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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: AGUIRRE BUENO, JUAN
Referencia: RYC2020-030583-I
Área Temática: Tecnologías de la información y de las comunicaciones
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Título:

Optical and optoacoustic imaging/sensing methods to solve unmet clinical needs

Resumen de la Memoria:

Dr. Aguirre research has been devoted to conceive, research, develop and do industrial transfer of preclinical and clinical optical imaging techniques. In particular, Dr. Aguirre activities have been mainly focused on Fluorescence Diffuse Optical Tomography (FDOT) systems and Optoacoustic Imaging systems. His research results lead to 32 publications in Q1 international journals including 1 research paper in Nature Biomedical Engineering, 2 research papers in Nature Communications, 1 technology review in Nature Biomedical Engineering and 1 technology review in Nature Reviews of Endocrinology. His industrial transfer results lead to 2 patents protecting a clinical optoacoustic imaging system that is currently sold worldwide for research purposes with more than 100 users distributed in Asia, Europe and USA.

The doctoral work of Dr. Aguirre in Madrid was focused on innovative preclinical FDOT systems for in vivo molecular imaging. Such devices make use of cheap non ionizing optical illumination and fluorescence probes, being a possible alternative to the expensive nuclear imaging paradigm based on ionizing tracers. In his work Dr. Aguirre set theoretically and experimentally the quantification accuracy limits of FDOT, he conceived and built a hybrid FDOT/CT system and he stablished new preclinical applications of the technique.

During his 2 years post-doctoral training in Germany Dr. Aguirre developed, patented and licensed the clinical raster scan optoacoustic mesoscopy technology (RSOM). RSOM extends the capabilities of optical imaging beyond the depths accessible to optical microscopy by making use of the optoacoustic effect and ultrawide-bandwidth ultrasound detection. As result, RSOM can visualize the microvascular structure, together with the distribution of melanin, fat and water through the whole skin depth at single cell resolution. Such imaging performance makes RSOM a technique with revolutionary potential in several medical fields, including dermatology (skin inflammation and cancer), cardiovascular and metabolic diseases. Dr. Aguirre¿s patent was licensed to the company Ithera Medical and now clinical RSOM is sold in research centers around the world.

Such developments promoted Dr. Aguirre 5 years ago to a group leader position where he runs a multidisciplinary group of 6 scientists including Engineers, Physicists and Medical Doctors. Since March 2020 Dr. Aguirre holds a permanent position as group leader in Germany. The responsibilities of Dr. Aguirre during the last 5 years included: 1) conceive technological developments for RSOM and guide the students toward implementing them. Such developments range from faster image reconstruction algorithm, better image processing schemes or conceiving new methodological variations to sense new biomedically relevant parameters. 2) design and supervise medium sized clinical studies towards to better assess the clinical relevance of RSOM. 3) secure international funding to fuel the activities of the group.

Current Dr. Aguirre research lines include the conception and development of wearable optical and optoacoustic sensors to monitor major metabolic and cardiovascular diseases for both the clinical and the consumers market.
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Resumen del Currículum Vitae:

Juan Aguirre graduated in Physics from the Universidad Autónoma de Madrid (Madrid) in 2006, obtained his Master Science in Mathematical engineering in 2011 from the Universidad Complutense de Madrid and earned his PhD in Medical Imaging from the Universidad Carlos III (Madrid) in 2012. His doctoral work was focused on innovative preclinical Fluorescence Diffuse Optical Tomography (FDOT) systems for in vivo molecular imaging. During his doctoral work he visited several reference labs of the field including The Laboratory for Research on the Structure of Matter (LRSM) at the University of Pennsylvania USA. For his PhD period he secured a pre-doctoral Marie Curie scholarship from the EU and Spanish national competitive FPI (researcher training) grant.

After one postdoc year at the Institute of Photonic Science in Barcelona, he obtained a EU Marie Curie individual fellowship to join the Institute of Biological and Medical Imaging (IBMI) at the Helmholtz-Zentrum Munich (September 2013). In this period Dr. Aguirre developed, patented and licensed the clinical raster scan optoacoustic mesoscopy technology (RSOM). Clinical RSOM is a new skin imaging technique with revolutionary potential in several medical fields, including dermatology, cardiovascular and metabolic diseases. Such developments promoted Dr. Aguirre to a group leader position at IBMI (September 2015). In May 2020 Dr. Aguirre obtained a permanent independent group leader position at the same institution. He leads a multidisciplinary group of 6 scientists including Engineers, Physicists and Medical Doctors.

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The seminal work of doctor Aguirre allowed him to author more than 20 papers in the field including 3 research papers in Nature publishing group journal (1 Nature Biomedical Engineering and 2 Nature Communications) and 2 technology reviews in Nature publishing group journals (1 Nature Biomedical Engineering and 1 Nature Reviews in Endocrinology). Dr. Aguirre made the cover as first author in Nature Biomedical Engineering. His patent was licensed to the company Ithera Medical and now clinical RSOM is sold in research centers around the world with more than a 100 users in Asia, Europe and USA.

During his career, Dr. Aguirre has participated in more than 20 R & D projects, including national projects from Spain and Germany together and international projects from the EU. As PI and CoPi he has been able to raise more 1,689,885 million euros from European Union funding. He has been invited speaker 11 times during the last 5 years in academic and industrial forums. His research has been covered by 14 press news outlets, several blog and twitter accounts, including an interview for Spanish radio and an appearance in german television.

All together Dr. Aguirre have 32 publications in first quartile (Q1) peer review international scientific journals. At least 6 of them in the first decile (D1). In 4 publications he is corresponding author. In 9 of them first author. In 5 of them he is supervisory author (penultimate position) and in 5 of them second author. He has 2 licensed patent and also wrote a book chapter.

Dr. Aguirre is a member of the International Photoacoustic Standardization Consortium. In 2017 he received the outstanding researcher award from IBMI at the Helmholtz-Zentrum Munich.

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Turno de acceso general

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Área Temática: Tecnologías de la información y de las comunicaciones
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Título:

Parallel Programming Models and Resource Heterogeneity for HPC

Resumen de la Memoria:

The candidate is currently a Senior Researcher at the Barcelona Supercomputing Center (BSC), where he leads a research team of six members funded by his grants. He accumulates wide experience in international public and private research projects, including leading roles. He is currently Coordinator of a 4M EC H2020 project, and PI for an Intel-sponsored project. He is also the Manager of the BSC/UPC NVIDIA GPU Center of Excellence. The applicant has held a Marie-Sklodowska Curie Individual Fellowship and a Juan de la Cierva (Incorporación) Fellowship. As an example of his recent success and impact, he coauthored solvers incorporated into NVIDIA s cuSPARSE library, which is leveraged by millions of users.

During his postdoctoral stage at the prestigious US Argonne National Laboratory, Antonio was member the R&D team in charge of MPICH, the base Message-Passing Interface (MPI) implementation in 9/10 top supercomputers worldwide. He contributed with a large amount of code currently used in production by thousands of users from academia and industry. Papers in prestigious venues and a large citation count corroborate the quality and impact of his contributions. He also spawned a pioneering and highly relevant research area for exascale computing: memory heterogeneity for main processors. This produced a handful of additional publications, but also production-quality software that he is currently preparing for a joint release with Intel.

As a PhD Student, Antonio developed rCUDA, pioneer on proposing remote GPU virtualization. When he finished his PhD, his software had already received 500+ download requests. He is author of 10+ papers related with this technology, collecting a very high number of citations that keeps increasing, since some of these are considered must-cite references. He received an Extraordinary Doctoral Award by his home university and a spin-off company was created to provide services around this technology.

Antonio has gained international recognition and visibility, as demonstrated by his international awards and fellowships, but also by his leading roles and highlighted participations in recognized venues. In the upcoming future, Antonio aims to influence further on the current two main pillars of his research: parallel programming models and resource heterogeneity.
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Resumen del Currículum Vitae:

Educated in Spain, with a predoctoral internship in Switzerland and a postdoctoral stage in the USA, Dr. Peña is currently a Senior Researcher, Team Leader, and Manager of a joint center of excellence at the Barcelona Supercomputing Center. He is former Marie Sklodowska-Curie Fellow and former Juan de la Cierva Fellow. His several awards include an IEEE Early Career, an Extraordinary Doctoral Award, and an Impactful Paper. With solid technology transfer records resulting in several pieces of software accounting millions of users, Peña has been the Coordinator of a 4M H2020 project, PI of 3 industrial projects summing 800K, and non-PI participant in 17 funded projects. He has already advised 3 PhD and 3 MS theses (1 PhD currently ongoing), and has supervised or mentored 24 individuals, including 4 postdocs. Co-author of 33 indexed papers without PhD advisors, Peña is already publishing as last author. He is occupying leading organization and technical roles in top-tier venues, giving invited lectures and keynotes, and participating in relevant reviewing activities, including two advisory board memberships. Peña has been pioneer in widely relevant fields such as remote GPGPU virtualization or data distribution methodology for heterogeneous memory systems in high-performance computing.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: BARGALLO GONZALEZ, MIREIA
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Área Temática: Tecnologías de la información y de las comunicaciones
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Título:

Fabrication, characterization and modelling of advanced micro and nano-electronic devices

Resumen de la Memoria:

My work is focused on the field of fabrication, characterization and modelling of advanced micro and nano-electronic devices. I pursued my PhD degree at the Epitaxial group of the Interuniversity Microelectronic Center (IMEC) in Belgium, the largest independent microelectronics research center in Europe. My PhD thesis was focused on the stress analysis and defect characterization techniques of SiGe/Si and Ge/Si hetero-epitaxial device structures, as potential materials to be integrated in advanced CMOS devices. In April 2011, I defended my PhD thesis. During my PhD, I gained extensive experience in the field of transport properties and electrical characterization of electronic devices. My area of expertise was the investigation of electrically active defects (point-defects, clusters of vacancies or interstitials, extended defects, grain boundaries, etc.) that may impact the trap response at device level.

During my 59-month experience of international mobility at IMEC, I also acquired a strong background in the physics modelling of semiconductor devices (junctions, transistors), electrical characterization, and physical simulation techniques. In addition, I contributed to the design and process flow development of micro and nano-electronic devices.

In July 2011, I joined the Instituto de Microelectrónica de Barcelona (IMB-CNM, CSIC) in the Advanced thin dielectric films group led by Prof. Francesca Campabadal. My research during the first two-year period at IMB was focused on the study of device physics and transport phenomena in metal-insulator-semiconductor based devices fabricated with atomic layer deposited thin dielectric films. In that period, I acquired strong skills in the design and development of smart software tools to control the instrumentation to electrically characterize and model the electrical characteristics. Special attention was given to the study of the electrical properties of electrically active defects in dielectric materials, and their impact on the device operation.

From 2014, and under my initiative, the IMB group has devoted an intense effort in the field of fabrication, software development, electrical characterization and modelling of emerging Resistive Random Access Memories (RRAM) based on memristor devices. This research line is gaining much importance in recent years to assess the potential of this emerging technology for a wide variety of potential applications including brain-inspired (neuromorphic) systems, nonvolatile data storage, digital logic circuits and hardware security purposes. As a senior researcher, from 2014 I have published 48 SJR-JCR publications in the memristor research line (among them, IEEE EDL (2), IEEE TED (3), IEEE TDMR (1), J. Physics D (2), APL (1), APEX (1), JAP (3), Nanotech. (1), Electronics (1), Chaos Soliton Fract. (1), Semicond. Sci. Tech (1)). In addition, I have contributed to 78 conferences, including 48 major international conferences in the field: IRPS (2), MEMRISYS (9), INFOS (16), RADECS (1), ESREF (1), EUROMAT (1), WoDIM (10), BALD (1), UPON (1), MSM (1), CISCEM (1), DRIP (1), ECS (1), and ULIS (2).

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Resumen del Currículum Vitae:

I graduated in Physics at the Universidad de Barcelona. I pursued my PhD degree at the Interuniversity Microelectronics Center (IMEC) in Belgium, a world-leading R&D and innovation hub in microelectronics, obtaining funding for my doctoral Fellowship at the Katholieke Universiteit Leuven under the supervision of Prof. Cor Claeys and Dr. Eddy Simoen. In 2011, I was awarded the best student paper at CSTIC 2011 conference, and I defended my PhD thesis.

During the 59-month period of mobility at IMEC, I participated in 6 Industrial contracts to deliver industry-relevant technology solutions. These contracts were funded by leading semiconductor foundries, or leading supplier companies of semiconductor process equipment (among them: ASM, Texas Instruments, Intel Corporation and TSMC). In addition, I participated in 3 European projects.

In July 2011, I joined the Instituto de Microelectrónica de Barcelona (IMB-CNM, CSIC) as a JAE-DOC Fellow. At IMB, I have participated in 7 national research projects (1 as PI), 2 regional research projects and 5 research contracts (2 as co-PI). In 2013, I was selected as a Scientific Committee member of the EMRS Meeting. In addition, I was a Spanish Young scientist selected to attend the 62nd Meeting of Nobel Laureates 2012 dedicated to Physics in Lindau, Germany.

From September 2015 to December 2018, I was contracted by my own research project VARERAM in the frame of Proyecto de Jóvenes

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Investigadores 2014 (8.7% success rate) financed with a total budget of 203.643 . This project allowed me to stablish a new research line in the reliability of memristors devices at IMB-CNM, and to contract 1 technician and 1 postdoc. In the memristor research line, I have supervised 3 PhD theses (1 finished, 2 on-going), 2 master projects, 1 bachelor project and 6 internships.

Furthermore, in 2019 I obtained the Acreditación de Profesor Agregado from Agència per a la Qualitat del Sistema Universitari de Catalunya, (AQU). And, in 2019 and 2021, I have been co-PI of 2 research contracts of D+T Microlectrónica A.I.E with the Universidad Autónoma de Barcelona, and the University of Passau, (Germany), respectively.

In summary, during more than 14 years of research experience, I have participated in 12 research projects, among them, 3 European projects, 7 national projects (1 as PI), 2 regional projects, and I have participated in 6 technology transfer contracts with internationally leading Industrial partners and 5 research contracts (2 as co-PI, 1 International, 1 national).

In addition, I have obtained self-funding in competitive regimes through 1 international Fellowship (Katholieke Universiteit Leuven), 1 national Fellowship (CSIC) and 3 international travel grants (2 from The Electrochemical Society-ECS, 1 from Fonds Wetenschappelijk Onderzoek Vlaanderen- FWO), and 1 regional grant (AGAUR).

Derived from my work, I have published 127 peer-reviewed publications (SCOPUS). My publications are classified as 82 SJR-JCR journal publications (46 of SJR-Q1) and 45 conference proceedings. In 62 of these publications, I am the first or second author. I have an h-index of 18 and 1074 citations. Furthermore, I have contributed to 142 conferences (10 invited), 1 book chapter and I have given 2 seminars. I am regularly acting as a referee for AIP, Elsevier and IEEE journals.

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Turno de acceso general

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Área Temática: Tecnologías de la información y de las comunicaciones
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Título:

Computer Networks and Cybersecurity

Resumen de la Memoria:

My main research activities fall in the areas of network measurements, and online privacy and cybersecurity. My work leverages the methodological synergies that exist between these two areas to tackle fundamental conceptual, methodological, and socio-technical challenges from an unifying and empirical prism. I incorporate knowledge and methods from complementary research areas like software engineering, software analysis, natural-language processing, and policy.

I developed and validated new methodologies for verifying the privacy and security claims of online services, characterizing socio-technical phenomena occurring on the Internet, and to assess the guarantees (and limitations) of new network protocols and standards. Particularly, in the networking area, I have performed IPv4-level Internet Scans and large-scale traffic analysis to measure the adoption of new protocol standards like TLS 1.2 and 1.3 (CoNEXT 17, IMC 18, CCR 20), identify DNS deployment inefficiencies (CoNEXT 17, IEEE Access 19), assess the robustness of new DNS over HTTPS standards against traffic analysis attacks (NDSS 20), detect performance and security implications of middleboxes such as carrier-grade Network Address Translators (NATs) (IMC 16, Awarded with an IETF ANRP Award), or quantifying and studying suddent traffic shifts (and how networks reacted to unseen traffic patterns and growth) resulting from the Covid-19 lockdown measures and tele-working (IMC 20). In the online privacy and cybersecurity domain, I have conducted ground-breaking research to identify and characterize the different actors involved in the online tracking ecosystem (NDSS¿18), characterize the privacy and security risks of pre-installed Android apps (IEEE Symposium on S&P 20), tackling concerning vulnerabilities in the Android permission model that enable side- and covert-channels to access permission-protected data (USENIX Security 19) (fixed in Android 10 after our responsible disclosure) and developed groundbreaking methodologies to automatically assess the regulatory compliance of mobile apps, at scale (PETS 18, PETS 20). In total, I have co-authored more than 7 and 17 Core-A* and Core-A papers, respectively.

The ability to develop sound and correct methodologies to study a complex socio-technical ecosystem like the Internet is critical not only for the scientific community, but also to inform industry actors, standardization bodies, and regulators. My research contributions have had profound regulatory and industrial implications and they were presented to regulatory and standardization bodies (e.g., FTC, AEPD), and I have given seminars at key industrial organizations like Google, Telefonica, and Facebook. I have received awards such as the Caspar Bowden Award, AEPD Emilio Aced, CNIL-INRIA Privacy Research Award for my contributions to privacy and regulation. The research community has also recognized the quality of my research with 5 best paper awards at prestigious conferences, and I obtained ACM IMC¿s Community Contribution Award for conducting research focused on assessing the soundness and correctness of previous research studies and enhancing reproducibility.

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Resumen del Currículum Vitae:

I have been an Assistant Research Professor at IMDEA Networks since 2016. I am also a part-time Research Scientist at the International Computer Science Institute (ICSI) at UC Berkeley (USA). At IMDEA, At IMDEA Networks, I am the leader of the IAG team, which is formed by 3 Ph.D students, complemented by a Post-doc based at UC Berkeley. I am also a co-founder of AppCensus Inc. a US-based tech startup founded in 2018 that develops technology focused on the analysis of mobile applications at scale.

I obtained my Ph.D in Computer Science at the Cambridge University in 2014 under the supervision of Prof. Jon Crowcroft (Fellow of the Royal Society), and my Telecommunications Engineering degree from the University of Oviedo in 2007. In 2014, I finished a one year Post-Doc at ICSI-UC Berkeley, becoming a principal investigator right after. Before joining the PhD program, I gained industry experience at Vodafone R&D, which I complemented with industry internships during my Ph.D at Telefonica Research and T-Labs in Berlin.

My research interests fall in the area of network measurements, privacy, security, and consumer protection. I have co-authored more than 50 peer-reviewed papers at the most selective conferences in Computer Science (Core-A* and Core-A ones) such as USENIX Security, IEEE Symposium on S&P, NDSS Symposium, The Web Conference, IEEE Infocom, ACM CoNEXT and ACM IMC, and in journals such as IEEE Communications of Tutorials and Surveys, ACM SIGCOMM CCR, or IEEE Access. My h-index, according to Google Scholar is 26, and I have gathered more than 2,100 citations. I am the most prolific European author (and second in the world) at ACM IMC since 2016.

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I participate regularly as a TPC member at conferences like ACM IMC, ACM CCS, ACM CoNEXT, and PoPETS, among many others, having had organizational roles at ACM Mobicom and ACM CoNEXT. I have experience as PI in projects funded by the EU H2020, USA NSF, USA NSA, and industry (AEPD, Telefonica, Google), having raised more than 1.5M euros as PI in total.

My work has been awarded with best paper awards at the 2020 IEEE Symposium on Security and Privacy (S&P), USENIX Security 19, ACM IMC 18, ACM HotMiddlebox'15, and ACM CoNEXT'14. I also received prestigious industry grants and recognitions for my career achievements (Google Faculty Research Award, and Qualcomm Innovation Fellowship). Particularly, my research in the mobile security and privacy domain has influenced policy changes and security improvements in the Android platform and has received the recognition of European Data Protection Agencies as reflected by the AEPD Emilio Aced Award and the CNIL-INRIA Privacy Protection Award, both in 2020. I have been responsible for several CVEs (vulnerabilities). I am also the recipient of the IETF/IRTF ANRP Award in 2017 and I have presented my work in non-academic events including privacy and regulatory forums (e.g., CPDP, FTC PrivacyCon, EDPB), and industry ones (e.g., NANOG, APRICOT/APNIC, Google). International media outlets like The Washington Post, The New York Times, The Guardian, RTVE, Le Figaro, The Times, Financial Times, and Wired have covered my research activities.

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Turno de acceso general

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Título:

Computational Forensics

Resumen de la Memoria:

The majority of my research career has focused on Soft Computing and its application to solve Computer Vision problems. My final goal is to develop hybrid intelligent system tackling real problems with social and industrial importance and impact.

Among the different real problems I have tackled during my research career (in fields such as ocean engineering, medical imaging or neuroscience) the research performed during my PhD thesis has opened up an uncharted area thanks to the promising results obtained in the application of hybrid SC and CV methods to the FA field. I have set techniques dealing with the automatic comparison of images of different objects (post-mortem skull and ante-mortem face photographs) taken under different conditions while accounting at the same time with the uncertainty inherent to the problem. This research line is evolving to a complete identification system (including decision making) called Skeleton-ID (developed by Panacea). This has challenged the visual inspection procedure traditionally followed in the current identification techniques in FA. This significant success, although restricted still to a very narrow application field (CFS), indicates a huge potentiality to ambitiously pursue the development of SC- and CV-based techniques in broader number of FA challenges as comparative radiography or biological profile determination.

Within this research field, I defended the first PhD on automatic craniofacial superimposition and co-supervised two additional PhDs in the same topic. I was the technical director of extinct Face2Skull commercial product and scientific coordinator of MEPROCS project . As a result, I am the researcher with a larger number of publications in the field of craniofacial superimposition (19 JCR-indexed journal articles and 23 articles in other journals, book chapters and conference proceedings). While the majority of those articles were published in either top-10 or Q1 ranked journals in the field of Computer Science, eight of them have been published in JCR-indexed Forensic Anthropology journals , what demonstrated the contributions of my research to both research communities.

During the last five years, I have led the application of AI techniques (mainly Deep Learning and Evolutionary Computation) to other FA techniques. I supervised a PhD dealing with automatic Comparative Radiography and I was one of the Principal Investigators of an EU project target for the same field of research. The main achievements have been published in four articles in Q1-ranked journals and were previously protected for its commercialization in a PCT patent. As a result of this research line, we were awarded with The 2020 International Society for Forensic Radiology and Imaging (ISFRI) prize. Similarly, I am also involved in another EU project proposal dealing with age estimation of minors. Finally, for the last five year I have been supervising another PhD applying the same family of artificial intelligence techniques to forensic facial comparison in collaboration with two Brazilian Universities and the Federal Police (two JCR-indexed journal papers published). Due to the quality, variety and number of contributions in the FA field I was invited to lead a monographic number in the Spanish Association of Forensic Anthropology-Odontology journal composed of three papers focused on AI applications to FA.
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Resumen del Currículum Vitae:

Dr. Oscar Ibáñez is co-founder, partner and CEO/CTO of Panacea Cooperative Research (an SME focused on finding intelligent solutions to solve unmet biomedical needs), and affiliated researcher at the DASCI Research Institute. He has developed his studies in five different universities and his research career in four laboratories. In addition, he has carried out stays in five other laboratories and short visits to approximately 20 institutions as part of different national and international projects.

As a result of his PhD, he received the EUSFLAT Best Ph.D. Thesis Award and the IFSA Award for Outstanding Applications of Fuzzy Technology in 2011. Other important awards include the IEEE CIS Outstanding CIM Paper Award for Best Article of the year 2013, the CAEPIA Best Ph.D. Thesis Award Frances Allen (second position) in 2016 and the 2020 ISFRI prize. He has also obtained prestigious scholarships and contracts with a highly competitive character, including the Juan de la Cierva (2014) and Juan de la Cierva-incorporación (2015) scholarships.

After +10 years of international experience, he is recognized for his work in the areas of soft computing and computer vision, and its applications in different scientific disciplines: forensic anthropology, medical imaging, neurology, and port and coastal engineering. He is co-author of more than 100 peer-reviewed scientific contributions with 80 researchers from 35 different institutions, including 34 articles

in SCI-JCR journals (13 of these journals are top-10% and 24 are Q1). Oscar has a record of 1002 citations in Google Scholar (h-index of 18). With a clear focus on technology transfer, he has co-authored four patents, three of them under exploitation by the company he leads. He has broad experience managing teams of all kinds, researchers and developers (+10), PhD (5), master and graduates (+10) students. Besides, he has participated on 30 research projects (PI in seven) and contracts at European (four FP7 and three H2020), national and regional level with a budget for the entities he was working at close to five million euros.

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Turno de acceso general

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Título:

Emerging threats in online communities: cyberthreats, cybercrime and cybersafety

Resumen de la Memoria:

My trajectory is characterized by over 6 years of post-doctoral international research experience in world-leading universities and research centers. It is also characterized by outputs that excel in quality, including those archived in my pre-doctoral training with key connections to industry and prestigious awards.

I am currently an Assistant Professor with a consolidated experience in the area of cybersecurity. Cyber-dependent crime has rocketed in the recent years. These crimes cost governments and industry billions every year and thwarting them is of paramount importance.

My area of research focuses on understanding emerging cyber-dependent threats in online communities. In particular, I apply data-driven approaches to better understand and mitigate these threats. During my career, I have developed three main directions that aim at addressing real-world problems revolving around the aforementioned area (online communities): i) Cyber-threats, ii) Cyber-fraud, and iii) Cyber-safety.

My most consolidated research direction relates to the detection of malware spread through online markets. Common to most of my contributions in this direction is the design and develop of new approaches to assist security analysts and end users in the study of malicious or potentially unwanted programs. In a nutshell, my research has provided specific methods to solve fundamental issues aiming at (i) automating the identification of unwanted software, and (ii) improving the detection of smart malware. I have also adopted some of these methods to better understand and detect mass-marketing fraud. In particular, I have focused my attention into those type of frauds that aim at exploiting humans with deception techniques to con them out of money. Finally, I have been devising automated methods to protect users, especially minors, from malicious actions like cyberbullying or misinformation in online communities. Specifically, I have been looking into how fringe communities like 4chan produce toxic content that influences other user in other Web communities like Twitter or Reddit.

I aim at maintaining an excellent publication record with high societal impact. My research plan for the next few years will continue to look at novel threats in online communities while relying on my background. In particular, there are a number of emerging threats that pose unique challenges to each of the areas introduced above (i.e., threats, fraud and safety). First, smart assistants like Amazon Echo (Alexa) or chatbots are now pervasive and are considered the source of future cyber-threats. Next, the proliferation of secluded anonymous places under the underground where criminals operate with impunity is enabling the core of current cyber-fraud. Finally, alternative chan culture like 8kun or neinchan are threatening the cyber-safety of users of mainstream platforms on the Internet.

The underlying ecosystem that is establishing around these three communities (Alexa market, illegal underground forums and novel chan communities) is shaping the way in which users interact with the technology and how services are offered on the Internet. All this brings important open issues that may put users at stake. Getting a deeper understanding on how these ecosystems work and shedding light on what these issues are will enable effective solutions.
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Resumen del Currículum Vitae:

I currently hold a double appointment as an Assistant Professor at two top research centers: King s College London and IMDEA Networks. I was awarded with the ANECA habilitation of Profesor Titular in 2018, only four years after completing my PhD.

Throughout my research career I have pursued excellence in every step of the way, always prioritizing impact and quality on top of quantity. My PhD won the FUNCAS award, positioning my pre-doctoral studies as the best nation-wide. I have done two post-docs at world-leading research international centers: Royal Holloway (RHUL 2015) and University College London (UCL 2017), after which I was made tenured at King s College London (KCL) in 2018. Overall, I have spent over 50% of my career abroad in international world-leading research centers. RHUL has one of the largest academic security groups in the world. My second post-doc took place at University College London (UCL), ranked as 3rd best university in Europe in the 2020 QS World University Rankings. KCL is in the top 30 world-wide according to the same ranking.

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I am the first author in 20 of my papers. Since 2018, I started leading a larger group of researchers, including 6 PhD students. This means altogether that I have solid experience leading the execution of papers, but also that I am a well-established researcher that has successfully transitioned to a consolidated career stage where I can independently lead research directions and supervise students working on my own research. In general, the number of authors per article signing in my papers does not exceed four people (average of 4.2 authors per paper).

My career path is distinguished by a good wealth of research outputs of outstanding quality and solid impact (see merits and citation metrics for strong evidence on this). To support my research, I have secured funding for a number of research projects, including funding from the UK national research council and industry.

I am currently supervising several PhD students, one of them being in his final year and two midway-through. I have also supervised five visiting PhD students, three GCHQ (equivalent to the CNI in Spain) research interns working on malware-related projects and supervised over 30 student-driven MSc projects.

I have been invited to carry out different academic service roles, which shows that I am a renowned researcher in my field. This includes roles in scientific Technical Program Committee, as Conference Chair, external reviewer of national projects (e.g., EPSRC and AENOR), as well panel member of different PhD defenses at top universities like Oxford. I have also taken important administrative roles, including the departmental PhD Admissions Coordinator of KCL.

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Turno de acceso general

Nombre: PELEATO IÑARREA, BORJA
Referencia: RYC2020-029593-I
Área Temática: Tecnologías de la información y de las comunicaciones
Correo Electrónico: borjapeleato@gmail.com

Título:

Autonomous spectrum and caching management

Resumen de la Memoria:

Dr. Borja Peleato obtained a double licenciatura in Telecommunications Engineering and Mathematics from the Universitat Politecnica de Catalunya (CFIS) in 2007, with the last year spent as a visiting student at the Massachusetts Institute of Technology (MIT) working on the proyecto final de carrera . He was then awarded a La Caixa fellowship to continue his graduate studies in USA and obtained his M.S. in 2009 and his Ph.D. in 2013, both from Stanford University. His research focused on distributed optimization methods and their application to the storage of information in block-based memories and data centers. During his Ph.D., he was a lecturing TA (Teaching Assistant) for 5 courses and did a summer internship at Apple. After completion of his Ph.D., he spent a year in a startup company, Proton Digital Systems, applying his previously theoretical contributions to the development of a novel NAND flash memory controller. His work resulted in two patents awarded and several publications in top journals and conferences.

Dr. Borja Peleato joined Purdue University as an Assistant Professor in 2014 and started his own research group composed of several undergraduate and graduate students (both at the masters and Ph.D. level). His work focuses on the interactions between information storage systems and communication networks, with special emphasis on coded caching and exposure-aware beamforming. During his tenure track, Dr. Peleato has served as co-PI in several projects, raising over $650,000 for his own group (over $2.2 million overall), and was awarded a Purdue Seed for Success Award for Excellence in Research. He has supervised 3 Ph.D. students until graduation and is currently supervising 2 more. He participated in the worldwide DARPA Spectrum Collaboration Challenge (SC2) and his team ended up in 11th place overall. In addition, he has taught several courses at the undergraduate and graduate level and given many invited talks at highly ranked universities, companies, and conferences.

In July 2020 he was awarded a CONEX-Plus-Marie Curie fellowship and joined the Signal Theory and Communications department of the Universidad Carlos III de Madrid, where he is currently employed and plans to continue his research career.

His most recent line of research is centered around coded caching in heterogeneous networks. Most of the existing coded caching protocols assume a single server fulfilling the random requests from a set of homogeneous users. However, modern content providers tend to store their files distributed across multiple servers and invest heavily in categorizing users according to their preferences. Dr. Peleato has characterized the fundamental limits of coded caching with heterogeneous user profiles or distributed file servers and proposed suitable protocols for these scenarios. Furthermore, his research has showed that practical networks are often constrained by the time required to read the information from the servers and not by the bandwidth available to transmit that information. In order to alleviate this problem, he proposed an algorithm that alleviates this problem through a careful trade-off between coded and uncoded transmissions.

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Resumen del Currículum Vitae:

I received a double Licenciatura in Mathematics and Telecommunications Engineering from the Universitat Politecnica de Catalunya (UPC, CFIS) in 2007, writing the final thesis as a visiting student at the Massachusetts Institute of Technology (MIT) in 2006. This thesis resulted in 2 conference presentations and 2 journal papers. I then received a "La Caixa" graduate fellowship to continue my graduate studies at Stanford University, from where I obtained my M.S. in 2009 and my Ph.D. in 2013, both in Electrical Engineering.

During my graduate studies at Stanford, I was a (lecturing) teaching assistant for a total of 7 semesters and 5 different courses. This gave me some invaluable teaching experience that I have been able to use in my later career. I also spent a summer working for Apple as an intern and started a company in the personalized news space. After graduating, I worked as a Senior Flash Channel Architect at Proton Digital Systems, where I was in charge of flash memory characterization, LDPC code construction, and supervising the design of signal processing firmware.

In January 2014, I joined the Electrical and Computer Engineering department at Purdue University as a Visiting Assistant Professor and in 2016 I was promoted to a tenure-track Assistant Professor position. I served in various committees until 2018, when I took the role of Associate Director of Graduate Admissions for the department. For the last two years, I was responsible for coordinating graduate student

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recruitment efforts, fellowships, and admission decisions. During my time at Purdue, I taught 5 different classes for a total of over 500 hours and consistently obtained teaching evaluations in the top 10% for the department. I also graduated 3 Ph.D. students (currently employed at Google, Goldman-Sachs, and NC State University) and 3 MS students that continued their graduate studies elsewhere.

In 2017, I received the Purdue Seed for Success Award in the category Excellence in Research and in 2019 I was part of the team that ranked 11th in the worldwide DARPA SC2 challenge, resulting in over $1,500,000 in funding overall. I have co-authored 16 journal papers (+4 under review), 22 conference papers, and 2 patents. One of these publications (highlighted below) pioneered the use of ADMM for distributed optimization and has over 12.000 citations. I have attended and presented my work in over 20 international conferences and given 12 invited talks at various universities and companies. I am currently a Technical Program Committee (TPC) member for 5 international conferences and have chaired 2 sessions. I have also served as a consultant for HiSilicon Technologies (China) and as a volunteer with the Gifted Educational Research Institute (GERI) and with Enlace Hispano-Americano de Salud (EHAS).

In September 2020, I received a CONEX-Plus Marie Curie Fellowship to continue my research at the Universidad Carlos III de Madrid, where I am presently employed. My current research is focused on coded caching and autonomous spectrum management, with the long-term goal of using these techniques to push the limits of autonomous communication networks. I plan to develop a framework suitable for autonomous collaboration in IoT and vehicular networks, by collaborating with machine learning experts and leveraging my background in communications and distributed optimization.

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Turno de acceso general

Nombre: VAZQUEZ CORRAL, JAVIER
Referencia: RYC2020-029516-I
Área Temática: Tecnologías de la información y de las comunicaciones
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Título:

Computational color for imaging

Resumen de la Memoria:

My research expertise encompasses image processing and computational vision, specializing in computational color. I base my research on a deep understanding of the camera imaging pipeline and visual perception models, which I combine with psychophysical experiments to develop and validate my proposed methods. My research has been centered around two topics: computational color constancy and image processing for cinema applications.

Computational color constancy aims at improving the color appearance in images emulating a basic perceptual property of the visual system. My PhD and early postdoc positions focused on this topic, with my research yielding 6 journal articles (4 Q1, 1 Q2, 1 Q4; 5 as first author, 1 as second).

The goal of image processing for cinema applications is to develop methods that meet the high-quality requirements of the cinema industry. This includes the automation of operations that are currently performed manually, and also provides insights for vision science, given that cinema professionals are able to emulate perception in a way that vision science models usually cannot. This research is also applicable to imaging in general, including videogames, AR/VR, etc. Specifically, I have worked on color stabilization, HDR, denoising, gamut mapping, dehazing and the relation between deep neural networks and visual perception. This research led to 16 journal articles (9 Q1, 5 Q2, 2 Q3; 6 as first author, 8 as second), 2 CVPR papers, 2 filed patents, and 3 PhD Theses co-supervised (1 in the UK).

During my PhD I was awarded two competitive mobility grants -10,500 -; as a post-doc I was awarded a Juan de la Cierva-Incorporación Fellowship -64,000 -. The first of the two patents that I co-authored won the Knowledge Transfer prize -10,000 - from Universitat Pompeu Fabra in 2017, and underpinned two projects -180,000 -.

I have significant international research experience in top labs in the UK (University of East Anglia), Canada (Simon Fraser University), and Switzerland (EPFL) -totaling more than 2 years-, and spanning four European projects.

Currently, I am the sole principal investigator of a Retos-Jóvenes Investigadores Project -181,500 -. My goal with this project is for digital cameras to be fully functional under conditions of bad visibility, without the need for further post-processing. This is useful for many applications (e.g. surveillance, intelligent vehicles, or medical imaging) in which the environment or the capture conditions introduce visibility distortions in the captured images.
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Resumen del Currículum Vitae:

I obtained my PhD (Cum Laude, European Mention) at UAB in 2011 at the age of 27. My PhD was co-supervised by a professor at UEA (United Kingdom).

My research area is computational color. I combine knowledge of digital camera pipelines with the definition of precise visual perception models to deliver better processed images. My research has a strong mathematical basis and leads to models which are grounded on physical and/or perceptual theories, supplemented by subjective experimental feedback to assess and refine the quality of the approach. My research achievements center around two topics: Computational Color Constancy (CCC) and Image Processing for Cinema Applications (IPCA).

I mostly worked in CCC during my PhD (2007-11) and my early post-doc positions (2011-12). During that time, I was invited to visit UEA and Simon Fraser University (Canada), and was hired at EPFL (Switzerland), UEA, and UAB.

I have been working in IPCA mostly at UPF and at UEA (2013-21). I have been involved in 4 European projects (7.9 M , +10 partners in different countries). My role has been growing from researcher to principal investigator. I led the group effort in the topics of color imaging and image visibility enhancement, co-supervising 2 PhD theses.

I have a large international mobility. I spent more than 2 years in top labs abroad, in the United Kingdom -UEA-, Switzerland -EPFL-, and

Canada -SFU-. I am an Honorary Lecturer at UEA, where I have also co-supervised a PhD Thesis. I have been invited to visit research labs of world industry leaders, such as Barco (Belgium) and NHK (Japan).

In terms of international exposure, I have been the general chair of the London Imaging Meeting (2020), and part of the organizing committee in the main conference in my area (CIC, 2018-20). I have given 2 invited talks and 7 invited research seminars abroad. Also, I serve on the program committee for top-tier conferences (CVPR, ECCV, ICCV, AAAI).

My research has obtained different prizes. During my PhD I was awarded two competitive mobility grants (10.5 K). As a postdoc, I was awarded a Juan de la Cierva-Incorporación fellowship (64 K , acceptance rate <14%), and a NVIDIA GPU Grant (hardware, 2 K). The first of the two patents that I have filed won the 2017 Knowledge Transfer prize from UPF.

Currently, I am the sole principal investigator of a Retos-Jóvenes Investigadores Project (181.5 K , acceptance rate < 9%). It deals with image visibility enhancement and aims at removing the effects caused in images by weather (fog, rain, etc.) or by the capture conditions (night-time, underwater, etc.) in cameras. Collaborators on the project are Prof. Sabine Süsstrunk (EPFL, Switzerland), and Prof. Graham Finlayson (UEA, UK).

I have extensive experience in teaching (over 800 hours) in both BSc and MSc courses in Spain and the UK.

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Turno de acceso general

Nombre: MORALES JIMENEZ, DAVID
Referencia: RYC2020-030536-I
Área Temática: Tecnologías de la información y de las comunicaciones
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Título:

Random Matrix Theory and Applications to Signal Processing

Resumen de la Memoria:

Dr Morales' main research activities lie within the wide area of statistical signal processing, with cross-disciplinary applications to wireless communications and computational biology. With a focus on inference and estimation theory under high-dimensional settings (big data), his research is aimed at providing contemporary signal processing solutions and machine learning methods, and at enhancing our understanding of complex biological systems. A common factor is the use of advanced concepts from high-dimensional statistics and random matrix theory to develop estimation and inference methods suited to the large-dimensional nature of contemporary data.

Part of his past (and current) activities have focused on wireless communications, with a special emphasis on multi-antenna technologies, including: channel and interference modelling, massive MIMO, coordinated transmission, and spectrum sensing. He is generally interested in challenges posed by the ever-growing dimensions (e.g., users, antennas) of emerging wireless networks, and particularly in the development of robust signal processing solutions.

Dr Morales' background and expertise have been shaped by different stages in my career: He earned a Ph.D. in Telecommunication Technologies from University of Malaga (Spain) in 2011, being awarded with the Best Ph.D. Thesis Award by the same University for my research on the analysis and design of 4G multi-antenna systems. Between 2011 and 2013 he underwent further post-doctoral research training in wireless communications at Universitat Pompeu Fabra (Barcelona) under the supervision of Prof. Angel Lozano. Between 2014 and 2018, he was with the Signal Processing Group, headed by Prof. M. McKay at the Hong Kong University of Science and Technology (HKUST); first as a Visiting Scholar (2014-2016), and then as a Research Assistant Professor (2016-2018). He also held a visiting position at Stanford University, Statistics Department (2015), collaborating closely with Prof. I.M. Johnstone. His research broadened substantially at HKUST and Stanford, becoming particularly engaged in the theories of large random matrices, high-dimensional statistics and robust estimation, and in their application to computational biology problems.

Focused on the theory of random matrices and statistical inference under high dimensions, Dr Morales fundamental research has been applied to different problems in signal processing, wireless communications and computational biology; the cross-disciplinary interest and recognition of his research are worth highlighting. He has authored over 50 publications in top-tier journals and international conferences, including highly-regarded and flagship publication venues in statistics (e.g., Statistica Sinica), statistical physics (e.g., Nuclear Physics B), signal processing (e.g., IEEE Transactions on Signal Processing), wireless communications (e.g., IEEE Transactions on Wireless Communications), and computational biology (e.g., PLOS Computational Biology, Bioinformatics); the overwhelming majority of these publications are ranked in the top-quartile of their respective (area specific) Journal Citation Reports.

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Resumen del Currículum Vitae:

Dr David Morales earned a PhD in Telecommunication Technologies from University of Malaga in 2011, being subsequently awarded the Best PhD Thesis Award in Telecommunication Engineering by the same university. His expertise and career have since been shaped by a remarkable international trajectory, through different academic appointments: he was a Postdoctoral Fellow (2011-2014) at Universitat Pompeu Fabra (UPF); he then joined the Hong Kong University of Science and Technology (HKUST), first as a Visiting Scholar (2014-2016) and then as Research Assistant Professor (2016-2018); since March 2018, he is a Lecturer at Queen s University Belfast (QUB). He has also held visiting appointments at Stanford University (Statistics Department, 2015) and at University College London (2010).

Dr Morales research is centred around random matrix theory and high-dimensional statistics with cross-disciplinary applications to signal processing, wireless communications, and computational biology. His main line of work is aimed at providing robust signal processing and machine learning solutions suited to the large-dimensional nature of contemporary data. Among his main current interests are: 1) robust estimation and detection solutions to address challenges posed by the ever-growing dimensions (e.g., users, antennas) of wireless networks and, 2) computational inference methods to help understand the complex dynamics of biological systems such as HIV or HCV viruses. On these topics, Dr Morales has supervised 2 PhD Theses at HKUST and 1 (ongoing) at QUB.

He has published extensively in his areas of expertise, including 30 publications in JCR journals (19 of which ranked in Q1 and 7 in Q2), 3

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book chapters, and 19 international conferences. His experience in research projects and contracts is also worth highlighting, with a remarkable involvement in international projects: he has participated in 7 projects (funded by the Hong Kong Research Grants Council) involving partnerships between different world-leading institutions such as HKUST, Stanford, Supélec and MIT; he has further been granted a national project Principal Investigator and participated as team member in 6 other national projects (Plan Nacional I+D) and 5 contracts with private companies.

Dr Morales sustained contributions are widely recognized by leading experts in his research fields and by relevant professional bodies: he has been elevated to IEEE Senior Member and is currently an elected member of the Technical Committee on Signal Processing for Communications and Networking (SPCOM) of the IEEE Signal Processing Society; the highly esteemed committee is formed by leading experts in signal processing, elected after very competitive voting. He has served in the TPC for 14 international conferences, including the prestigious IEEE ICASSP and IEEE ICC. Dr Morales international esteem is further evidenced by his strong network of collaborators, including renowned experts at world-leading institutions; among his current collaborators are Prof I. M. Johnstone (Stanford), a world-leading authority in high-dimensional statistics, Prof M. R. McKay (HKUST) and Prof R. Couillet (Supélec), renowned figures in random matrix theory. He also collaborated closely with renowned leaders in signal processing and wireless communications, e.g., Prof Lozano (UPF), Prof Heath (UTEXAS) and Prof Wong (UCL).

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Turno de acceso general

Nombre: GORLA , ALESSANDRA
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Área Temática: Tecnologías de la información y de las comunicaciones
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Título:

Testing and analysis of software for quality and trustworthiness

Resumen de la Memoria:

Modern software systems are complex, and their structure evolves and often deteriorates as they grow. It is usually infeasible to estimate during the development phase how external factors in the execution environment will impact its behavior. This leads to faults that are usually difficult to anticipate. In order to deploy reliable software systems it is thus necessary to work along two directions: it is desirable to detect as many of these faults as possible before releasing a software artifact. The most practical approach to do this is with software testing, which requires to exercise a piece of software by repeatedly sampling among its possible inputs trying to gain confidence that its behavior is as intended. However, since the complete elimination of faults is not always possible or economically feasible, it is also useful to employ techniques that can mitigate the effects of previously undetected faults while the software system is running. My primary research activities are in both directions, aiming to develop techniques to automate software testing and techniques to tolerate the effect of faults in deployed software systems.

The complexity of modern software systems and their continuous evolution make it challenging also when it comes to analyze software systems in terms of their trustworthiness. Malware and potentially unwanted programs are more and more prevalent among mobile applications, as several user sensitive information can be stolen through the mobile platform. My recent research activities apply software analysis and machine learning techniques to detect mobile applications that pose security and privacy threats to the final user.

I received my Bachelor and Master degrees in computer science from the University of Milano-Bicocca in Italy. I completed my Ph.D. in informatics at the Università della Svizzera Italiana (USI) in Lugano, Switzerland in 2011. In my Ph.D. thesis I defined and developed the notion of Automatic Workarounds, a self-healing technique to recover Web applications from field failures, a work for which I received the Fritz Kutter Award for the best industry related Ph.D. thesis in computer science in Switzerland. Before joining IMDEA Software Institute in December 2014 as an Assistant Research Professor, I have been a postdoctoral researcher in the software engineering group at Saarland University in Germany. During my postdoc I have also been a visiting researcher at Google in Mountain View (USA).
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Resumen del Currículum Vitae:

Alessandra Gorla received her Bachelor and Master degrees in computer science from the University of Milano-Bicocca in Italy. She completed her Ph.D. in informatics at the Università della Svizzera Italiana in Lugano, Switzerland in 2011. In her Ph.D. thesis she defined and developed the notion of Automatic Workarounds, a self-healing technique to recover Web applications from field failures, a work for which she received the Fritz Kutter Award for the best industry related Ph.D. thesis in computer science in Switzerland. Before joining IMDEA Software Institute in December 2014 as an Assistant Research Professor, she has been a postdoctoral researcher in the software engineering group at Saarland University in Germany. During her postdoc she has also been a visiting researcher at Google in Mountain View (USA).

Her primary research activities are in the areas of software engineering, in particular on the automation of software testing and analysis activities, and mobile security.

She has given keynote talks at software engineering and security venues, and has participated as lecturer in summer and winter schools in software engineering. She supervised over 20 master and bachelor students in four universities in Italy, Switzerland, Germany and Spain. She graduated one PhD student in 2019 at UPM and she is currently supervising 3 more PhD students. She taught 10 courses and seminars, and she received an award for the best seminar course in 2013 at Saarland University.

She has been the coordinator of SMAPPER, a European project funded by EIT Digital to define a better permission management system for mobile devices, and she the PI of one of the 10 worldwide Facebook Testing and Verification research awards of 2019.

Citations:
- h-index:21, according to Scholar
- 3800 citations according to Scholar
Peer reviewed publications:
- Journal publications: 4
- Flagship software engineering conferences (CORE rank A*): 4 ICSE, 2 ESEC/FSE
- Top software engineering conferences (CORE rank A): 3 MSR, 1 ICST, 2 ASE, 1 ISSRE, 2 ISSTA
- Other conference and workshop publications: 23
Awards:
- Premio Emilio Aced AEPD
- 2019 Facebook Testing and Verification research award.
- Distinguished reviewer award at ICSME 2019.
- Distinguished Paper Award for   How do Apps Evolve in Their Permission Requests? A preliminary Study , SATToSE June 2017
- MARIE CURIE Fellowship Award as part of the EU-funded project AMAROUT-II Europe (AMAROUT- II). 2015-2016
- Nomination for the Distinguished Paper Award for   Automatic Generation of Oracles for Exceptional Behaviors , 25th International Symposium on Software Testing and Analysis (ISSTA). July 2016
- Special mention for the paper   Abnormal Sensitive Data Usage in Android Apps   at the Second Jornadas Nacionales de Investigación en Ciberseguridad (JNIC), 2016
- Nomination for ACM SIGSOFT Distinguished Paper Award for   Mining Apps for Abnormal Usage of Sensitive Data , 37th International Conference on Software Engineering (ICSE). 2015
- Best paper award for   Search-Based Security Testing of Web Applications , 7th International Workshop on Search-Based Software Testing (SBST), June 2014
- Award for the best seminar course   Mobile Testing and Analysis   of the summer semester, Saarland University. July 2013
- Fritz Kutter Award for the best industry related Ph.D. thesis in computer science from a Swiss university. Nove

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Turno de acceso general

Nombre: RODRIGUEZ LARRAD, IGNACIO
Referencia: RYC2020-030676-I
Área Temática: Tecnologías de la información y de las comunicaciones
Correo Electrónico: nacho771984@hotmail.com

Título:

Wireless Communication Systems for Industries

Resumen de la Memoria:

During my PhD studies (2013-2016) at Aalborg University, Denmark, my research was focused on radio propagation at cm-wave and mm-wave frequency bands compared to traditional frequency bands in urban mobile broadband scenarios. My measurements and models served for characterizing urban macro cell, micro cell and femto cell scenarios for frequencies ranging from 800 MHz to 38 GHz. The empirical data and results from my PhD have been considered in the development of several 3GPP and ITU-R standards targeting 5G scenarios.

As a Postdoctoral Researcher (2016-2020), also at Aalborg University, Denmark, I have changed the focus of my investigations towards the novel IoT scenarios, targeting massive machine-type communications (mMTC) and ultra-reliable low-latency communications (URLLC). I have done some research work related to the application of IoT wireless technologies such as LoRa, Sigfox, LTE-M and NB-IoT to different smart-city, and smart-building use cases. However, my main efforts have been put in Industry 4.0 scenarios, where I have been dealing with radio propagation in factories and investigating the suitability of different wireless technologies (4G, 5G, Wi-Fi) for application to the different industrial use cases. I have also addressed research problems related to the integration of machinery and wireless systems and defined my vision of the factories of the future. I have also done some research in non-terrestrial network aspects, as Principal Investigator in a project with the European Space Agency (ESA). Further, I have contributed to the definition and design of a novel 6G wireless technology addressing life-critical applications.

I am currently coordinating the Aalborg University 5G Smart Production Lab and managing multiple collaborations with Industry and research activities within the domain of wireless automation and 5G.

I am the author or co-author of over 50 scientific publications, and I have received 2 prestigious awards (one national, and one international).
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Resumen del Currículum Vitae:

I received the Telecommunication Engineering degree (MSc) from University of Oviedo, Spain, and the MSc degree in Mobile Communications and the PhD degree in Wireless Communications from Aalborg University, Denmark. Since December 2016, I have been a Postdoctoral Researcher at the same institution where, building up on top of the extensive radio propagation knowledge acquired during my PhD, I have shifted the focus of my research activities towards the new cellular scenarios, where I am involved in the research, development and testing of innovative wireless solutions for wide area and industrial IoT scenarios. I am currently leading the Industry 4.0 experimental wireless research activities at the Wireless Communication Networks Section, and I am also an External Research Engineer with Nokia Bell Labs, where I am involved in Industrial IoT research, and 3GPP and ITU-R standardization activities. I am the author or co-author of over 50 scientific publications and my research has generated a great academic and industrial international impact. My current research interests are related to radio propagation, channel modeling, machine-to-machine communications, ultra-reliable and low-latency communications, non-terrestrial networks, 5G and Industrial IoT. I am a co-recipient of the IEEE VTS 2017 Neal Shepherd Memorial Best Propagation Paper Award, and in 2019, I was awarded with the 5G-prize by the Danish Energy Agency and the Danish Society of Telecommunication Engineers.

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Turno de acceso general

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Área Temática: Tecnologías de la información y de las comunicaciones
Correo Electrónico: catiux@gmail.com

Título:

Knowledge representation. Clinical Information Modeling

Resumen de la Memoria:

I started my research career when I was doing my Bachelor degree project within the TECNOMOD group (part of the Instituto Murciano de Investigación Biosanitaria (IMIB-Arrixaca)) at the University of Murcia. In 2007 I started my Masther thesis (finished with honors) and in 2008 I began my PhD under the supervision of Dr. Jesualdo Tomás Fernández Bréis and in the context of the research project Platform for information and knowledge acquisition and sharing for networked clinical research communities funded by the Spanish Ministry for Science and Education. In my PhD thesis, entitled Modelos de representación y transformación para la interoperabilidad semántica entre estándares de Historia Clínica Electrónica basados en arquitectura de modelo dual I looked into de application of MDE (model-driven engineering) and Semantic Web technologies for the semantic representation of clinical models to enable semantic interoperability of dual-model based architecture EHR information systems.

In 2010 I did a three-month research stay at the UCL CHIME team in London, under the supervision of Prof. Dipak Kalra (leading research and development of EHR architectures and systems) in which I collaborated with his team in the development of a simplified information model in order to provide clinicians with an editing tool for defining clinical concepts.

During my PhD participated in a total in 11 research national projects at the University of Murcia. I also collaborated with the FFIS (Fundación para la Formación y la Investigación Sanitaria) of the Region of Murcia. In January 2012 I moved to the Institute for Medical Informatics Statistics and Documentation (IMI) at the Medical University of Graz, Austria as postdoctoral researcher joining the BST (Biomedical Semantics Team) group headed by Prof. Stefan Schulz. Here I could follow on with my previous research but now not limited to healthcare data from dual model-based architectures but to healthcare data independently of the standardised / non-standardised representation. How to relate information models with clinical terminologies has been one important contribution of my postdoctoral research which has influenced international developments in clinical modelling as for instance the Clinical Information Modelling Initiative (CIMI) approach. I carried out the above research in the context of the FP7 European Network of Excellence SemanticHealthNet (SHN) (2012-15). Briefly I worked in the EU ASSESS CT project (Assessing SNOMED CT for Large Scale eHealth Deployments in the EU) (one year project) outcome of which I did a qualitative analysis of manual annotations of clinical texts using SNOMED CT. Later, I worked in the Austrian IICCAB project (Innovative Use of Information for Clinical Care and Biomarker Research) headed by Prof. Stefan Schulz within CBmed (Austrian K1 competence center), contributing to the project with my experience in using terminologies and semantic data harmonization / integration. Since 2017 I have been working in the H2020 Precise4Q project in which I lead the work package about data semantics and harmonization and the building of the semantic data warehouse. In November of this year I moved back to the Faculty of Computer Science at the University of Murcia, being beneficiary of a contract from the MICINN within the program Retos Investigación 2018 in the modality JIN.

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Resumen del Currículum Vitae:

Catalina Martínez Costa (CMC) is European PhD in Computer Engineering (University of
Murcia, 2011), visiting researcher at the UCL (London, UK, 2010), part-time associate lecturer at Computer Science Faculty (University of Murcia, 2010-11), accredited as Associate Professor by the ANECA (2011,2017), postdoctoral researcher at the Institute of Medical Informatics (Medical University of Graz, Austria, 2012-2019) and granted with a contract of access to the Spanish system of science by the Ministry of Science, Innovation and Universities at the University of Murcia (2019-2022).

CMC research focuses on providing biomedical data with semantics for their better management and exploitation. Among others, she works with biomedical terminologies / ontologies, electronic healthcare records (EHR), interoperability EHR specifications, clinical data warehouses, biomedical data repositories, semantic web technologies.

CMC PhD researched about interoperability of EHR data and clinical models. Her methods and tools were highly valued internationally. She applied them for the development of the ResearchEHR platform. After her PhD she moved to the Institute for Medical Informatics Statistics and Documentation (IMI) at the Medical University of Graz, Austria as postdoctoral researcher joining the BST (Biomedical Semantics Team) group headed by Prof. Stefan Schulz. (2012-2019). Here, and especially in the context of the two European projects she worked in, she had the opportunity to collaborate with renown experts such as Prof. Alan Rector with whom she co-authored one work that got the best paper award at the FOIS (International Conference on Formal Ontology in Information Systems) conference 2014 about the binding between clinical and information entities using description logics, Prof. Stefan Schulz, Prof. Dipak Kalra, with whom she also authored several publications, Prof. Christopher Chute, Prof. Robert Stevens, etc. She also collaborated with initiatives to improve EHR semantic

interoperability, internationally like CIMI or SNOMED International and at EU level like ISO 13606. Currently she is collaborating with the Charité hospital in Berlin for the implementation of the clinical data warehouse in the context of the Precise4Q project, as well as with Günter Neumann from the DFKI (German Research Center for Artificial Intelligence) for the processing of the free text clinical records from the project partners.

Her postdoctoral research has been conducted mainly in the context of the following projects:

1. EU FP7 Network of Excellence SemanticHealthNet (2012-15): CMC co-directed the work package (WP) responsible for the EHR semantic interoperability infrastructure and helped to bridge the gap and to promote collaboration between different communities (EHR standard community, Semantic Web and Ontology communities, Industry, etc.)

2. IICCAB (CBMed, 2016-17, Austrian FFG and private companies): CMC collaborated to integrate data from Austrian hospitals for clinical care and biomarker research.

3. EU H2020 Precise4Q (2017, current): CMC is WP leader of data semantics and harmonization to provide predictive modelling experts with data they can use to offer patients with personalised stroke treatment

4. DATA4HEALTH   (2019, current): Arquitectura semántica y metodología para el uso eficiente de información clínica para investigación y cuidado de la salud (RTI2018-099039-J-I00, RETOS 2018   Modalidad JIN) in which she is the project leader.

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AYUDAS RAMÓN Y CAJAL
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Turno de acceso general

Nombre: RUFO TORRES, JULIO FRANCISCO
Referencia: RYC2020-029925-I
Área Temática: Tecnologías de la información y de las comunicaciones
Correo Electrónico: juliorufo@gmail.com

Título:

Comunicaciones ópticas no guiadas en el espectro visible (VLC) para aplicaciones de Internet de las Cosas (IoT)

Resumen de la Memoria:

In 2005 Julio Rufo began to work in the Department of Signals and Communications at the ULPGC as a junior engineer in the Photonics and Communications group. During this period, he was involved in several research projects. It is of special interest the work in the OWLS project, a contract between Instituto Nacional de Técnica Aeroespacial (INTA) and European Space Agency (ESA) in collaboration with the ULPGC. In this project, he worked on the phase II of the project, carrying out the design, assembly and programming of the EGSE module (Electrical Ground Support Equipment) for a Venus Express type satellite whose presentation was held in December 2008 at the headquarters of the ESA in the Netherlands.

His research activities are in the area of optical wireless communications and more specifically within VLC (Visible Light Communications). His PhD thesis was about the services that this type of networks can offer to the users. The work carried out with companies such as INERZA, in the THOFU project, with GLOBALAN, in the BALDUR project and others tried to find a market niche for VLC technology. Some of the main journals publication in this period has been   Experimental evaluation of video transmission through LED illumination devices   in IEEE Consumers Electronics in 2010, where a video transmission with a VLC link was implemented and studied.   Design and Implementation of an Ethernet-VLC Interface for Broadcast Transmissions   in IEEE Communications Letters in 2010, where based on a FPGA an embedded system was implemented to obtain a general purpose Ethernet to VLC interface.   BRDF Models for the Impulse Response Estimation in Indoor Optical Wireless Channels   in Photonics Technology Letters in 2017, where modern infographics models, not only Phong model, where used to obtain wireless optical channel estimations.   Color Shift Keying Communication System With a Modified PPM Synchronization Scheme   in IEEE Photonics Technology Letters in 2014 where a CSK transmission scheme was proposed related to IEEE 802.15.7 standard. Julio Rufo is also coauthor of a book chapter   VLC Applications for Visually Impaired People   in Visible Light Communications Theory and Applications, 2017 by Taylor & Francis Group, LLC.

The most relevant international congress where Julio Rufo has participated are   Considerations on modulations and protocols suitable for visible light communications (VLC) channels: Low and medium baud rate indoor visible light communications links   in 2011 IEEE Consumer Communications and Networking Conference (CCNC).   Visible light communication systems for passenger in-flight data networking   in 2011 IEEE International Conference on Consumer Electronics (ICCE).   Enhance Lighting for the Internet of Things   in 2019 Global LIFI Congress (GLC).   Thermally-induced Spectral Variations of LED applied to Optical Multispectral Camera Communications   in 2020 12th International Symposium on Communication Systems, Networks and Digital Signal Processing (CSNDSP).

As it can be seen the research activities in the last five years has been focus on VLC for IoT devices including the problem of low power consumption and the application of this technology in the automotive sector and in underwater environment. The researcher Julio Rufo was in 2017 nominally granted with a TORRES QUEVEDO program, from the Ministry of Economy and Competitiveness.
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Resumen del Currículum Vitae:

Julio Francisco Rufo Torres is a telecommunication engineer and PhD in telecommunication by Universidad de Las Palmas de Gran Canaria (ULPGC). He received the national award for the best PhD thesis in 2016 from the COITT. During his professional life he has worked in several private companies and public institutions always related to research, development and technology transfer in the telecommunications field. As educator, he has been part-time instructor at the ULPGC in the Telecommunications and Electronics Engineers School, at Universidad del Atlántico Medio and even at High School. With ULPGC institution he has participated in more than ten research projects as well as being the author or co-author of 19 papers in JCR journals and more than 20 contributions in national and international conferences.
In 2005 he began to work in the Department of Signals and Communications at the ULPGC as a junior engineer in the Photonics and Communications group. During this period, he was involved in several research projects. It is of special interest the work in the OWLS project, a contract between Instituto Nacional de Técnica Aeroespacial (INTA) and European Space Agency (ESA) in collaboration with the ULPGC. In this project, he worked on the phase II of the project, carrying out the design, assembly and programming of the EGSE module (Electrical Ground Support Equipment) for a Venus Express type satellite whose presentation was held in December 2008 at the headquarters of the ESA in the Netherlands.

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His research activities are in the area of optical wireless communications and more specifically within VLC (Visible Light Communications). His PhD thesis was about the services that this type of networks can offer to the users. The work carried out with companies such as INERZA, in the THOFU project, with GLOBALAN, in the BALDUR project and others tried to find a market niche for VLC technology. Some of the main journals publication has been Experimental evaluation of video transmission through LED illumination devices in IEEE Consumers Electronics in 2010, where a video transmission with a VLC link was implemented. Design and Implementation of an Ethernet-VLC Interface for Broadcast Transmissions in IEEE Communications Letters in 2010, where based on a FPGA an embedded system was implemented to get a general purpose VLC interface. BRDF Models for the Impulse Response Estimation in Indoor Optical Wireless Channels in Photonics Technology Letters in 2017, where modern infographics models, not only Phong model, where used to obtain wireless optical channel estimations.

As it can be seen the research activities in the last five years has been focus on VLC for IoT devices including the problem of low power consumption and the application of this technology in the automotive sector and in underwater environment. Regarding his work as head of the technical office at LIGHTBEE S.L. it is worth highlighting the achievement of several international patents as WO2014135184A1, System and method for the access to information contained in motor vehicles as well as being research responsible in several H2020 EU projects. The researcher Julio Rufo was nominally granted, in 2017, with a TORRES QUEVEDO, from the Ministry of Economy and Competitiveness, of more than 115,000 for the study of the viability of VLC technologies to the automotive sector.

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AYUDAS RAMÓN Y CAJAL
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Turno de acceso general

Nombre: HERNANDEZ LUZ, CARLES
Referencia: RYC2020-030685-I
Área Temática: Tecnologías de la información y de las comunicaciones
Correo Electrónico: carherlu@upv.es

Título:

Designing High-Performance Processor for Safety Critical Applications

Resumen de la Memoria:

During my research career I have worked in different aspects of the design of processors and processor
architecture in general and I have been the Principal Investigator in 4 European and 1 national research projects, and two contracts. I started with the design of on-chip interconnects like networks-on-chip and on-chip buses with special emphasis on the reliability aspects of the interconnection architectures (first at the Institute of Microelectronics Circuits in Hannover and later in UPV where I did my PhD). After completing my PhD studies in UPV I joined BSC due to my expertise on reliability aspects of processor design and my experience on RTL based processor design. Once at BSC I have gained deep experience on further aspects of reliability working in the VeTeSS ARTEMIS project and in providing real-time guarantees with complex processor designs like the PARMERASA and PROXIMA FP7 projects. At BSC I reached the Established Research Category (R3).

In 2015 I got a JIN grant (9% acceptance rate) from MINECO under the scope of which I was the principal
investigator of the TIN2014-60404-JIN PROPHER project (205K). I have developed a probabilistic processor
design IP that is licensed by Cobham Gaisler (check www.gaisler.com/leon3) after the appropriate agreement
with BSC. To achieve this end, I have collaborated with the space-domain processors design companies
Cobham Gaisler, and Airbus Defense and Space. The architecture I proposed has been also ported to the
NGMP Space domain processor in a research project funded by the European Space Agency. At BSC, I brought
the funds and was the IP of the H2020 RECIPE (405K) project. As the IP of the whole H2020 RECIPE
contribution I have worked on providing high-performance processors with real-time and reliability capabilities,
first from BSC side and now from UPV.

Currently, at UPV as a senior researcher, I am building a team and stablishing a new research line about highperformance computing processors for safety-critical systems. In total, I am supervising 9 researchers (6 at UPV and 4 at BSC). From UPV, I am coordinating the H2020 SELENE Project (~5M), I am the principal investigator at UPV side for the ECSEL FRACTAL project (402K), and I am also involved in two other H2020 projects (RECIPE, DEEPHEALTH). In 2019 I also started collaborating with the BSC working as in-house consultant for the H2020 European Processor Initiative. Since its creation in 2020, I am an active member of the Special Interest Group in Functional Safety from RISC-V International contributing to the definition of a safety processor blueprint. In general, I am using most of my knowledge to influence the way processors are built with the aim of easing the adoption of high-performance processor designs in safety-critical systems.

During my 12 years of career I have achieved an outstanding record of high-quality scientific publications that
includes 21 journals indexed in the JCR, >40 peer-reviewed international conferences, 11 workshops and/or
national conferences, and 2 book chapters. I have 8 Q1 and 8 Q2 journal publications according to the SCIMAGO Journal ranking and 7 A+ ranked and 18 A ranked conference papers (GII-GRIN-SCIE ranking). I have an H-index of 17 and 870 citations (according to google scholar January 2020).
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Resumen del Currículum Vitae:

Carles Hernández is senior researcher at UPV with expertise in reliable and time predictable processor design and collaborator researcher at the Barcelona Supercomputing Center (BSC). Previously (2012-2016) he was senior researcher at BSC. Currently, he is the technical coordinator and principal investigator of H2020 SELENE project targeting the design of an open-source high-performance processor design for safety critical systems. SELENE has a total budget of 5M and involves 11 partners including industry like Airbus and SIEMENS. At UPV he is also the principal investigator of the ECSEL FRACTAL activities. At BSC, he was the BSC principal investigator of the H2020 RECIPE project on predictive high-performance computing managing 415K of funding where he was also in charge of leading a work package (119 person months). He was also co-IP of a project funded by ESA. In 2015 he was granted with a Young Researcher Grant (205.000) by the Spanish MINECO to conduct research on high-performance and reliable processor design. Dr. Hernandez is research consultant for BSC in the context of the H2020 European Processor Initiative project. Carles Hernández is the Program Co-chair of the 17th SELSE Workshop, program committee member of McSoC since 2015, has served as session chair of several international events, and is member of RISC-V International.

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Turno de acceso general

During my career I have achieved an outstanding record of high-quality scientific publications that includes 21 journals indexed in the JCR, >50 peer-reviewed international conferences, 14 workshops and/or national conferences, and 2 book chapters. I have 8 Q1 journal publications according to the SCIMAGO Journal ranking and 7A+ ranked conference papers. 8 Q2 journal papers and 18 A-ranked conference papers. I have an H-index of 17 and 870 citations (according to google scholar January 2021). I have published papers with authors from at least 10 different countries coming from both the academia and the industry and from more than 25 different institutions.

Considering only the post-doctoral period (8 years), without any of my advisors, I have a scientific publications productivity of 25 high impact (>=A) international conferences and 17 Q1/Q2 journals (17 out of 21). One of my papers was amongst the top 4 papers in DAC 2018 (A+) out of 774 submissions received. I have received 5 HiPEAC paper awards and one HiPEAC technology transfer award, none of them with my advisors. I am serving with Professor Qiang Guang from Kent University as Program co-chair of the 17th edition of the SELSE 2021 workshop on dependable computing. In 2020 I was the chair of the DSN Workshop on High-performance computing platforms for dependable autonomous systems . I have been appointed session chair in DATE 2016, 2018, 2020, and 2021. I am program committee member of the McSoC conference since 2014.

Summary of Scientific Production
* 21 journals indexed in the JCR (8 Q1, 8 Q2)
* >40 peer-reviewed international conferences (7 Class1/A+, 18 Class 2/A GGS)
* 2 book chapters
* H-index 17, 870 citations (Google scholar January 2021)
* >140 citations/year in the last 3 years (2018-2020)
* 1 PhD Thesis, 5 Master, and 3 Bachelor students advised.
* Co-advising 5 PhD students from 2 different universities
* Papers with authors affiliated to institutions from at least 10 different countries.

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Turno de acceso general

Nombre: RUNOWSKI , MARCIN
Referencia: RYC2020-028778-I
Área Temática: Tecnologías de la información y de las comunicaciones
Correo Electrónico: runowski.marcin@gmail.com

Título:

Development of contactless, optical (nano)sensors

Resumen de la Memoria:

My research concern development of various remote, contactless, optical sensors of high and low (vacuum) pressure, temperature, refractive index, phase transitions, etc., including their synthesis, surface modification and structural, morphological and spectroscopic characterization, as well as their final utilization in scientific and technological applications. Most of the sensors are based on the optically active, lanthanide doped inorganic materials and nanomaterials exhibiting luminescence phenomena, which can be applied in the remote data transmission for rapid communication technologies. In my studies I developed many different optical sensors of pressure and temperature, working under extreme conditions, as well. Recently I developed the first luminescent (upconverting) sensor of vacuum, converting the luminescent thermometer into the vacuum sensor, utilizing the phenomenon of light-to-heat conversion, which is enhanced under vacuum conditions. I also work with plasmonic nanostructures, i.e. noble metal nanoparticles (mainly gold nanorods), including their synthesis and application as optical sensors of refractive index and phase transitions under high-pressure conditions. During my scientific career I performed 3 long-term abroad internships (Switzerland, Germany and Spain), and I was a laureate of a highly competitive Bekker Scholarship Programme - for scientists and academic professors employed at Polish universities and scientific units. The results of my research were presented in a form of 62 publications, cited 1257 times (h-index 22), 1 book chapter (Elsevier), over 110 communications/presentations during national and international conferences, as well as 1 patent and 2 patent applications. I am/was a principal investigator of 3 research projects (224 000   ), and a performer of 5 research projects in Poland (840 000   ).

Leadership, independence and management:

I`m a leader of the research group in Poland (Faculty of Chemistry, Adam Mickiewicz University), focused on synthesis, surface modification and detailed physicochemical characterization of optically active inorganic, luminescent and plasmonic (nano)materials. I am/was a principal investigator (PI) of 3 research projects. I`m a corresponding author of 20 articles, and the first Author of 28 publications.

Teaching, supervising and reviewing:

As an academic teacher I performed 725 hours, including theoretical classes and experimental laboratories. I`m a co-supervisor of 3 PhD theses; auxiliary supervisor of 3 BSc and 3 MSc theses; supervisor of 1 BSc thesis; reviewer of 1 BSc, 1 MSc and 1 PhD theses. I was a reviewer of 3 book proposals (Elsevier) and over 90 scientific reviews for the international journals.

Technology Transfer:

I`m an inventor of one patent (patent no. PL231125B1), concerning preparation of functional nanomaterials, and a co-inventor of two patent applications (P.424850; P.424851) concerning modification of cellulose microfibers with optically active nanostructures. It is worth noting, that I collaborate with Polish Institute of Aviation and the Photonic Institute in Poland, in order to combine the active sensor material with microelectronic components, and provide the miniaturized version (integrated microchip) of the developed vacuum sensor, in order to test and utilize the final gauge under the harsh conditions in space.
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Resumen del Currículum Vitae:

Dr Marcin Runowski
Age: 31
Citizenship: Polish
Address: 34 Osiedlowa street, Jerzykowo 62-007, Poland
Email: runowski@amu.edu.pl
Phone: +48 691963225

Graduation
PhD studies, chemistry, Adam Mickiewicz University in Poznan (AMU), Poland   2012-2016
MSc studies, chemistry, AMU, Poland   2011-2012

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Turno de acceso general

BSc studies, chemistry, AMU, Poland   2008-2011

Professional experience
Assistant professor in Faculty of Chemistry, AMU (Poland) since 01.02.2017
(permanent contract)

ORCID: 0000-0002-9704-2105; Scopus ID: 54894396500; ResearcherID: X-5396-2018

Citations: 1257 ; h-index: 22 ; i10-index: 39

- A co-author of 62 scientific articles in international journals, including one book chapter (Elsevier)
- Over 110 scientific communications at national and international conferences, including one Invited lecture in the ULL, Spain (2017)
- Co-author of 1 patent (PL 231125 B1) and 2 patent applications (P.424850 and P.424851)
- Principal investigator (PI) of 3 research projects (224 000   ) and co-investigator of 5 projects (840 000   ) in Poland
-Supervisor and reviewer of several BSc, MSc and PhD theses (13)
- Organizer of 5 scientific conferences
- Reviewer of 3 book proposals (Elsevier)
- Reviewer for the journals (over 90 reviews), e.g. Light Sci. Appl, Mater. Horiz., Small, Nanoscale, Adv. Opt. Mater., Adv. Mater. Technol., Adv. Photonics Res., ACS Appl. Mater. Interfaces, J. Phys. Chem. C, J. Mater. Chem. C, Dalton Trans., CrystEngComm, Sci. Rep., Sensors Actuators B Chem

List of the selected publications

1   M. Runowski (AC), in Handbook of Nanomaterials in Analytical Chemistry, ed. C. M. Hussain, Elsevier, 2020, 227 273 (book chapter)
2   M. Runowski (AC), P. Wozny, N. Stopikowska, et al., ACS Appl. Mater. Interfaces, 2020, 12, 43933. IF 8.758
3   S. Goderski, M. Runowski (AC), P. Wozny, et al., ACS Appl. Mater. Interfaces, 2020, 12, 40475. IF 8.758
4   K. Soler-Carracedo (AC), I. R. Martin, M. Runowski (AC), et al., Adv. Opt. Mater., 2020, 2000678. IF 8.286
5   T. Zheng, M. Runowski (AC), P. Wozny, et al., J. Mater. Chem. C, 2020, 8, 4810. IF 7.059
6   M. Runowski (AC), P. Wozny, S. Lis, et al., Adv. Mater. Technol., 2020, 5, 1901091. IF 6.072
7   M. Runowski (AC), S. Sobczak, J. Marciniak, et al., Nanoscale, 2019, 11, 8718. IF 6.895
8   M. Runowski (AC), P. Wozny, N. Stopikowska, et al., ACS Appl. Mater. Interfaces, 2019, 11, 4131. IF 8.758
9   M. Runowski (AC), N. Stopikowska, D. Szeremeta, et al., ACS Appl. Mater. Interfaces, 2019, 11, 13389. IF 8.758
10   M. Runowski (AC), P. Wozny, V. Lavín and S. Lis, Sensors Actuators B Chem., 2018, 273, 585 591. IF 7.100
11   M. Runowski (AC), A. Shyichuk, A. Tyminski, et al., ACS Appl. Mater. Interfaces, 2018, 10, 17269. IF 8.758
12   M. Runowski, J. Marciniak, T. Grzyb, et al., Nanoscale, 2017, 9, 16030. IF 6.895
13   M. Runowski, S. Goderski, J. Paczesny, et al., J. Phys. Chem. C, 2016, 120, 23788. IF 4.189

Internships

- 1 year (2019-2020) post-doc, and a series of short-term stays (4 months; 2017, 2019) in the group of Prof. Victor Lavin and Inocencio R. Martin, in the Faculty of Physics (ULL), Spain.
- 3 months (2015) in the group of prof. Michael Giersig - Freie Universität Berlin and Helmholtz-Zentrum (Germany, Berlin)
- 2.5 months (2008, 2010), in the group of prof. Alan F. Williams at the University of Geneva (Switzerland)

Languages

Polish C2
English C1
Spanish B2
Italian B1

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Turno de acceso general

Nombre: SOLER AZNAR, MARIA
Referencia: RYC2020-029015-I
Área Temática: Tecnologías de la información y de las comunicaciones
Correo Electrónico: maria.soler@icn2.cat

Título:

Nanophotonic label-free biosensors for precision medicine

Resumen de la Memoria:

Since the beginning of my scientific career, I have directed my interests towards the development of new nanotechnologies for bettering our daily life and medical care. My research mainly focuses on the development of nanophotonic biosensors as integrated analytical tools for advanced biomedical studies, point-of-care diagnostics, and therapy evaluation. My profile stands out by a strong multidisciplinary nature, including physics and optical engineering, material sciences, surface chemistry and biochemistry, and biomolecular and cell analysis. My work covers the whole development process for new enabling technologies, from the design and fabrication of novel sensor devices until the final validation in real scenarios within clinical settings. It is driven by a clear technology transfer vision, enriched through close collaborations with major stakeholders and end users, such as the biotechnology industry and public hospitals.

During my PhD (Catalan Institute of Nanoscience and Nanotechnology, ICN2, Spain), I carried out different scientific projects for developing nanoplasmonic biosensors for point-of-care clinical diagnostics. I demonstrated the unique potential of new integrated nanotechnology devices for the early diagnosis of cancer, rapid antibiotic allergy identification, or non-invasive gluten-free diet monitoring in celiac patients, among others. My expertise in photonics nanotechnology was further expanded during my international postdoctoral stage (Ecole Polytechnique Federale de Lausanne, EPFL, Switzerland). I managed and carried out a highly innovative and ambitious project to develop optofluidic nanosensors for live cell analysis. I worked on the design and integration of advanced microfluidic systems in powerful nanohole array technology for multiplexed clinical analysis and real-time cell activity monitoring, at the single cell level.

My current research line as Senior Researcher at the ICN2 is devoted to push the nanophotonic biosensor technologies beyond the state of art, incorporating new materials with exceptional recently discovered properties at the nanoscale, i.e. all-dielectric nanoresonators, and enhancing their applicability through the integration of novel graphene nanostructures and two-dimensional organ-on-a-chip interfaces. My research comprehends the main four work packages for biosensor development (nanophotonic sensor technology, lab-on-a-chip system engineering, surface biofunctionalization, and biomedical applications), introducing significant novelties through the rational engineering design, and with solid perspectives on the real impact in the scientific progress and innovation. The research program is envisioned as an interdisciplinary and translational project that will ultimately demonstrate the real application of novel nanotechnology in the emergent field of precision medicine for cancer and infectious diseases, including advanced diagnosis based on immunology studies, and the boost of personalized cell immunotherapies.

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Resumen del Currículum Vitae:

I am an Early Career Researcher specialized in photonics nanotechnology for health applications. I have received the highest quality training in top international nanophotonics research groups, where I have established a significant track record in nanoscience and biomedical engineering. Currently, I am a Senior Researcher of the Catalan Institute of Nanoscience and Nanotechnology (ICN2, Barcelona, Spain), where I lead my own research line while being immersed in important scientific projects in the laboratory, guiding a research team, and collaborating with Hospitals and Industry for technology transfer actions.

My professional research career started in 2011 at the ICN2, where I did my doctoral thesis under the supervision of Prof. Laura M. Lechuga. I graduated in April 2015 with a PhD in Biochemistry, Molecular Biology, and Biomedicine issued by the Universitat Autonoma de Barcelona (UAB). My PhD thesis was graded as Cum Laude, with an International Doctorate Mention, and it was recognized with the Extraordinary Doctorate Award (UAB 2015) and with the Pioner 2015 Award, granted by the CERCA Institution to doctoral thesis with high technology transfer component.
In May 2015, I moved to Switzerland, hired as a postdoctoral researcher in the laboratory of Prof. Hatice Altug at the Ecole Polytechnique Federale de Lausanne (EPFL). For three years (2015-2018), I was in charge of the bioapplications research line of the group, being responsible of conceiving and managing new scientific projects, supervising and mentoring several PhD, master and undergraduate students, and teaching in a EPFL Master.

In 2018, I returned to ICN2 (Spain) as a senior researcher in the group of Prof. Lechuga, thanks to a competitive contract from CIBER-BBN. Here, I am the Principal Investigator of a brand-new research line, funded through European, national and institutional scientific projects:

LEGOCHIP (ERA-NET), SensCELL (National Research Program GdC), and DIANA (ICN2 Severo Ochoa). I am directing two PhD thesis, supervising the research team, and teaching in a UAB Master. Also, I intensively participate as senior researcher in the European CONVAT project for COVID-19 diagnostic solutions.

I have published a total of 16 peer-reviewed articles (+ 1 under review) in top-ranked international journals (15 in Q1), 13 of them as first author or equal contribution, and 3 of them as corresponding author. My h-index is 10, with more than 600 citations. My work has been highlighted in journal covers, video-abstracts, and editorial features. I have also published outreach and dissemination articles for large-audience scientific magazines. I have participated as well in general television, radio, and press reports and interviews at local, national, and international level.

I have participated in prestigious international conferences, including an invited plenary session (POM 2021). I have also been invited to give seminars in Universities, high-schools, and primary schools.

Finally, I am also involved in other scientific activities, such as peer-review of articles, proposal evaluation for the Spanish Research Agency (AEI), I am member of the Internationalization Panel of the ICN2-Severo Ochoa Program, and I have participated in the organization and scientific committee for conferences and workshops.