ciencia analítica y biotecnológica (3 paper, 1 patente mundial, 2

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

premios). Al mismo tiempo, mi experiencia en sensores ópticos, biomateriales y materiales poliméricos micro/nanoestructurados, me sirvieron para trabajar en proyectos de detección de patógenos, análisis multianalito de biomarcadores protéicos utilizando microarrays de fibra óptica y microscopía TIR. Además, desarrollé una estrategia de amplificación de señal optosensora que Tufts ha patentado a escala mundial.

Desde octubre de 2011, trabajo y co-dirijo proyectos multidisciplinares en el grupo de la UCM, GSOLFA. Algunos logros incluyen, preparación de un sensor inteligente para Mahou que evalúa la frescura de cerveza (1 patente, 1 paper, 1 premio joven invest SUSCHEM) y de membranas MIP para la liberación controlada de antioxidantes en alimentos envasados (2 papers). Dirección 4 Tesis Doctorales centradas en (1) la preparación de materiales nanoestructurados para su aplicación en el campo alimentario (Becario FPU, defensa en 10/11/2016), (2) desarrollo de sensores ópticos integrados para la identificación de cepas de Fusarium y detección de micotoxinas en cereales (Becario Marie Curie), (3) preparación de biomateriales bifuncionales y su aplicación en biosensores ópticos "point-of-care" POCs para la detección de inmunosupresores (Becario garantia juvenil) y (4) diseño, síntesis y aplicaciones analíticas de elementos de reconocimiento biomimético. En 2015 firmé mi primer contrato con empresa como investigador principal. El 10/7/15 tuve hija

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: BORRELL TOMAS, AMPARO
Referencia: RYC-2016-20915
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: aborrell@upv.es

Título:

Desarrollo y diseño de materiales cerámicos mediante tecnologías no convencionales de microondas

Resumen de la Memoria:

El periodo de 2005-2010 estuve desarrollando el trabajo de tesis doctoral en el CINN-CSIC en el tema de materiales ultrafuncionales cerámica/nanofibras de carbono. Durante este tiempo se desarrollaron nuevos materiales basados en carbono por distintas técnicas de sinterización, siendo la más prometedora la técnica no convencional de spark plasma sintering. Se estudiaron los mecanismos de sinterización para obtener materiales con una nanoestructura controlada y con aplicaciones en sectores tecnológicos.

Durante el periodo postdoctoral, fue donde desarrollé mi principal línea de investigación con la que llevo trabajando desde el 2010: Métodos alternativos de sinterización no-convencional mediante microondas de materiales cerámicos avanzados. Se han diseñado nuevos equipos de sinterización adaptándolos a la necesidad de obtener materiales para distintas funcionalidades. Se ha colaborado con un grupo multidisciplinar de investigadores, ya que este tema abarca distintos campos ingenieriles. Esta tecnología de microondas para sinterización de materiales, se trata de una tecnología eco-friendly, rápida, limpia y flexible que utiliza la potencialidad de la energía de las microondas para la consolidación y densificación de los materiales con unas propiedades mejoradas, esto hace que el proceso sea económico y medioambientalmente sostenible. El consumo energético para consolidar un material cerámico del orden de los 100-150 W para alcanzar temperaturas de aprox. 1400 ºC, por lo tanto, se trata de una auténtica revolución, en términos económicos, de los procesados industriales. Durante estos años, se han desarrollado y diseñado en el grupo materiales cerámicos con aplicaciones industriales, como el aluminosilicato de litio (LAS) o composites basados en LAS, que presentan una clara alternativa frente a los actuales, ya que poseen tres características muy importantes: coeficiente de expansión térmica nulo o negativo, propiedades mecánicas altas y una baja densidad superficial. También, se han desarrollado biomateriales para aplicaciones odontológicas basados en circona, mediante la tecnología de microondas, con muy buenos resultados para una posible explotación industrial, ya que se está trabajando con el IVIO y empresas afines al sector.

A lo largo de estos años, se ha trabajado conjuntamente con el CINN-CSIC para seguir colaborando en temas de sinterización no-convencionales, con el spark plasma sintering y el equipo mixto HP-SPS, ya que tienen una Unidad de Desarrollo de Materiales Multifuncionales. También participo en tareas de investigación de otra línea de trabajo del grupo en la temática de desarrollo de nuevos materiales cerámicos para barreras térmicas en el sector aeronáutico. Dentro de esta temática, se han dirigido varios trabajos de investigación y solicitado y concedido 5 proyectos competitivos de investigación del Plan Nacional de Materiales desde el 2008.

Resumen del Currículum Vitae:

Durante los años 2005-2009, desarrollé mi Tesis Doctoral (premio extraordinario) dentro de un proyecto europeo Structural ceramic nanocomposites for top-end functional applications (IP-NANOKER, FP6) en el CINN-CSIC. En 2010, tuve un contrato postdoctoral en la Universidad Politécnica de Valencia (UPV), donde implementé los conocimientos adquiridos en la realización de mi tesis con el desarrollo de una nueva línea de investigación en procesos de sinterización no-convencional de materiales cerámicos mediante microondas. Esto me permitió poder evolucionar hacia nuevas tecnologías de sinterización emergentes eco-friendly de bajo consumo energético como son las microondas. En el 2011, el MICINN me concedió un contrato postdoctoral en el ITM-UPV Juan de la Cierva de 3 años, relacionado directamente con esta nueva línea de investigación. Durante este período he sido IP de 2 proyectos de investigación basados en la sinterización de materiales cerámicos mediante microondas. Resultado de estas investigaciones he codirigido 2 Tesis doctorales y, actualmente, estoy codirigiendo otras 2 tesis más, cotuteladas, con la USP de Brasil y la UQ en México. En diciembre 2015, el MINECO me concedió un contrato postdoctoral Juan de la Cierva-Incorporación de 2 años en la misma institución. Durante este periodo postdoctoral he realizado varias estancias de investigación en el ICV-CSIC en Madrid, en el ITC en Castellón, en la Universidad de Sao Paulo en Brasil y en la Universidad de Módena en Italia. He publicado más de 50 artículos en revistas JCI (índice H=10), he participado en 71 congresos y en 19 proyectos de investigación, financiados por: la Unión Europea (3), internacionales (1), nacionales (8), regionales (6) y con empresas privadas (1). He participado en un total de 71 congresos.

También, he colaborado en varias actividades de transferencia de tecnología que han generado 3 patentes. Estoy acreditada como profesor Ayudante Doctor y profesor Contratado Doctor por ANECA, ya que he impartido docencia en varias asignaturas de Grado (Ingeniería Industrial y Aeroespacial) y de Master en la UPV.

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: BRETOS ULLIVARRI, IÑIGO
Referencia: RYC-2016-20047
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: ibretos@icmm.csic.es

Título:

Low-Temperature Processing of Electroceramic Thin Films

Resumen de la Memoria:

The research interests of IÑIGO BRETOS encompass materials science and technology, with a focus on the processing and integration of functional ceramic layers (ferroelectrics, piezoelectrics, dielectrics, multiferroics or superconductors) in advanced electronics and emerging technologies for applications ranging from memory devices and transduction to photovoltaics and electronic skin. Over the last 15 years, his research career has evolved from the area of microelectronics to the appealing field of flexible electronics. The different type of substrate employed in one and other scenario requires nothing sort of a technological revolution due to the lower thermal stability and mechanical properties of the flexible substrates (polymers, paper, and textile) with respect to their rigid counterparts based on semiconductor silicon. This fact motivated his main research line, namely Low-Temperature Processing of Electroceramic Thin Films. During his predoctoral period at ICMM-CSIC, he developed a novel technology called photochemical solution deposition enabling the growth of ferroelectric oxide layers (multifunctional materials conventionally processed between 600-800ºC) at temperatures compatible with CMOS microelectronic integration routines (450ºC). This technique was promptly recognized at international level (ongoing collaborations were then born) and became the core of his research in the following years. Additionally, he made significant contributions to the ferroelectric community by the investigation on new synthetic routes to PbTiO3-based thin films such as the entirely aqueous method developed during his stay in Belgium (Hasselt University). In his postdoctoral period at Germany (RWTH Aachen University), he had his first contact with the fabrication of electronic oxide layers on flexible substrates of base metal foils. There, he was responsible for two research projects financed by the private companies BASF SE and Deutsche Nanoschicht GmbH. The results achieved led in the first case to a novel product design consisted of thin-film multilayer (Ba,Sr)TiO3 capacitors of high capacitance density and reliability, and in the second case to new superconducting nanostructured composite YBa2Cu3O7-δ films with artificial defects of BaZrO3 nanoparticles for effective vortex pinning, a work recognized by the Royal Society of Chemistry as 2015 Hot Paper. Back to Spain again, the experience and multidisciplinary knowledge acquired led him to the first demonstration worldwide of a functional oxide layer (the commercial Pb(Zr,Ti)O3 piezoelectric) directly grown on a flexible polymeric substrate at a temperature of only 300ºC. The novel approach he developed was protected by an international patent of invention. During his successive postdoctoral positions in Spain, he also contributed to explore new areas in his group by investigation on multiferroic thin films of BiFeO3 and multilayer composite films based on lead-free (Bi,Na)TiO3-BaTiO3. In 2015, he was awarded a ComFuturo grant (Fundación General CSIC) leading his own research project entitled ESTIMULO: New Materials and Processes for Electronic Skin: The Incorporation of Multiple Operation into Large-Area, Low-Cost Systems. Here, he is working in a revolutionary concept for the near-room-temperature processing of any functional metal-oxide thin film for integrating into e-skin devices.

Resumen del Currículum Vitae:

IÑIGO BRETOS (Vitoria-Gasteiz, 1979) earned his B.Sc. in Chemistry from the Universidad de Navarra (Pamplona). His research career started in 2002 with a Predoctoral Scholarship FPI at the Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC), receiving in 2006 his Ph.D. from the Universidad Autónoma de Madrid (Madrid) with maximum Cum Laude qualification and European Mention (supervisor Prof. M.L. Calzada). Subsequently, he was postdoctoral assistant within the European Network of Excellence MIND on the integration in the field of piezoelectric materials before moving to RWTH Aachen University (Germany), where he was Postdoctoral Research Fellow from 2007 to 2009. Currently ranked first among the top universities in Germany in the area of electrical engineering, he joined Prof. R. Waser's group on the development of novel electronic equipment, materials research and fabrication of integrated devices. There, he was responsible for two research projects financed by the private companies BASF SE and Deutsche Nanoschicht GmbH. He returned in 2009 to the Spanish system for Science and Technology with a Postdoctoral Fellowship JAE-DOC and a subsequent Juan de la Cierva. Since then, he carries out his own research activities at the group of Electroactive Oxides for Smart Devices (EOSMAD) at ICMM-CSIC. In 2015, he was awarded a ComFuturo grant (FGCSIC) leading his own research project (159 kEUR) entitled ESTIMULO: New Materials and Processes for Electronic Skin: The Incorporation of Multiple Operation into Large-Area, Low-Cost Systems. During his career, he has been involved in 12 R&D projects and 5 European R&D Actions and Network of Excellence of former EC Framework Programmes, and 2 R&D projects with private companies, being scientific coordinator of a working group within MPNS Cost Action MP0904. He has published 41 articles (76% within Q1, 40% first author, 27% corresponding author) in SCI journals, 3 book chapters (first author) and 1 international patent. He is first author in 5 of his 7 highest-impact publications (average IF=14), with 1 publication highlighted as 2015 Hot Paper. The impact of his work has been illustrated in journals such as Advanced Materials (x3), Journal of the American Chemical Society, Chemistry of Materials (x3), Scientific Reports (x2) and Journal of Materials Chemistry (x2), among others, with current h-index of 13 (Google Scholar). He has designed and developed 2 experimental prototypes part of the infrastructure of ICMM-CSIC, with a highlight international development at scientific newsletter (Piezo Institute). He has supervised 3 M.Sc. works and is regular mentor of undergraduated students in his group. He has

contributed to more than 70 conferences, including 12 invited contributions. He was invited speaker in his research line on low-temperature processing at 2 international conferences. He has developed 6 stays in R&D&I centers of Germany, Belgium, France, Portugal and Brazil. He was(is) invited teacher in 3 courses (1 European) and 3 seminars oriented to university/postgraduate teaching. He was organizer of the II Young Scientist Meetings at ICMM-CSIC. He has an active participation in activities of science outreach, being scientific coordinator of ICMM Guide Tour Playing with Chemistry for Materials Design, and appearing in several national/autonomic media (RTVE, EITB, madri+d, etc).

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2016

Turno de acceso general

Nombre: WAGNER , MARKUS RAPHAEL
Referencia: RYC-2016-20467
Área Científica: Ciencia y Tecnología de Materiales
Correo Electrónico: wagner.markus.r@gmail.com

Título:

Semiconductor nanophotonics and nanophononics

Resumen de la Memoria:

My research activities are focused on the photonic, phononic, and electronic properties of a wide range of materials and nanostructures such as metal-oxides, low dimensional III□V hetero- and quantum-structures, Si, Ge and InGaN nanowires, group IV, III-nitride, and II-oxide membranes, phononic crystals and superlattices.
During my different postgraduate research activities, I became an expert in a large variety of experimental techniques, many of which I have implemented, improved or build from scratch. In particular, in the field of time resolved, nonlinear, coherent, and near-field optical spectroscopy, I have acquired extensive knowledge both in the study of nanostructures as well as the implementation of novel experimental setups. Among others, I have been in charge of the optical spectroscopy laboratories in three different research institutes and developed and implemented two different femtosecond pump & probe setups to study the dynamics of acoustic and optical phonons in nanostructures (acoustic reflectivity modulation / anti-Stokes Raman), a combined micro-Raman cathodoluminescence setup for in-situ measurements of Raman scattering under electron beam irradiation, a tip enhanced near-field Raman setup with spatial resolution below 30 nm, and a 2-laser Raman thermometry technique for thermal conductivity measurements.
I have used these and other techniques to investigate the optical, thermal, and electronic properties of nanostructures and suspended membranes, to study the impact of doping, structural defects, and compensation mechanisms in semiconductors, to elucidate the effects of magnetic and stress fields on phonons, excitons, and polaritons, to analyze the size-shape-property relations in nanostructured and functionalized materials, to determine the optical properties of metastable polymorphs, and to investigate the nanoscale thermal transport and phonon dynamics in phononic crystals and suspended nanostructures.

Resumen del Currículum Vitae:

My research career is markedly international as expressed by my different postdoctoral research positions in Germany, Australia and Spain as well as several invited short-term research stays in the United States, Singapore, and South Africa. It is also intrinsically multidisciplinary with strong collaborations in chemistry, physics, and material science which resulted in several joint high impact publications in Nano Letters, ACS nano, Advanced Functional Materials, Chemistry of Materials and Chemical Science. Since 2007, I have authored and co-authored 72 articles and one book chapter with 3 additional publications currently under review. These include two extensive review articles on (i) nanophononics and (ii) polarity effects in wide band gap materials, as well as one Springer material science book on zinc oxide. These works were cited more than 1600 times in total and my current h-index is 24 (Google Scholar). To disseminate the results of these, I have given 19 invited talks, 29 regular talks and 13 poster presentations as first and presenting author. In addition, I have co-supervised 10 PhD candidates and final year projects and given lectures and practical courses on six different subjects in three different countries. Currently, I give the weekly general lecture □physics for engineers□ for undergraduate students of 7 different engineering degrees at the Technical University Berlin with more than 500 students.
My PhD research was funded by a highly competitive Ernst-von-Siemens fellowship and both, my PhD thesis and PhD exams were awarded with summa cum laude (outstanding). Following several postdoctoral positions in Germany, Australia and Spain, I was awarded in 2013 with the prestigious Marie Curie postdoctoral fellowship for my research project on nanoscale thermal transport at the Catalan Institute of Nanoscience and Nanotechnology (ICN2) in Spain. Since the beginning of 2016, I am principal investigator (PI) and senior scientist of the collaborative research centre CRC 787 on "Semiconductor Nanophotonics" at Technical University Berlin (TUB), Germany, which is funded by the German research foundation (DFG). Up to now I have acquired a total amount of third party funding of 863.504□ as principal scientist.