



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2018

Turno de acceso general

Nombre: VARGAS BALBUENA, JAVIER
Referencia: RYC2018-024087-I
Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
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Título:

Pushing the computational limits of cryo-electron microscopy to enhance its biomedical impact

Resumen de la Memoria:

Vargas is an Assistant Professor (Tenure-Track) at McGill University (Montreal, Canada). McGill is a world leading institution ranked 33rd worldwide (2019) by QS World University Rankings. Besides his main appointment, he currently holds or held the following positions:

-8/2017- Associate Director of the Facility of Electron Microscopy Research (FEMR) and part of the FEMR Executive Committee (EC). The EC establishes the scientific direction of FEMR, proposes improvements to the infrastructure through funding bodies, management and staffing of the facility. It approves the annual budget and prepares the annual report.

-1/2012- Associated Scientist of the INSTRUMENT Image Processing Centre (I2PC). Vargas was invited to participate in the I2PC initiative. I2PC belongs to INSTRUMENT, the European Strategic Infrastructure Project in the area of structural biology. I2PC supports to structural biologists providing them with image processing advice in cryo-EM projects and organizes workshops and specialized courses.

-1/2016 12/2018 Member of the Special Area Team in Biomedical Image & Signal Analytics (BISI) of the European Association for Signal Processing. Vargas was invited to serve in this team in 2016. This group promotes synergies at the interdisciplinary interface where advanced image processing meets with biomedical sciences. BISI organizes workshops and special sessions in research meetings, sponsors the Best paper award at EURASIP in the area of biomedical image processing and provides expertise to the European Association for Signal Processing Board of Directors.

Vargas' research program focusses on the development of novel image processing and machine learning computational methods in cryo-electron microscopy (cryo-EM) to obtain 3D reconstructions of biomolecules. Cryo-EM is a form of transmission electron microscopy where macromolecules are embedded in a thin layer of amorphous ice and studied close to its native state. Cryo-EM is currently undergoing a revolution in its capability to analyze macromolecular structures at high-resolution. Reconstruction of macromolecules at atomic-resolution allows to infer their molecular mechanisms and ultimately understand how life works. Vargas' research focusses in two major areas: 1) the development of generic cryo-EM methods to overcome current limitations of the technique; 2) his laboratory uses these newly developed methods to obtain new insights into the assembly process of the bacterial ribosome, an unexploited cellular process with great potential for the development of new antimicrobial targets.

Before, Vargas was a Postdoctoral Fellow (2011-2017) at Carazo's lab - one of the world leaders in cryo-EM - at CNB-CSIC (Madrid). From 2008 to 2011, Vargas worked at INTA, where was very active proposing innovative phase retrieval computational methods in optical metrology. These methods are extensively used in quantitative phase contrast microscopy and allow to determine the phase from translucent objects as living human cells and evaluate the quality of optical instruments. He obtained his PhD in 2009 from the Optics Department of the UCM. His PhD focused on the development of 3D reconstruction methods by structured light projection. Vargas did research stays at prestigious research groups: PhD stay (4 months) at VISIC, KULeuven (Belgium), Postdoc stay (3 months) at Koster Lab, LUMC (Holland).

Resumen del Currículum Vitae:

Vargas' publication record includes 71 published peer-reviewed JCR articles in top-tier journals, including Nature Communications, Molecular Cell, Bioinformatics, Structure, Scientific Reports, Optics Express and Optics Letters that have collectively been cited 1,621 times generating an H-index of 20 (Google Scholar). Since 2014, his work has been cited 1,410 times generating an H-index of 20. He has been first or last author 33 and 9 times respectively. Additionally, he has co-authored the following peer-reviewed documents: 1 book, 2 book chapters, 6 referred conference proceedings and 14 technical documents. In 2016 Vargas licensed an European patent on a new technology to allow using liquid crystals as variable phase retarders in space conditions.

Vargas' research group at McGill is composed by one postdoctoral fellow (Dr J Gomez-Blanco), one PhD student (S Kaur) and one MSc student (S Adinarayanan). In the past, he co-supervised one PhD student (Dr V Abrishami), a Practicum thesis (~MSc thesis) (A Mena) and he is currently co-supervising another PhD student (JL Vilas) who will defend his thesis in March 2019.

Vargas is currently Associated Editor of Applied Optics journal (OSA) and has edited more than 29 manuscripts. Additionally, he is Associate



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Editor of JSM Biology and in 2016 was Lead Guest Editor of the Special Issue on Cryo-EM Image Analysis Methods for BioMed Research International journal. He has reviewed more than 115 manuscripts for 20 different JCR journals. He has participated in the organization of scientific meetings:

2014-10th International Conference of Computational Methods in Sciences and Engineering Athens Greece.
2017-Canadian Microscopy & Cytometry Symposium, Montreal Canada.

He has served since 2016 as invited member of the Biomedical Image & Signal Analytics team of the European Association for Signal Processing. In 2012, Vargas was invited to join the Instruct Image Processing Center as Associated Scientist.

Vargas has given 7 invited talks in international meetings and prestigious research centers and has been invited 7 times to participate as lecturer in international cryo-EM workshops.

Vargas research program has been supported by the following grants and fellowships:

Grants:

2018-FRQNT New Researchers Start-Up, (CANADA) PI: Vargas (\$83,376).
2018-NSERC Discovery Grants program, (CANADA) PI: Vargas (\$185,000).
2018-CFI-JELF, (CANADA) PI: J Ortega, co-PIs: Vargas and Tocheva (\$1,900.000).
2017-McGill Start-up program, (CANADA) PI: Vargas (\$200,000).
2015-Comfuturo program FGCSIC, (SPAIN) PI: Vargas (124,500).

Fellowships

2014-European Molecular Biology Organization postdoctoral fellowship (GERMANY) (6,620)
2012-Juan de la Cierva fellowship (SPAIN) (96,000)
2006 FPU PhD fellowship travel award (SPAIN)
2005 FPU PhD fellowship (SPAIN)

In the past he participated in 22 research projects: 3 funded by Canadian public granting agencies, 1 funded by McGill University, 3 funded by the European ESFRI program, 4 funded by the European Space Agency, 6 by the Spanish Government, 4 by private companies and 1 by Comfuturo. He collaborates with groups in Spain, Netherlands, France, China, USA, Mexico and Canada, including collaborations with industry (Arcoptix, Visual Display, Thermo Fisher, Indizen Optical Technologies, KC Solutions) and was PI of a project funded by KC Solutions company.



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Turno de acceso general

Nombre: SKET , FEDERICO

Referencia: RYC2018-026166-I

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Correo Electrónico: federico.sket@imdea.org

Título:

In-situ processing and mechanical characterization of materials

Resumen de la Memoria:

I have been active in material research for the last 12 years, carrying out research in 4 countries (Argentina, Austria, Germany and Spain) working with reputed scientists in the field (e.g. Prof. A. Pyzalla, Prof. A. Borbely, Prof. G. Requena, Prof. J. Llorca). My background has a good balance of fundamental research and interaction with industry, which I am increasing it with more academic supervision and teaching in the last years.

I am currently a researcher at IMDEA Materials Institute (Spain), leading the group of In-situ processing and mechanical characterization of materials (4 PhD students, 2 Post-doc, 2 technicians). My research focuses on experimental mechanics and understanding the mechanical behavior of advanced structural materials, such as metallic alloys, intermetallics and fiber-reinforced polymers. This includes the characterization of mechanical properties, analysis of deformation and fracture mechanics of these engineering materials from the nano- to macro-scale, aided by using advanced characterization techniques, such as laboratory and synchrotron X-ray tomography and X-ray diffraction. A strong focus is given in my research to the material mechanical properties and microstructural evolution (4D or sequential evaluation) through the use of unique in-house developed in-situ devices, such as mechanical testing rigs for tension, compression, fatigue, creep at room and high temperatures that coupled with advanced characterization techniques allow me to combine the field of mechanical engineering and material science.

Additionally, I complete my research interests with studies of microstructural development during in-situ processing. Again, the combination of unique in-situ devices development (furnaces for in-situ heat treatment, infiltration devices for resins or metals, etc.) with non-destructive characterization techniques provides me insight beyond the state of the art for different manufacturing processes. This allows me to expand the knowledge gain along the manufacturing chain, from the processing to the mechanical properties of materials.

The group I lead, collaborates with leading international groups in the field of Material Science in Europe. My expertise in the development of unique devices for mechanical characterization and material processing coupled with advanced characterization techniques allows me to interact with research groups of different fields. This transversal research line I conduct, is becoming very rapidly one of the most useful experimental techniques in the world to understand the fundamentals of processing and mechanical behavior in metals and composites (e.g. matrix infiltration, damage and microstructure evolution, etc.). This combined with other advanced characterization tools such as X-ray tomography, diffraction for phase analysis, residual stresses and textures with the possibility of in-situ testing either at laboratory or synchrotron facilities gives me a combined expertise which is very rare in Europe.

I have co-authored 38 international peer reviewed publications with currently about 500 citations and h-index of 13. I have contributed to 79 conferences. I have participated in 23 industrial projects, from which I acted as PI in 9 of them, and in 26 National, European and international projects funded by public calls and I act as PI in 3 of them (H2020 programme).

Resumen del Currículum Vitae:

CURRENT POSITIONS

July 2015 present. Researcher at IMDEA Materials (Spain). Head of group In-situ processing and mechanical characterization of materials .

Sept. 2013 present. Venia Docendi for teaching at the Master in Materials Engineering, Technical University of Madrid (UPM, Spain).

PREVIOUS POSITIONS

Jan. 2010 July 2015. Post-doc at IMDEA Materials (Micro- and Nano-mechanics group, Spain)

Sept. 2012 Nov. 2012. Stay at TUWien (Austria) where I worked on high temperature deformation of titanium alloys combined with in-situ X-ray synchrotron diffraction.

June 2006 May 2010. PhD student (MPIe, Germany). Study of creep properties and microstructure evolution under inhomogeneous creep conditions of several metallic alloys characterized in-situ by synchrotron microtomography.



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Dec. 2004 – May 2006. Diploma Thesis student. I worked in an industry-related project on the development of corrosion resistant cemented carbides. Technical University of Vienna (Institute of Material Science and Technology)

2001-2004. Technological Materials Predictive Engineering Assistant - Member of GEMAT group. National University of Technology (UTN) and National University of Comahue (UNCo)

EDUCATION

2006-2010 Ph.D. in Mechanical Engineering, Max-Planck Institute for Iron Research & Ruhr-University of Bochum, Germany

2004-2006 Research Assistant at Technical University of Vienna – Institute of material science, Austria

2000-2005 Diploma studies in Electrical Engineering, University of Comahue, Argentina

RESEARCH ACTIVITIES

- Participated in 23 industrial projects, from which I acted as PI in 9 of them,
- Participated in 26 National, European and international projects funded by public calls and I act as PI in 3 of them (H2020 programme)
- 38 peer-reviewed papers (h-index 13 WOS- citations 500)
- Participation in 79 conferences (2 keynotes) + invited talks

TEACHING & SUPERVISING EXPERIENCE

- Venia Docendi at the "Master in Material Engineering" at the Technical University of Madrid (Universidad Politécnica de Madrid)
- Structural characterization of materials II
- 21 Master & Bachelor thesis
- 1 PhD (defended 2019)
- 3 PhD (ongoing)
- 2 Post-docs
- 2 Technicians

SCIENTIFIC, TECHNICAL AND/OR ASSESSMENT COMMITTEES

- Beam Time Allocation Panel for nano-imaging and nano-analysis at the ESRF (European Synchrotron Radiation Facility) 2016 till 2021
- Reviewer of several journals such as, Composite Science and Technology, Material Science and Engineering A, Powder Metallurgy, Composites Part A, Engineering Fracture Mechanics, Nuclear Inst. and Methods in Physics Research, A.

OBTAINED GRANTS & PRIZES

- 1st Innovation Award at IMDEA Materials, 2016
- Ayudas de formación postdoctoral del ministerio de economía y competitividad de España, CONVOCATORIA 2013. Post-doctoral 2014-2016
- Marie Curie AMAROUT Europe Programme fellowship 2010-2012
- Doctoral scholarship from Helmholtz Zentrum Berlin, Germany, 2009
- Doctoral scholarship from Max-Planck Institute for Iron Research, 2006-2009
- Scholarship for Diploma Thesis - ALPHA II Programme, 2004-2005



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Nombre: OLALLA MARTINEZ, CARLOS
Referencia: RYC2018-025080-I
Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
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Título:

Modeling, Control and Optimization of Power Electronics Converters

Resumen de la Memoria:

During his 12 years of research career, Carlos Olalla has worked unceasingly in the areas of control theory, power electronics and optimization. Initially focused on the robust control of DC-DC power converters, his researches have tackled several scientific and technological challenges, including: (i) the development of novel control methods for switched-mode power supplies and their modelling, (ii) the synthesis of robust and optimal controllers for these systems, and (iii) the integration and control of distributed power conversion systems. Although most researchers with strong control theory background focus on energy challenges from a power systems viewpoint, the applicant undertakes this task from the perspective of power electronics.

Predoctoral phase 2005-2009 (Spain, France). Appointment at Universitat Rovira i Virgili (Tarragona, Spain), realization of his PhD thesis in Universitat Politècnica de Catalunya (Barcelona, Spain) and 12 months as a visiting scholar in LAAS-CNRS (Toulouse, France): development of robust control synthesis methods for DC-DC/AC-DC converters, using novel optimization algorithms based on semi-definite programming techniques.

Postdoctoral phase 2009-2010 (France). Appointment as researcher at LAAS-CNRS where he joins the 'Methods and algorithms in control' group. Novel models and robust control methods and synthesis algorithms for power converters.

Postdoctoral phase 2010-2012 (United States). Appointment as researcher and lecturer in University of Colorado at Boulder (US) where he joins the Colorado Power Electronics Center. Dr. Olalla participates in the ARPA-E ADEPT project Wafer-level submodule integrated dc-dc converter, funded by the US Department of Energy (1.1 M\$), leads 8 of the 16 publications resulting from the project and participates as coauthor in another 3. The applicant develops a control method for submodule-level power converters that results in a US patent.

At the end of 2012, Dr. Olalla returns as an independent researcher to Universitat Rovira i Virgili. He first obtains a Beatriu de Pinos fellowship, and later a Marie Curie Individual Fellowship, both as PI. He also receives a Juan de la Cierva grant, which he has to turn down in order to accept the Marie Curie Fellowship. Besides of teaching, his responsibilities include supervision of PhD students and project management. He participates in several national projects and continues two main research lines: algorithms for the synthesis of robust controllers and control of distributed power converters. This research is awarded with the 2016 best paper prize of the IEEE Transactions on Power Electronics. Also, he starts a novel research line on control of resonant converters, which results in a PCT patent (2017). Recently, he has received funding from the BBVA Foundation (competitive projects Leonardo 2018), Lear Corp (2018) and the NREL laboratory (2018). He is the coordinator and principal investigator of the recently awarded national project 'ConexPOT' (Retos Investigación 2017).

Resumen del Currículum Vitae:

Carlos Olalla obtained the PhD degree in Advanced Automatic Control and Robotics in 2009. He was a predoctoral visiting scholar in the CNRS LAAS laboratory (France) for 12 months, where he also held a postdoctoral position until mid-2010. Then he joined the Colorado Power Electronics Center of University of Colorado (US) as postdoctoral researcher. At the end of 2012 he returned to Universitat Rovira i Virgili (Spain) as a Beatriu de Pinos fellow and as recipient of a Marie Curie individual award. Currently, he is working under the framework of a Personal investigador de acceso al SECTI contract.

After 12 years of research career, he has his own research line on modelling, control and optimization of power converters and power conversion systems. He has published 23 peer reviewed journal articles or book/book chapters (21 papers, 2 books), 30 international conference papers and he is authors of 2 patents (1 US, 1 ES PCT). His h index is 15 (Scopus), 76 % of his publications are in the first quartile (16 papers Q1, 5 papers Q2), and he is the first or corresponding author in more than two thirds (> 66 %) of his publications. His papers have been published in top rank journals such as the IEEE Trans. on Power Electronics, Progress in Photovoltaics, and the IEEE Trans. on Industrial Electronics.

The leading-role and independent thinking of the applicant can be assessed by the high-quality and impact of the papers where he has been leading/corresponding author, which add up to more than 66 % of his publications. As an example, he has recently received the 2016 best paper prize of the IEEE Transactions on Power Electronics without the participation of the PhD supervisor.



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He has participated in 11 research projects (4 international, 7 national), being PI in 4 of them. It is worth to highlight (i) an EU-funded FP7 Marie Curie individual project (PI), (ii) an ARPA-E project funded by the Dept. of Energy of the US, and (iii) a recently awarded national project 'Retos-Investigacion' (PI+Coordinator). As a researcher, Dr. Olalla accumulates a total of 3.5 years of international experience (1 year predoctoral, 2.5 years postdoctoral).

His teaching activities include the supervision of one PhD thesis (completed in 2017) and of another PhD student in his last year (ECD 2019). Also, he has supervised two master's thesis in 2016 and 2017. In addition, he has been a lecturer both in the University of Colorado (60 hours) and Universitat Rovira i Virgili (approximately 420 hours). Finally, he has been an invited lecturer at the Dept. of Electronics Engineering of Universidad de Sevilla, in 2014 and 2015.

OTHER MERITS

-Selected in competitive calls for individual fellowships:

Reserve candidate in previous Ramon y Cajal call (2014).

Marie Curie Individual Fellowship.

Juan de la Cierva.

Beatriu de Pinos.

Ayudas para Estancias Postdoctorales en el Extranjero.

Ayuda predoctoral de formación de Personal Investigador (FPI).

-Member of the following international technical committees:

IEEE Workshop on Control and Modelling for Power Electronics (COMPEL)

Photovoltaics Specialists Conference(PVSC)

Seminario Anual de Automatica y Electronica Industrial (SAAEI)

-Member of the following international organizing committee:

2018 International Symposium on Nonlinear Theory and Its Applications (NOLTA)



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Nombre: GONZALEZ REGUERO, BORJA
Referencia: RYC2018-025865-I
Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
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Título:

Civil and Environmental Engineering for Coastal Risk and Adaptation

Resumen de la Memoria:

Dr. Reguero's research focused on the numerical modeling of wave climate variability and associated environmental and technological risks. He investigated the global wave climate and its variability, coastal hazards and the impacts of climate change in coastal areas. His work on the Regional study on the effects of climate change on the coasts of Latin America and the Caribbean, led for the UN Economic Commission for Latin America and the Caribbean (ECLAC), resulted in 6 reports (the first report is the most downloaded document of the Agency), 2 guideline documents, and different scientific articles on wave climate, extreme sea levels, vulnerability and risk, and the effects of climate change in coastal areas. This research directly informed the coastal impact assessment of the 5th Assessment Report of the IPCC regional chapter for Latin America, the local Economic Studies of Climate Change, coordinated by ECLAC, and has been used in several countries in their National Communications to the UN Framework Convention of Climate Change (UNFCCC).

Since 2013, at the University of California at Santa Cruz (UCSC), Dr. Reguero has applied a strong engineering and climate science background to advance adaptation, hazard risk reduction, and sustainability policies to drive global change. In a joint appointment with The Nature Conservancy (largest environmentalist non-profit), he has critically contributed to the development of their global agenda (science, policy and demonstration projects) on Climate Risk and Resilience. As a postdoctoral scholar, Dr. Reguero examined the cost effectiveness of adaptation strategies and the limited knowledge on the cost-effectiveness of green infrastructure, a barrier for their wider adoption in coastal protection. His postdoctoral work also focused on innovative engineering of ecosystem-based adaptation projects, such as the engineering of artificial coral reefs for erosion control and protection of a vulnerable coastal community in the Caribbean (a video of this work co-developed with ESRI received great attention in the UNFCCC COP 21 in Paris).

Since 2016, as a Researcher at the Institute of Marine Sciences at UCSC, his research has focused on: (1) climate risks; (2) innovative risk financing; and (3) climate-resilient coastal engineering and management; in close collaboration with leading partners such as the US Geological Survey and the Natural Capital Project at Stanford University. Significant achievements include the identification of the first global signal of climate change in the wave climate and a global assessment of the risk reduction benefits of coral reefs (both published in Nature Communications). This body of work is also informing decision-making in USA, Mexico, the Caribbean, and other regions, and leading to global innovations in: (1) ecosystem-based hazard risk reduction; (2) pioneering risk financing products (e.g. an innovative scheme to insure a stretch of the Mesoamerican Reef and a new resilient insurance); and (3) the design of engineering frameworks for nature-based solutions.

His work has received significant scientific and media attention and has created the most comprehensive case globally for the role of natural infrastructure. This has vaulted Dr. Reguero into a global leadership position on the science and practice of coastal risks, adaptation, and natural coastal defenses

Resumen del Currículum Vitae:

Dr. Reguero earned a 5-year degree in Civil Engineering (U. of Cantabria, 2006), a MSc in Leadership in Civil Engineering (U. of Castilla la Mancha, 2007), a MSc in Coastal and Port Engineering (U. of Cantabria 2008), and a PhD in Environmental Hydraulics with a Thesis on Numerical modeling of the global wave climate variability and associated environmental and technological risks (U. of Cantabria, 2013). The candidate complemented this education with a Certificate in Index-based Insurance (2013) and a MSc in Applied Economics (UNED, 2016).

Dr. Reguero was a postdoctoral scholar from 2013 to 2016 at the Department of Ocean Sciences at the University of California, Santa Cruz campus (UCSC). Since 2016, he has been a researcher at the Institute of Marine Sciences (IMS) at UCSC, a Research Fellow with The Natural Capital Project at Stanford University (since 2018), and an Associate with the Innovation Lab of the World Bank.

Dr. Reguero has developed a wide research network at the national and international level, with key institutions and agencies that include: US Geological Survey, Stanford University (Civil and Environmental Engineering), the Natural Capital Project, US Army Corps of Engineers, US National Oceanic and Atmospheric Administration, Instituto del Mar del Peru, and universities in Mexico (UNAM), Spain (Universidad de Cantabria), University of Miami, and the University of California, Santa Barbara. With this network of partners, he is leading crucial innovations in climate risk adaptation and in the engineering and design of nature-based solutions.



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He has led 6 competitive R&D projects (PI or co-PI, ~1,724,108 since 2016), participated in 16 R&D competitive projects in Spain, Europe and the United States; and 17 R&D non-competitive projects with the industry (Dragados, Lloyd s of London, etc.), development agencies (IADB, UNDP, ECLAC, WB, etc.) and non-profit organizations such as Island Conservation and The Nature Conservancy, in developed (Europe, United States) and developing regions (Latin America, the Caribbean, Africa, Pacific Islands).

His research activity comprises 19 journal articles (and 2 under review) with a total of 459 citations (Scopus) - 31% only during 2018; 13 book chapters or conference proceedings; 8 technical reports; 63 conference talks (16 by direct invitation).

His trajectory also includes significant scientific communications and outreach (e.g. - National Geographic); media interviews (e.g. - BBC World News); scientific adviser to the California Academy of Sciences Planetarium Show Expedition Reef ; 9 committees and working groups, including the International Guidelines on the use of natural and nature-based features for sustainable engineering , led by the USACE and co-led by Dutch Rijkswaterstaat, Deltares, UK Environment Agency and HR Wallingford (70 international experts); and reviewer of proposals for the European Research Council and the American Association for the Advancement of Science (AAAS).

His work has been recognized with different awards and recognitions such as the CYTAMA award to best academic record in Hydraulic Engineering, Modesto Viguera National Award, and different awards to projects such as the Geospatial World Excellence Award to the Coastal Resilience platform, the Tourism for Tomorrow Innovation Award, and the Mapping Ocean Wealth Project.



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Turno de acceso general

Nombre: ORTEGA PONCE, DANIEL

Referencia: RYC2018-025253-I

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

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Título:

Nanotechnology Applied to Healthcare

Resumen de la Memoria:

My research interests lie within the application of nanotechnology to biomedical engineering. I started my career designing magnetic nanomaterials for technological applications; of particular note is the development of magneto-optical current sensors during my PhD at the University of Cádiz. The postdoctoral stage at UCL in the UK, and later as honorary researcher at the UCL Institute of Biomedical Engineering, represented a turn towards biomedical technology. This research period embodied a number of technically disruptive projects such as: (i) a magnetically-driven tissue engineering technique for producing hollow/tubular organs, (ii) a stem cell-based therapy for treating vascular injuries using magnetic nanoparticles delivered through an original system of magnets, (iii) magnetically-loaded smooth muscle cells to improve the quality of life of faecal incontinence patients and, (iv) the study of magnetic hyperthermia therapies for treating localised tumours, which entailed devising techniques for tracking treatments in real time. At a subsequent stage in Japan, I focused on developing a microfluidic-based transmission electron microscopy for studying the interaction of nanomaterials with cells in their native state, enabling unprecedented in situ studies on their efficacy and toxicity as therapeutical agents.

I have coordinated the largest international network on magnetic hyperthermia for cancer treatment (under the RADIOMAG project, involving institutions and companies from 26 countries), and my efforts have contributed to the first ISO rule applied to magnetic nanoparticles for biomedicine.

The topic about cancer therapy further evolved into a more translational research line during the onset of my independent career: the in silico testing of magnetic hyperthermia treatments using computer simulations. I developed custom computable phantoms from diagnostic images and algorithms to test electromagnetic cancer therapies like hyperthermia avoiding animal or human experimentation. This technology is being put into practice in a clinical trial on pancreatic cancer and an approved clinical study on the role of tumour microcirculation in electromagnetic therapies, both in close collaboration with Vall d'Hebron Hospital in Barcelona. Remarkably, my latest research has attracted the attention of NVIDIA Corporation, which has contributed to further it through a grant seed program.

Resumen del Currículum Vitae:

After an MSc in Engineering of Industrial Processes at the University of Cadiz in 2003, I obtained a PhD in Condensed Matter Physics in 2007 with a thesis focused on the development of magneto-optic current sensors based on magnetic nanoparticles. In 2008 I joined the University of the Basque Country as a research associate working on new technological applications of magnetic nanoparticles. In 2009 I won a Marie Curie IEF to join the University College London (UCL) and the Royal Institution of Great Britain (RIGB) in London for two years. During this time, I specialised in the application of nanotechnology to biomedicine, particularly to hyperthermia for the treatment of certain cancers, as well as to tissue engineering and cell therapies based on magnetically modified mesenchymal stem cells. In 2011 I held a research position at the UCL Department of Physics, continuing my research on biomedical applications of magnetic nanostructures. While at the UK, I spearheaded and managed the Electron Microscopy Unit at RIGB and the Mössbauer Spectroscopy Laboratory at UCL. I was appointed honorary research fellow to the London Centre for Nanotechnology (2010-2013, and 2015 to date), and later to the UCL Institute of Biomedical Engineering (2013-2015). In order to develop a new imaging technique for characterising the interaction of magnetic nanomaterials with cells in their native state, I conducted two stays at the University of Toyohashi in Japan in 2012 and 2013, first as visitant researcher and then as research associate. In 2013 I joined IMDEA Nanoscience after winning a PEOPLE-COFUND Marie Curie Action.

I am leader of the Applied Nanomagnetism group at IMDEA Nanoscience and scientist in charge of the regional Laboratory of In Silico Electromagnetic Testing. Regarding my scientific production, I am the author of 41 scientific publications - accumulating over 1000 cites - comprising 1 Applied Physics Reviews (IF 14,3), 1 Advanced Functional Materials (IF 13,3), 1 Biomaterials (IF 8,3), 2 Nanoscale (IF 7,7), 2 Journal of Materials Chemistry (IF 6,6), 1 Nanomedicine (IF 4,8), among others. I presented 59 conference contributions, including 1 keynote and 9 invited talks at important international conferences (JEMS, E-MRS, INTERMAG, etc.). I mentored 1 postdoc, supervise 2 PhD theses and have supervised 12 MSc thesis and 4 internships. I have participated in 20 research projects and 3 industrial research contracts, and in terms of my ability to attract research funding, I have raised 818 k of international funds (FP7, H2020, COST, NVIDIA Corp.), 310 k of British (RSC) and Spanish funds (National R&D&I Plan, Community of Madrid) as PI. I am currently vice-chair of the COST action "RADIOMAG", and member of the management committee of the COST action MyWAVE (CA17115). I'm part of the management committee of the RSC Chemical Nanoscience and Nanotechnology interest group. Finally, I have been appointed as evaluator by the European Commission, the EPSRC, Cancer Research UK, the National Research Development and Innovation Office of Hungary, the



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European COST Association, the Ministry of Education and Science of Romania, CONICYT Chile, and ANEP.



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Nombre: OLIVA GONZALO, EDUARDO
Referencia: RYC2018-026238-I
Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
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Título:

Hydrodynamic and Maxwell-Bloch modelization of plasmas

Resumen de la Memoria:

I graduated in Nuclear Engineering (5-years program) by the Universidad Politécnica de Madrid, Spain (UPM) in 2005. In 2010 I got a cotutelled PhD degree on Nuclear Science and Technology (UPM) and Physics (École Polytechnique, France). The thesis received the highest marks, European Doctorate and Extraordinary Thesis Award (UPM). Its results were published in Optics Letters and Physical Review E and presented in international conferences.

I obtained a post-doctoral research contract at the Laboratoire d'Optique Appliquée (CNRS) to develop a time-dependent Maxwell-Bloch code and study the amplification of soft X-rays through non homogeneous plasmas. These results were published in Physical Review A, Optics Letters, Optics Express and Nature Photonics (2 articles, as first and third author) and presented in international conferences (1 invited).

In 2013 I started a second post-doctorate at the Laboratoire de Physique des Gaz et des Plasmas (Université Paris Sud, France). I modified a particle-in-cell code and my Maxwell-Bloch model in order to study dense, Krypton plasma amplifiers of soft X-rays. The results of this post-doc were published in Physical Review A, Physical Review Letters and Nature Photonics and presented in international conferences.

In 2015 I started my third post-doctorate at the Universidad Politécnica de Madrid, thanks to a Marie Skłodowska-Curie fellowship. I developed DAGON, a 3D Maxwell-Bloch code and studied cavity-free atmospheric Nitrogen lasers. Two articles in Physical Review A have been published.

Nowadays, I am assistant professor at the Departamento de Ingeniería Energética of the E.T.S.I. Industriales (UPM). I have managed to consolidate my own research line by applying successfully to highly competitive European projects: FP7 Marie Curie IEF and H2020 FETOPEN. I have attracted more than 400.000 in funds to secure my position and hire PhD students.

This research line, related to the field of industrial engineering, involves plasma hydrodynamics (1 Phys. Rev. E in 2018 and a collaboration with LOA, France and PALS, Czech Republic on hydrodynamic models) and applications of ionizing radiation in medicine (X-ray tomography, H2020 FETOPEN project VOXEL).

In addition to this, I collaborate with the ESS Bilbao consortium, advising them in the field of plasma confinement devices. I have also developed in collaboration with J. Moreno (one of my PhD students) and M. Sánchez a prototype to generate electricity by means of radiative cooling. We received two awards from ActuaUPM, the entrepreneurship program of UPM and funds from the Greenhouse program of EIT Climate-KIC (2.500). We are currently studying its patentability.

In conclusion after 13 years of research and learning I have demonstrated my capabilities of independent thinking, attracting funds, managing research and teams. I thus believe I am a most suitable candidate for a Ramón y Cajal grant.

Resumen del Currículum Vitae:

I have published 26 articles in international peer reviewed journals, 18 of them in Q1 journals. Among them 3 Nature Photonics (as first, second and third author), 1 Physical Review Letters (as second author), 5 Physical Review A (one as senior author, two as first author, one as second), 2 Physical Review E (as first author), 4 Optics Letters (two as first author) and 2 Optics Express (one as second author). I have presented my work in international conferences (42; 5 invited, one of them plenary). I also have written 4 book chapters and 4 popular science articles. My h-index is 13 (Google Scholar), 10 (Web of Science). My articles have been cited 369 times (Google Scholar) 244 (Web of Science).

I am reviewer for Journal of Computational Physics, Nature Scientific Reports, ACS Photonics (Q1), Dynamics, Games and Science III (Springer), the Polish National Science Centrum, the Czech Science Foundation and Sociedad Nuclear Española. I also have been member of three Nuclear Engineering thesis committees.

I successfully applied to two competitive European calls, a FP7 Marie Skłodowska-Curie project, DAGON (16% success rate, 173.370) and a H2020 FETOPEN project, VOXEL (3% success rate, 271.000 UPM, 3.996.875 total) being PI of the latter and coordinator of the former. I have taken part, as an invited speaker, in three infodays about Marie Skłodowska-Curie actions and H2020 FETOPEN projects. I have participated in 18 national and international research projects. In addition to the two aforementioned projects, I am PI of an UPM project (15.000).

As a MSC fellow, I was selected in competitive calls by the European Commission and the Council of the Lindau Nobel Laureate Meeting to



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participate in the 66th Lindau Nobel Laureate Meeting. Only 16 MSC fellows were awarded with the participation.

I have supervised six final year projects and one MsC thesis in Industrial Engineering, the stages of two high school students (Lycée Français), one undergrad student (École Polytechnique), one master student and one assistant engineer (Université Paris Sud) and a graduate student in an engineering enterprise. Currently I supervise two final year projects and two doctoral thesis on Nuclear Engineering. I have also a broad experience teaching at bachelor and master level (engineering), both in Spanish and English, the following subjects: Nuclear Physics, Energy Technologies, Energy Sources, Advanced Numerical Methods and Fluid Dynamics. In 2011 I obtained the habilitation given by ANECA as assistant professor and associated professor. In addition to this, I have organized a thematic session of an international conference, a workshop in plasma modelling, a Summer School on X-ray metrology and a Cost Action's General Meeting. I also prepared stands in the European Researchers Night, Marie Skłodowska-Curie Meet the Fellows and "Semana de la Ciencia".

I currently advise the engineering consortium ESS Bilbao on plasma confinement technologies.

I participate in the development of a prototype to generate electricity by radiative cooling (HEAT). EIT Climate-KIC funded us (2.500).

All this indicators demonstrate that I can do and manage multidisciplinary research of superb quality as my principal line of research covers such different thematics as plasma physics, hydrodynamics and laser technology and applications (machining).



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Nombre: GOMEZ YEPES, ALEJANDRO
Referencia: RYC2018-024407-I
Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Correo Electrónico: agyepes@uvigo.es

Título:

Current control of voltage source converters for fault-tolerant multiphase drives

Resumen de la Memoria:

In late 2008, Alejandro Gómez Yepes started working on the current control of voltage source converters (VSCs) with his end-of-course project and subsequently with his PhD thesis, in the Department of Electronics Technology at the University of Vigo. The PhD was funded by an FPI scholarship. In particular, his research was focused on the discretization, frequency-adaptive implementation with low computational burden and the design of resonant current controllers. This PhD thesis was supported by 3 papers in JCR-indexed journals and 2 in Scopus-indexed international conferences. It received the International Mention and the Extraordinary Doctorate Award.

In 2011 the applicant carried out a 3-month research stay in Liverpool John Moores University, where he started to actually work with multiphase ac drives. This stay yielded 2 articles in JCR-indexed journals.

After the PhD, Alejandro participated in 8 R&D projects until 2016, involving universities and companies from three different nationalities. These projects gave rise to numerous journal and conference publications, as well as transfer of technologies to companies. It also allowed him to start supervising research teams and PhD students. As a continuation of the research lines he started with his PhD thesis, he collaborated in further research about current control of VSCs, including design methods to improve the transient response and stability (e.g., in presence of LCL filters and uncertainties in the context of microgrids), and strategies to cancel the current harmonics in multiphase drives, thus raising the efficiency and decreasing torque/speed ripple.

In mid-2016 the applicant was awarded a postdoctoral grant from the Government of Galicia to independently lead a research project about fault-tolerant multiphase drives for hybrid and electric vehicles, involving Texas A&M University (USA), the University of Vigo, and the University of Beira Interior (Portugal). In fact, he performed a stay of 23 months in Texas A&M University, and a 1.5-month one in University of Beira Interior. So far, this project has given rise to 5 journal articles and 7 papers in international conferences. During these stays, he has also supervised PhD students; e.g., to carry out some of the goals of the postdoctoral grant.

A PhD thesis he co-supervised, about thermal monitoring and fault tolerance of multiphase ac drives, has been defended in December 2018 with the Cum Laude and International Mention.

As a highly motivated and experienced researcher, I am looking for the opportunity to further expand my research activities in a leading and autonomous manner and make an increasing outstanding international impact.

Resumen del Currículum Vitae:

The applicant has produced in a short time (since 2009) a high impact on the research community. His publications already have 2884 citations. He has co-authored 41 papers in peer-reviewed international conferences (39 of them indexed in Scopus) and 45 in JCR-indexed journals, out of which 39 are in the first JCR quartile. He is the first author of 19, 16 and 15 of such papers (about 40%), respectively, which proves his research independence and leadership. His h-index and i-10 index are currently 24 and 39, respectively. He has maintained an elevated rate of citations and high-quality publications during all the years from his second predoctoral year to the present; in fact, he has published papers in journals of the first JCR quartile as the first author in almost every year (9 out of 10) of such period. He also received awards for his scientific output, including 3 best-paper prizes and the Extraordinary Doctorate Award. He is Associate Editor of the JCR-indexed journal IET Electric Power Applications.

The applicant has participated in 3 competitive R&D projects funded by public entities (2 national and 1 regional), which involved entities of three nationalities, and in which he also successfully collaborated in the proposal writing. He has also participated in 5 projects with private funding, including one performed in USA. In some of these 8 projects he also lead research teams. He has been awarded in 2016 a postdoctoral grant from the Government Galicia for leading a three-year research project as an independent researcher in Texas A&M University and University of Vigo, which so far yielded 6 journal and 7 conference papers.

He has frequently performed tasks of supervising research work of PhD students, giving rise to co-authored articles in high-impact journals. One of his co-supervised PhD Theses has been already defended, with International Mention and the maximum mark (Cum Laude), and supported by 3 journal publications in the first JCR quartile and 2 papers presented at international conferences. He has also supervised



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several MSc and BSc Theses.

Regarding the international character of his activity, he has carried out a 3-month predoctoral stay in Liverpool John Moores University, a 23-month postdoctoral stay in Texas A&M University, and a 1.5-month postdoctoral stay in University of Beira Interior. These stays have given rise, so far, to 7 publications in international journals of the first JCR quartile and 7 publications in peer-reviewed international conferences. Furthermore, as a result of international collaboration, out of his 45 JCR-indexed journal publications, 19 are co-authored by (18) foreign researchers, including very prestigious ones (h-indices of 138, 83, 75, 73, 58, etc.). In fact, 4 out of 7 members of the committee of his PhD thesis were foreign. In addition, the applicant was recently an invited speaker at the Electromechatronic Systems Research Centre (Portugal) because of his cutting-edge expertise.

He has taught 285 hours of theoretical and lab sessions in undergraduate and graduate degrees, in the University of Vigo, Texas A&M University and National University of Asunción.



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Turno de acceso general

Nombre: UGGETTI , ENRICA

Referencia: RYC2018-025514-I

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Correo Electrónico: enrica.uggetti@upc.edu

Título:

Green technologies for resource recovery from wastewater

Resumen de la Memoria:

I am internationally recognized in the field of green solutions for waste and wastewater treatment and resources recovery. During my career I have consolidated my expertise in the design and operation of constructed wetlands and microalgae-based wastewater treatment, working in different environments and approaching projects from an interdisciplinary point of view. During the last years I have been involved as main researcher in two European projects, being in charge of the research development and budget administration. The first of them aimed to investigate new configurations to improve constructed wetlands design, while the second project, currently under course, aims to generate bio-products from algal-based wastewater treatment. Currently, I am PI of 1 European Project (PAVITR, H2020 call) aiming at validate, develop and deploy cost effective and sustainable solutions to ensure the provision of safe water in India.

I successfully participated in different competitive calls obtaining the following grants: a) the FPI fellowship from UPC that funded my PhD studies in Civil Engineering, b) a scholarship from the Agency for Management of University and Research Grants (AGAUR), which allowed me to spend 4 months in the University of Eastern Finland (Finland) and 1 month in the University of Aarhus (Denmark) and c) the postdoctoral grant Juan de la Cierva Incorporación from the Spanish Government (MINECO).

My PhD thesis won the Extraordinary Doctorate Award from the doctoral school of the UPC. In 2012, the thesis was published by LAP Lambert Academic Publishing AG & Co KG Editor.

From 2011, I was hired for 2 years as postdoctoral researcher by the French National Institute for Agricultural Research (LBE-INRA) (France). There, I participated in the management of national French projects dealing with microalgae-based wastewater treatment and bioenergy generation. My research work focused on the optimization of design and operational parameters of high rate algal ponds to enhance wastewater treatment as well as microalgae and biogas production.

Since December 2013, I am working as a postdoctoral researcher within the GEMMA group in the UPC. Currently, my tasks are: development and coordination of research activities, management of National and European research projects (both research and economic issues), elaboration of projects proposals, supervision of Bachelor, Master and PhD students, and teaching.

I have published 39 scientific papers in ISI listed peer-reviewed journals (h-index 16). I have been co-author of 5 book chapters and author of 1 book. My works were presented in more than 40 international conferences.

I have participated in the organization of 4 international conferences, being part of the scientific committee in 2. Since 2014 I am part of the Editorial Board of Environmental Processes and I have recently been Guest Editor of a Special Issue of Science of the Total Environment. I am reviewer of several scientific journals and I have participated as independent expert to projects evaluation in the call COST Actions 2015.

I have been supervisor of 3 PhD thesis (two from the UPC and 1 from the Università della Basilicata in Italy) and I am supervisor of other one in collaboration with the Czech Technical University in Prague (Czech Republic). Moreover, I have been involved in the supervision of 22 Bachelor and Master thesis.

Resumen del Currículum Vitae:

In 2007 I obtained my MSc degree in Environmental Engineering from the Politecnico di Torino (Italy) and I started my PhD in Civil Engineering within the group of Environmental Engineering and Microbiology (GEMMA) in the Universitat Politècnica de Catalunya (UPC) working on a research project founded by the Catalan Water Agency (ACA). In 2009 I obtained a FPI fellowship from UPC, and one year later, in 2010, a second scholarship from the Agency for Management of University and Research Grants (AGAUR), which allowed me to spend 4 months at the University of Eastern Finland (Finland) and 1 month at the University of Aarhus (Denmark). My PhD thesis was presented in September 2011, and won the Extraordinary Doctorate Award from the doctoral school of the UPC. In 2012 the thesis was published by LAP Lambert Academic Publishing AG&CoKG Editor.

In December 2011 I was hired as postdoctoral researcher by the French National Institute for Agricultural Research (LBE-INRA) in Narbonne (France). Since December 2013, I am working as a postdoctoral researcher within the GEMMA group in the UPC and in 2014 I obtained a Juan de la Cierva - Incorporación fellowship from the Spanish Government (MINECO).

During my career I have been involved in 14 National and European R+D+i projects (both in Spain and France) related with green technologies for waste and wastewater treatment and valorization, being PI of 1 of them. I have also participated in the elaboration of several proposals for competitive calls and in different cooperation and international platforms (e.g. EIP Water, WssTP, PTEA).

I have published 39 scientific papers in ISI listed peer-reviewed journals, almost all of them included in the first quartile of the rankings of science journals. My articles have been cited in 724 documents (h-index 16). Moreover, I have been co-author of 5 book chapters and author of 1 book. My works were presented in 40 international dissemination events.



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I have been participating in the organization of 4 international conferences and have been part of the scientific committee in 2. Since 2014 I am part of the Editorial Board of the journal Environmental Processes and I have recently been Guest Editor of a Special Issue of Science of the Total Environment. I am reviewer of several scientific journals and I participated as independent expert to projects evaluation in the call COST Actions 2015.

I have been co-supervising 4 PhD thesis and 22 Bachelor and Master thesis. I have been teaching several courses in the field of Civil and Environmental Engineering at the UPC and 1 course at the University of Perpignan (France). In 2012 I was qualified by the Catalan University Quality Assurance Agency (AQU Catalunya) for applying to lecturer positions (Acreditación de Profesor Lector), and in 2017 I eventually received the qualification for apply to associate professor positions (Acreditación de Profesor Agregado) from the same agency in recognition of proven abilities in teaching and research. In 2013 I also had a favorable evaluation for applying to lecturer position in France (Qualification de maître de conference (CNU 62)), issued by the French Ministry of Higher Education.