



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2013

Nombre: ABAD MUÑOZ, LIBERTAD
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Área Científica: Tecnología Electrónica y de las Comunicaciones
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Título:

Micro and nano-fabrication, biomaterials, biosensors, microfluidics and their applications

Resumen de la Memoria:

The applicant presents here the 5 most relevant contributions in chronological order, with the wish of reflect her scientific evolution. During her doctoral thesis in Materials Science at ICMA-B-CSIC, the applicant devoted her time in the growth by sputtering of mixed-valence manganite films and their complete structural, surface, magnetic and transport characterization. She complemented her formation with long scientific stays in highly reputed international laboratories like at IEF-CNRS, IMM-CSIC and MIT. Among the results obtained, all published in highly reputed international ISI Journal, one of the most relevant publications was: ♦Electronic Effects in Manganite/Insulator Interfaces: Interfacial Enhancement of the Insulating Tunneling Barriers♦, SMALL (2008), 3 (365-371). The knowledge acquired during her doctoral thesis (surface characterization, growth of thin film functional materials and micro/nano-fabrication techniques) has paved the way to a successful adaptation on the current scientific task.

After the thesis, the applicant decided to spread her scientific profile into multidisciplinary area of micro and nano-fabrication, biomaterials, biosensors, microfluidics and their applications. The applicant performed 2 postdoc stays where she worked in : (i) the characterization and electrodeposition of electroactive materials with potential interest in the field of neural repair and (ii) the fabrication of nanotransistor arrays stimulation and recording of cortical neurons (ICMA-B-CSIC and Institut Neel-CNRS). Her most relevant publication in these period was:

- ♦Iridium oxohydroxide, a significant member in the family of Iridium oxides: Stoichiometry, characterization and implications in bioelectrodes♦, J. Phys. Chem. (2012), 116 (5155-5168).

Finally, in 2010 the applicant joined the BioMEMs-IMB-CNM-CSIC with a JAE contract. She has been involved in the implementation of new materials (complex oxides and conducting polymers) in the development of biosensors.

Last 2 years, working in different applied projects, focused in biomedical sensing, the applicant developed new techniques to fabricate electrodes for electrochemical biosensors into polymeric materials with integrated fluidics. These biocompatible materials are transparent, flexible and make easier to implement low cost microfluidics, opening their applicability to a wide range of fields. A selection of the most relevant publications from the present period are:

- ♦Design and fabrication of a COP-based microfluidic chip: Chronoamperometric detection of Troponin T♦, Electrophoresis (2012), 33, (1♦8)

- ♦Iridium oxide pH sensor for biomedical applications. Case urea-urease in real urine samples♦, Biosensors and Bioelectronics (2013) (163-169)

-♦Localized, Stepwise Template Growth of Functional Nanowires from an Amino Acid-Supported Framework in a Microfluidic Chip♦, ACS Nano (2014).

Resumen del Currículum Vitae:

In 2002, I received a Bachelor degree in Physics and subsequently, in 2004, a Master in Materials Science both from UAB. With a FPI predoctoral fellow from (MCYT) supervised by Prof. Martinez, I joined the Magnetic and Superconducting Materials Group at ICMA-B-CSIC, where I performed my research thesis working in the thin-film growth and complete characterization of magnetic oxides (Manganites) to implement spintronic devices. In 2007, I defended my PhD thesis (Cum Laude) entitled ♦Efectos estructurales y de Interfase en Capas Finas de LCMO♦ to obtained the PhD in Materials Science (UAB). During the PhD period, I had the opportunity to collaborate with several leading groups in the field (being trained in long research stays): MMS-IEF-CNRS (France) supervised by Prof. Haghiri-Gosnet, IMB-CSIC (Spain) supervised by Dr. Anguita and at MIT(USA) under supervised by Prof. Moodera.

After my PhD, I performed 2 postdoctoral stays previous to my present position: The first, 18 months under supervision of Prof. Casañ at ICMA-B working in the characterization and electrodeposition of electroactive materials with potential interest in the field of neural repair. Then I moved for 2 years to Institut Néel-CNRS (France) to work in the fabrication of nanotransistor arrays for neural stimulation and recording under supervision of Prof. Villard.

In 2010, granted with a JAE contract I joined the BioMEMs leaded by Prof Muñoz. I am currently involved in the use of new materials with potential interest in the field of biosensors development (complex oxides and conducting polymers) taking advantage of my expertise in growth and characterization of magnetic and electroactive materials and in micro/nano-fabrication. During last 2 years, in the frame of different applied projects, I have been developing in collaboration with Dr del Campo new techniques to fabricate electrodes for electrochemical biosensors into polymeric materials making easier to implement low cost microfluidics and opening their applicability to a wide range of fields such as biosensors for clinical diagnostics, electrochemical sensing of elements in fluids



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(like bacteria on water or heavy metals). During this period, I have also been contact researcher for different GircServ projects: with GNAM-UAB group led by Prof. Rodriguez-Viejo and with MNOM-ICMAB group led by Prof. Amabilino.

During my scientific career:

- I have published 31 papers in ISI journals with high impact factor receiving in total more than 140 citations, also 2 more papers are currently submitted. In 17 of these publications, I am the first or the second author.
- I have participated in 67 conferences (oral or poster).
- I have been awarded with 4 competitive fellows.
- I have participated in 17 projects funded by competitive calls (public or private), in 2 of them as principal researcher (IP):
 - (i) PN-CEPCCELLS which target the development of a microfluidic device for sensing pH,Na⁺,K⁺ and TEER in monolayers of epithelial renal cells (1 FPI associated contract).
 - (ii) INNPACTA: Nanocardiococo; the objective is the diagnosis of cardiovascular diseases through the electrochemical sensing. (2 associated contracts).
- I have been involved in several technology transfer activities, generating 2 patents.
- I am regularly acting as referee of ACS, Elsevier and Wiley journals.



AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2013

Nombre: GISPERT LOPEZ, JUAN DOMINGO
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Título:

Acquisition, procession and analysis of biomedical imaging modalities

Resumen de la Memoria:

My research interests include improving the acquisition, processing and analysis of biomedical imaging modalities, like molecular imaging and magnetic resonance imaging, as well as their practical application to tackle novel scientific undertakings in the fields of neuroscience, oncology and drug development. Due to the intrinsic multidisciplinary nature of these interests, I have lead and collaborated with teams combining several academic disciplines like medicine, biology, chemistry, physics or pharmacology.

During my last year as undergraduate student, in 1998, I was awarded with an Erasmus fellowship to perform my Master Thesis at the Institut National Polytechnique de Grenoble to develop a cortical flattening algorithm for MR images in collaboration with the Grenoble University Hospital. My experience there was central to develop my research focus after realizing of the difficulties between the technical and biomedical researchers to understand each other's needs and capabilities.

For this reason, in 1999 I moved to Madrid to pursue my PhD degree under the supervision of a Medical Doctor and Telecommunications Engineer, Dr. Manuel Desco, at the Hospital Gregorio Marañón. There, I developed significant contributions for the spatial normalization of brain PET scans, the correction of intensity inhomogeneities in cerebral MRI scans and for analyzing rodent microPET brain scans.

After completing my PhD, in 2004 I moved to a molecular imaging center (Institut d'Alta Tecnologia) where I served as head of the image processing and bioengineering department where I was the technical responsible of a cyclotron facility and three PET scanners. In 2008 I was promoted to scientific director of the center and was able to develop several investigational radiotracers and radiolabelling methodologies, research on rodent models of brain aging, characterized the biodistribution of novel nanoparticle materials, and collaborated with top oncology research teams.

In 2011, I moved to the Fundació Pasqual Maragall (later Fundació Barcelonabeta Brain Research Center) where I serve as Head of Neuroimaging Research. I am investigator of the ALFA project which aims characterize and follow a cohort of 2500 kindred of Alzheimer's patients by neuroimaging methods like MRI and amyloid PET among other tests. I am currently the principal investigator a European project aimed to validate new biomarkers of neurodegenerative diseases.

Resumen del Currículum Vitae:

Research Interests:

Methods: Biomedical image acquisition and processing (PET, MRI). Development of novel methodologies for in vivo molecular imaging.

Applications: Neuro, Aging, Onco, Drug Discovery.

Academic Background:

2004 Master in Biomedical Technology and Instrumentation. UNED. Madrid.

2003 PhD Telecommunication Eng. Electrical Eng. Dept. UPM. Madrid.

1999 MSc Telecommunication Eng. UPC. Barcelona.

Employment:

2011 - now Head of Neuroimaging Research. Barcelonabeta Brain Research Center. Barcelona

2004 - now Assistant Professor. Universitat Pompeu Fabra (UPF). Barcelona

2011 - 2013 Head of Neuroimaging Research. Pasqual Maragall Foundation. Barcelona

2004 - 2011 Scientific Advisor. Institut d'Alta Tecnologia - PRBB. Barcelona.

1999 - 2004 Research Fellow. Lab. de Imagen Médica. Hospital Gregorio Marañón. Madrid.

1998 - 1999 Research Fellow. INSERM-Unité 438 RMN Bioclinique. Grenoble. France.



Research Impact (Entries, Citations, h-index):

ISI WOS: 74, 853, 18.

Google Scholar: 125, 1421, 21.

MedLine: 60.

Selected Publications:

As senior author

In vivo molecular imaging of the GABA/benzodiazepine receptor complex in the aged rat brain. *Neurobiol Aging*. 2012 Jul;33(7):1457-65.

GABA and serotonin molecular neuroimaging in essential tremor: a clinical correlation study. *Parkinsonism Relat Disord*. 2012 Aug;18(7):876-80.

Simultaneous dual-tracer PET imaging of the rat brain and its application in the study of cerebral ischemia. *Mol Imaging Biol*. 2011 Jun;13(3):500-10.

The effects of aging on dopaminergic neurotransmission: a microPET study of [¹¹C]-raclopride binding in the aged rodent brain. *Neuroscience*. 2010 Dec 29;171(4):1283-6.

As first author (or contributed equally)

The AD-CSF-index discriminates Alzheimer's disease patients from healthy controls: a validation study. *J Alzheimers Dis*. 2013 Jan 1;36(1):67-77.

Biodistribution of amino-functionalized diamond nanoparticles. In vivo studies based on ¹⁸F radionuclide emission. *ACS Nano*. 2011 Jul 26;5(7):5552-9.

Method for bias field correction of brain T1-weighted magnetic resonance images minimizing segmentation error. *Hum Brain Mapp*. 2004 Jun;22(2):133-44.

Influence of the normalization template on the outcome of statistical parametric mapping of PET scans. *Neuroimage*. 2003 Jul;19(3):601-12.

As team member

A personalized preclinical model to evaluate the metastatic potential of patient-derived colon cancer initiating cells. *Clin Cancer Res*. 2013 Dec 15;19(24):6787-801.

In vivo evaluation of amyloid deposition and brain glucose metabolism of 5XFAD mice using positron emission tomography. *Neurobiol Aging*. 2013 Jul;34(7):1790-8.

Beta-catenin confers resistance to PI3K and AKT inhibitors and subverts FOXO3a to promote metastasis in colon cancer. *Nat Med*. 2012 Jun;18(6):892-901.

Major Grants (PI or coordinator):

Biomarkers for Alzheimer's and Parkinson's Disease (BIOMARKAPD). EU Joint Programme on Neurodegenerative Diseases. 2012-2014. 42.350.

Advanced Molecular Imaging Techniques (AMIT). CENIT Programme. Spanish Ministry of Industry. 2010-2013. Budget: 3.472.973.

Production of ¹⁸F-labelled PET radiotracers by electrophilic substitution. PROFIT Programme. Spanish Ministry of Industry. 2007. 145.655.

Consortium for the Development of Advanced Technologies in Medicine (CDTEAM). CENIT Programme. Spanish Ministry of Industry. 2006-2009. 206.000.



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Título:

Energy-efficient Wireless Networking

Resumen de la Memoria:

Energy-efficient network operation is critically important to attain sustainable and scalable wireless networks. During the last decade, there has been tremendous growth in the wireless networks market. Such unprecedented growth has pushed the limits of energy consumption in wireless networks, resulting in rapidly rising energy costs and carbon footprints of these networks. On the other hand, extensively deployed battery-operated wireless devices require long battery lifetimes to reduce the network operation and maintenance costs. Both these factors call for energy-efficient wireless network operation, which has been observed by the research community and also by public bodies such as European Commission (EC). The EC has included energy-efficiency of wireless networks as a target in several of challenges in FP7 and H2020 framework programmes.

Throughout my research career, I have mainly studied energy-efficient wireless networking, where I have focused on two main solutions: a) the use of wake-up radios, and b) development and analysis of energy-efficient medium access control (MAC) protocols.

Wake-up radios (WuRs) enable very low or no power consumption at the wireless devices, when they have no data to send or receive. A common approach in the literature had been the use of duty cycling (periodic sleep-active modes), which creates synchronization overhead, sleep delays, and leaves significant room to save energy. In this regard, WuR presents an important future potential enabling complete asynchronous communication. Through my research studies, I have improved the state of the art WuR capabilities and shown the contribution WuRs promise over duty cycling. These studies have been published in prestigious journals, creating significant interest from the wireless community, which can be observed from the number of recent publications and patent applications in this area. We have submitted 1 patent application for WiFi-enabled WuR, which is currently under evaluation.

Another approach I followed has been to achieve energy-efficiency through developing new energy-efficient protocols or adapting the existing protocols to function in an energy-efficient manner. MAC protocols are crucial in this topic as the methods like duty-cycling disrupt coordination between the neighboring devices for the medium access. However, this requires complicated MAC protocols albeit with minimum overhead and communication to achieve the energy-efficiency. Through my research studies I have: a) proposed three energy-efficient MAC protocols for RFID systems and Wireless Sensor Networks (WSN), which were shown to improve state of the art protocols in energy-efficiency, delay and packet delivery ratio (PDR) metrics; b) derived an analytical packet traffic model for WSN, which was proven to be critical for realistic performance evaluation of the protocols; c) develop an optimization framework for contention-based medium access, which was shown to provide energy-optimal contention; and d) derived energy-efficient configurations for ZigBee and IETF standards through experiments, which were shown to improve the energy consumption and PDR performances significantly. These studies have improved the state of the art in this topic, and have provided new benchmarks to the research community (the source codes and simulation codes were made publicly available).

Resumen del Currículum Vitae:

During my 15 year research career, my works have been presented in 22 peer-reviewed international conferences. I have authored 19 publications in journals indexed in Scopus Q1 and 2 book chapters. I have also served in the technical program committees of 19 international conferences and have served as a reviewer for 20 leading journals in the area. These scientific disseminations have been part of the 12 research projects I have participated in at institutions in Europe and USA. I am the co-author of proposals for 3 of these projects with a total budget amounting to 1.300.000€. Currently I am the co-principal investigator of one FP7 research project at Universitat Politècnica de Catalunya. With the start of the H2020 framework programme, I am currently participating in 4 prospect project proposals in partnership with internationally known companies such as Philips Lighting and Telefonica, and leading research institutes such as IMTEC-Netherlands.

Since 2008 I have been supervising student researchers. Following my continued support and dedication to help advise students, my efforts were recognized when I received the "Best Mentor Award" in 2010 at University of Rochester, NY, USA. During my first postdoctoral position at University of Rochester, I was responsible for providing new research directions to the Wireless Communications and Networking Research Group, mentoring and leading graduate students in the group, while also acquiring research grants for the group. I mentored 6 PhD and 1 MS student, producing publications with each of them. Based on my past



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industrial experience on project coordination and team work, I maintained regular meetings with the students, defined milestones for their thesis together and I periodically reported the students' progress to their advisor. These studies resulted in 7 Scopus Q1-indexed journal papers and 12 peer-reviewed international conference papers. I introduced two new research directions to the group and brought in two research grants: one industrial grant from the OmniID Corporation and one grant from National Science Foundation, USA.

At my current postdoctoral position at Universitat Politecnica de Catalunya, I have been mentoring 3 PhD students and 4 MS students and collaborating with researchers from Spain, USA, Germany and Turkey. These studies have resulted in 5 peer-reviewed international conference papers, 4 published (and 3 under review/revision) Scopus Q1-indexed journal papers, and 1 patent filing under evaluation.

My 7 year professional career has helped me to foster strong leadership and independent thinking skills. In my past consultancy position I coordinated various IT projects, arranging meetings with the customers, helping to define the requirements of various projects, and proposing solutions based on detailed research from the project team members, which allowed me to implement solutions directly at the customer site. Whereas coordinating team members and building customer relationships required a steady balance of interpersonal skills and expert organization which helps me to define my successful leadership style today. While working on any project I utilize both of these strengths to analyze problems and work with individuals to create a positive and rewarding work environment for all involved.



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Área Científica: Tecnología Electrónica y de las Comunicaciones
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Título:

Novel techniques and instrumentation for imaging and quantifying electrical properties at molecular level

Resumen de la Memoria:

During my research career, I have focused in developing and implementing new experimental techniques and instrumentation based on scanning probe microscopy (SPM) to measure the electrical properties (impedance, capacitance and dielectric constant) at the nanoscale beyond current detection limits (tens of nanometers) with the final objective to reach the single-biomolecule resolution. Despite great progress in SPM technology, the electrical properties at the nanoscale scale have remained inaccessible to state-of-the-art techniques due to the extremely small dimensions of nanoscale systems, their complex or heterogeneous structure and the ultra-weak signals that need to be detected. The ability to quantify electrical properties at the nanoscale is crucial in materials science and nano-electronics, in which novel materials based on low-dimensional (1D and 2D) systems with unknown electrostatic properties will be used to control next generation of nano-electronic devices. Electrostatic properties are also key in biology and biophysics, because they are responsible for the formation of chemical bonds and the structure of molecules. Thus, new measurement tools able to image and quantify in-situ the electrical properties at true nanometer resolution down to molecular scale are of fundamental interest.

In the last years, I have successfully developed new techniques based on scanning probe microscopy able to probe capacitance and electrostatic forces with sub-attofarad resolution. This has enabled me to experimentally observe and quantify for the first time electrical properties such as the dielectric constant - an intrinsic physical property of matter - of small systems, e.g. nanoparticles of 10 nm radius, and of fundamental biomolecular systems, e.g. viruses and DNA, that have remained unknown so far owing to the lack of experimental techniques. The ability of probing dielectric polarization properties has also allowed me achieving three-dimensional detection and identification using scanning probe microscopy of nanoparticles and macromolecules without labelling and with unparallel resolution, a key issue for materials science, nanomedicine and the scanning probe community. The high-impact of my research is demonstrated by the prestige and excellence of the journals that have published my results, among the others, Nano Letter (2009) and Nature Materials (2012), that I obtained as first and corresponding author, and based on a very personal effort. Currently, my last work applied to the study of dielectric properties of DNA is under review in Nature Communications. Given that my research is only at the very beginning and further developments are under work, new results of higher impact and interest are to be expected.

In all these years of high-impact research, I accumulated leading experience as a senior researcher, participating to several European and national projects, actively contributed to form 3 PhD students and 2 Post-docs. Currently as Principle investigator (IP) I submitted two projects and I am supervising two PhD students.

Resumen del Currículum Vitae:

After receiving my 5-years diploma in Electronic Engineering from Politecnico di Milano (Italy) with summa cum laude, and from École Superior d'Electricité (Paris, France) in the frame of EU double-degree program, and worked as an engineer in Alcatel Microelectronics (Belgium), I received my PhD in Information Technology from Politecnico di Milano in May 2006. During my PhD, I developed a novel instrumentation for scanning probe microscopy (SPM) that achieved attoFarad capacitance resolution (unparalleled worldwide, Nanotechnology 2006, first author). This work opened the possibility to measure fundamental electrical properties, such as impedance/capacitance at the nanoscale. From 06-2006, as a post-doc, I moved to Barcelona and joined a newly formed laboratory of nano-bio-engineering first, and then the Institute for BioEngineering of Catalonia (IBEC), where I dedicated my effort in setting up a new research group lead by Dr. G. Gomila. During that time I succeeded in measuring for the first time the dielectric constants of oxide films at the nanoscale (Appl.Phys.Lett. 2007, first author) using my instrumentation. This result opened an exciting field and specific line of research on measuring nanoscale dielectric properties of materials. From 01-2009 to 10-2010, I held a Juan de la Cierva position at the University of Barcelona (UB). During that period, I pushed to the limit the performance of my instrumentation down to 100 zeptoFarad and succeeded measuring the dielectric constants of ultrathin layers. This result was published in Nano Letters (2009, first author) that ranks #2 in nanoscience. From 11-2010, I am lecturer professor at UB and senior researcher at IBEC. In the last two years, I was able to improve the lateral resolution of dielectric characterization down to ~ 10nm. This enabled me to unravel for the first time the dielectric properties of nanoparticles and biological macromolecules such as viruses and DNA condensed inside, so far remained inaccessible due to the lack of experimental techniques, and to demonstrate that label-free material identification at the nanoscale can be achieved by scanning force microscopy - a major goal for materials science and biology, and a long-standing goal of the SPM community since SPM invention (1980s). This work is a scientific breakthrough



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published in the prestigious Nature Materials (2012, first and corresponding author) that ranks #1 in materials science. My achievements are recognized by 26 publications of high impact (first quartile), 4 proceedings in peer-reviewed journals, 2 book chapters (one in the prestigious series on SPM, Springer-Verlag, 2008, first author), a series of oral presentations (3 invited) in all the international conference attended, 3 poster awards and 1 patent. The excellence of my research (years 2006-2010) is proved by the normalized impact index following of 2.1 (calculated according to the SCImago World Report 2012) well above international centers such as Cambridge (1.88). I developed my research in the frame of 4 European and 2 national projects as a senior researcher and currently submitted two projects as Principal Investigator. I am currently supervising 2 PhD students and previously I actively contributed to form three PhD students and 3 post-doc. Additionally, I am full-time contracted as professor of master and undergraduate courses at the UB since September 2010.



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Título:

Nitride-based nanostructures for solar cells and photonic devices

Resumen de la Memoria:

I received my MSc (2006) and European PhD (best PhD award 2011) degrees in Telecommunication Engineering at the University Miguel Hernandez and the University of Alcalá in Spain, respectively. During my PhD my main research topic was the deposition by reactive RF sputtering, and linear and non-linear optical characterization of III-nitride-based nanostructures targeting the development of all-optical devices for communications networks at 1.5 μm . As a major achievement, I reported the first measurement of the third-order nonlinear susceptibility of GaN/AlN quantum dots (QDs) at 1.5 μm , in collaboration with the CSIC in Madrid. In 2008 and 2009 I was visiting researcher (7 months) at the French Atomic Energy Commission (CEA) in Grenoble, where I focused on the structural, morphological and optical characterization of InN-based layers and nanostructures. In 2010 I was visiting researcher (3 months) at the University of Paris-Sud, where I studied carrier localization phenomena in InN/InGaN multiple-quantum wells (MQWs). The same year, I reported the first measurement of nonlinear absorption in sputtered InN at telecom wavelengths. My first postdoctoral experience in 2011 at the University of Alcalá allowed me to develop the first ultrafast all-optical saturable absorbers at 1.5 μm based on intraband transitions in GaN/AlN QDs. In 2012 I moved to CEA-Grenoble, where I focused my research on the technological development of pin (In)GaN/(In)GaN solar cells with InGaN/GaN QWs or high In-content InGaN films as active region. In Dec. 2012, I was granted by a Marie Curie Intra-European Fellowship for the development of solar cells based on InGaN nanostructures on silicon.

During my research career, I have acquired a wide number of technical and personal skills which will not only be useful for the design, growth and characterization of the structures, but also for the technological process of device fabrication and final tests of the devices:

- ◆ Extensive experience in nanostructures design, III-nitrides growth and structural and morphological characterization techniques: nextnano3, RF sputtering deposition, Plasma-Assisted Molecular Beam Epitaxy (PAMBE), Scanning Electron Microscopy (SEM) and Atomic Force Microscopy (AFM).
- ◆ Extensive experience in linear and nonlinear optical characterization using UV, visible and NIR sources: (time-resolved) photoluminescence (PL) spectroscopy, transmission and reflection spectroscopy, z-scan, pump and probe, four-wave mixing and waveguide setup techniques.
- ◆ Extensive experience in electrical characterization of III-nitride devices: Hall Effect, UV-visible photocurrent and I-V characteristics under normalized AM1.5 illumination for conversion efficiency measurements.
- ◆ Extensive experience in design of fabrication procedure and contact technology for solar cell devices; in clean room for micro-fabrication of III-nitride devices using chemical benches, UV photolithography, ICP-RIE etching, metallization, annealing, bonding, etc. Finally, I am referee of the international journal Thin Solid Films, author of one book chapter; author or co-author of 24 (11 as first author) publications in international journals, and have 57 contributions to international conferences, 6 of them invited. Moreover, I have practical and theoretical teaching experience at national and international level.

Resumen del Currículum Vitae:

EDUCATION

- 09.2006 Telecommunications Engineering. Emphasis on Optical Communications (5 year degree) University Miguel Hernández of Elche, Spain
- 09.2006 Diploma Thesis: ◆Spectroscopic and polarimetric study of optical phase shifters and nematic liquid crystal optical modulators◆ (with honors). Advisor: Prof. Dr. Ignacio Moreno. University Miguel Hernández of Elche, Spain
- 07.2011 European PhD Thesis: ◆Nitride-based semiconductor nanostructures for applications in optical communications at 1.5 μm ◆ (with honors). Advisors: Prof. Dr. Miguel González-Herráez and Prof. Dr. Fernando B. Naranjo. University of Alcalá, Spain

PROFESSIONAL EXPERIENCE

Bachelor and MSc

- 2001-03 Training in telecommunications companies during studies, Germany
Lucent Technologies. Nürnberg, Germany. 3 months (2003)
VSE NET. Saarbrücken, Germany. 2 months (2002)
VSE AG. Saarbrücken, Germany. 1 month (2001)
- 2004 Erasmus Fellowship. University of Florence, Italy. 6 months of lectures during the 4th year of studies. Average qualification:



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- 2005-06 Undergraduate Assistant. University Miguel Hernández, Elche, Spain. Diploma Thesis in the Materials Science, Optics and Electronics Technology Dept.

PhD work

-2007-09 Research Fellowship. Photonics Engineering Group, University of Alcalá, Spain

-2008-09 Visiting Researcher. Institute of Nanoscience and Cryogenics, French Atomic Energy Commission (CEA), Grenoble, France, with Dr. Eva Monroy. 7 months during 2008-09

-2009-11 Research Assistant. Photonics Engineering Group, University of Alcalá, Spain

-2010 Visiting Researcher. Fundamental Electronics Institute, University Paris-Sud, France, with Dr. François H. Julien. Oct.-Dec. 2010

-2010 Visiting Researcher. Physics & Astronomy Dept., University of Porto, Portugal, with Dr. P. Marques. Jan. 2010 (1 week)

Postdoctoral work

-2012-13 Postdoctoral Researcher. Institute of Nanoscience and Cryogenics, French Atomic Energy Commission (CEA), Grenoble, France, with Dr. Eva Monroy

-03.13-♦ Marie Curie Intra-European Fellowship. Institute of Nanoscience and Cryogenics, French Atomic Energy Commission (CEA), Grenoble, France, with Dr. Eva Monroy. Marie Curie grant ♦SolarIn♦ (IEF #331745): Solar cells based on InGaN nanostructures on silicon

DISTINCTIONS

-Young Scientific Award at the European Materials Research Society Congress (E-MRS), Nice, France. May 2011

-Best PhD Thesis Award 2011 by the University of Alcalá, Spain

-Marie Curie Intra-European Grant ♦SolarIn♦ (IEF #331745)

-Referee of international journal Thin Solid Films

TEACHING EXPERIENCE

- 02-06.2010 Laboratory of Electronic Device Characterization, 1st year of Telecommunications Engineering. University of Alcalá, Spain (30h)

-09-12.2011 Laboratory of Photonic Devices, 2nd year MSc degree ♦Advances Electronic Systems.Intelligent Systems♦ at the University of Alcalá, Spain (10h)

-09-11.2013 Theory course ♦Characterization Techniques♦ in 2nd year MSc degree ♦Ingénierie de Micro et Nanostructure Laboratory♦ at the University of Grenoble, France (12h).

LANGUAGES

Spanish (native), English (C1, fluent), German (C1, fluent), French (B2, fluent), Italian (B2, fluent), Catalan (C1, good)

SCIENTIFIC CONTRIBUTIONS

-Publications in peer-reviewed journals: 23, 11 as first author (h-index=5)

-Book chapters: 1

-Contributions to international conferences: 57, 6 invited