



MINISTERIO  
DE ECONOMÍA  
Y COMPETITIVIDAD

## AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2014

Turno de acceso general

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SUBDIRECCIÓN GENERAL  
DE RECURSOS HUMANOS  
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**Nombre:** MARTINEZ MOZOS, OSCAR  
**Referencia:** RYC-2014-15029  
**Área Científica:** Ciencias de la Computación y Tecnología Informática  
**Correo Electrónico:** omozos@gmail.com

### Título:

Computer-Based Intelligent Technologies Applied to Service Robotics and People Assistance

### Resumen de la Memoria:

My areas of interest include artificial intelligence, machine learning, and computer vision applied to perception in service robotics, bioengineering, sensor interpretation, and assistive technologies. Currently, I work on the integrating the previous fields into the creation of computer-based intelligent technologies for improving quality of life (QoLTs).

I was a researcher at the Bioengineering Institute at Miguel Hernandez University (Spain) where I supported research on technologies to improve the quality of life of visual impaired people studying the principles of bio-inspired artificial retinas used to replace or partially recover damaged functionalities in the human visual system. In collaboration with the Medical University of Vienna I developed a new statistical test based on the Voronoi diagram and Monte Carlo simulations to study spatial relations between neural mosaics.

During my Ph.D. under the Supervision of Prof. Wolfram Burgard in the AIS group at the University of Freiburg, I worked as a researcher in the EU project Cosy where I did research on artificial intelligence and machine learning applied to the semantic perception and interpretation of indoor environments by services robots using different sensor modalities. This research established the foundations for the new line of research **semantic mapping** in the robotics community. Moreover, I participated in the design of a new artificial intelligence-based conceptual model for spatial representations that allowed a service robot to autonomously infer high conceptual models of indoor environments by interacting with people. In addition, I worked on people detection by developing a novel method based on Boosting to detect people in 2D range laser scans. Moreover, I did several contributions to computer vision applied to visual SLAM.

After my Ph.D. I was a Juan de la Cierva researcher at the University of Zaragoza, where I applied machine learning techniques to the design of intelligent assistive prosthesis using different bio-signals including EMG and EEG. During this period I also was a visiting researcher at the Technical University of Munich where I developed a 3D perception system based on probabilistic voting approach to interpret indoor environments. This system was tested in the humanoid service robots PR2 from Willow Garage and the TUM-Rosie.

During my JSPS research fellow at Kyushu University in Japan I worked on assistive technologies for elderly people, including research on ambient assisted living technologies applied to the informationally structured room. This room is equipped with a network of sensors and further supported by the humanoid robot SmartPal from the Yaskawa company. Currently I keep a position as collaborative researcher in Kyushu University in Japan.

All in all my research has resulted in more than 70 scientific outputs, and has established me as a well known scientist in the international research community.

### Resumen del Currículum Vitae:

#### Current positions:

- Lecturer, University of Lincoln, UK
- Collaborative researcher, Kyushu University, Japan

#### Education:

- PhD Computer Science (2008), University of Freiburg, Germany
- MSc Applied Computer Science (2005), University of Freiburg, Germany
- Advanced Studies Certificate (DEA, 2000), Miguel Hernandez University, Spain
- Degree Computer Science (Ingeniería en Informática, 1997), University of Alicante, Spain

#### International research and academic experience:

- 2012-2013 Researcher, Kyushu University, Japan
- 2010-2012 JSPS Postdoc Fellow, Kyushu University, Japan



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- 2009-2010 Juan de la Cierva Researcher, University of Zaragoza, Spain
- 2008 Visiting Researcher, University of Kyushu, Japan
- 2005-2008 PhD student, University of Freiburg, Germany
- 2002-2005 Student research assistant (HIWI), University of Freiburg, Germany
- 1999-2000 Researcher, Miguel Hernandez University, Spain
- Research collaborations with other 14 national and international research groups

#### Languages:

- Spanish, English, German, Japanese

#### (Co-)Supervision:

- 4 PhD students
- 8 BSc projects
- 4 MSc projects
- 3 research projects
- 2 summer student projects funded with £1000 each

#### Grants:

- Santander Mobility Award, 2013
- Canon Foundation in Europe Research Grant, 2008
- Japanese Society for the Promotion of Science (JSPS) Postdoctoral Fellowship for Overseas Researchers, 2010
- Jose Castillejo Grant, 2009
- Juan de la Cierva Grant, 2009

#### Project participation:

- Horizon 2020 project ENRICHME. Co-Investigator. 550K Euros for University of Lincoln
- JSPS Grant in Aid, Japan. Co-Principal Investigator. 2400K Yen
- EU FP6 project STRANDS. Collaborator
- EU FP6 project CoSy. Researcher
- SCOPE project, Japan. Researcher
- 4 Spanish national projects. Researcher
- Yaskawa Electric Corporation joint project, Japan. Researcher

#### Publications:

- h-index: 23. Citations: 1675. 3 papers over 150 citations and 12 papers over 50 citations (Google Scholar)
- Total of 63 scientific publications: 1 book, 5 chapters, 2 editorials, 20 journals, 33 conferences and workshops, 1 PhD thesis
- First author/Principal investigator in 26 publications
- 16 JCR indexed journal publications with 13 journals in Q1 according to JCR/SJR
- 1 paper in first-ranked journal in robotics (IJRR)
- 17 papers in top-ranked international conferences and workshops (EMBC, RSS, ICRA, IROS, AAAI, ICIP, IJCAI, ISRR)
- 15 top 20% most cited papers (for the corresponding year and publisher), 5 papers in top 5%, and 1 most cited paper
- One patent
- 13 invited talks
- High international recognition

#### Awards:

- Best Paper in the Machine Vision Workshop, EST-2014
- Finalist Best Student Paper, ICRA 2015

#### Services:

- Guest editor for top-ranked international journals: SORO, IEEE J-BHI



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- Reviewer for top international journals (TPAMI, T-RO, MVAP, RAS, SORO)
- Chairman/Program committee member for international and national conferences and workshops (including top-ranked RSS, ICRA, IJCAI)
- Reviewer for top international conferences (ICRA, IROS, ECMR, IJCAI, RSS, RO-MAN, ICPR)

Accreditations:

- ANECA: Profesor Contratado Doctor, Spain
- Higher Education Academy (HEA) Associate Fellow, UK



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**Nombre:** RUIZ COSTA-JUSSA, MARTA  
**Referencia:** RYC-2014-15907  
**Área Científica:** Ciencias de la Computación y Tecnología Informática  
**Correo Electrónico:** martaruizcostajussa@gmail.com

### Título:

Hybrid Machine Translation

### Resumen de la Memoria:

The applicant's research experience has been mainly in Machine Translation (MT). Additionally, she has experience in related areas such as Automatic Speech Recognition (ASR) and Information Retrieval (IR). The applicant has been one of the main leaders in MT by: pushing Ngram-based translation; proposing novel methods of reordering; using neural networks and vector-space models; developing hybrid methods (specially, adding linguistics in statistical MT) and experimenting with Chinese-Spanish.

The applicant's research career started in January 2004 in LIMSI-CNRS (Paris) taking her final degree project. Her research work focused on developing text normalization techniques, which highly reduced the word error rate in ASR. The applicant did her PhD (2004-2008) at the UPC (Barcelona) under an FPU grant. Her PhD focused on the definition and experimentation of novel algorithms for building a correct structural reordering for translated words. Moreover, challenging techniques regarding language modeling and system combination were successfully applied to state-of-the-art SMT systems. The applicant did an internship in LIMSI-CNRS working in smooth bilingual translation. In April 2009, the applicant started a Juan de la Cierva in the Fundació Barcelona Media. The main objective was to conduct research on innovative techniques for cross-language IR and their possible use on MT. The applicant also received a mobility grant BE-DGR-2010 financed by the Generalitat de Catalunya for an internship at the Institute for Infocomm Research (I2R) in Singapore. She visited the Universidade de São Paulo under a FAPESP Visiting Professor Program working on MT applied to IR. In December 2012 the applicant moved to Singapore supported by an International Outgoing Fellowship Marie Curie Action to develop her proposed project on Integrating Machine Translation Paradigms (IMTRAP). The aim of the research was to promote corpus-based methods and technologies that combine linguistic knowledge with data resources and algorithms from the general approaches to MT: rule-based MT and statistical MT. Under this fellowship, the applicant has worked in I2R, Instituto Politécnico Nacional (Mexico) and UPC.

The applicant's research includes 24 publications in journals indexed in JCR/ISI and 76 other publications in books, international journals and conferences. Taking advantage of her experience, the applicant proposes to work on a novel MT paradigm under a connectionist framework. The proposed architecture will create an interlingua (universal) representation of all languages. This research line will have a high impact on the vast multilingualism area.

### Resumen del Currículum Vitae:

Marta R. Costa-jussà got her PhD (with honors) by Universitat Politècnica de Catalunya (UPC) at the age of 26. She has a high international experience supported by the fact that she has worked as a researcher in 5 different countries including France, Spain, Brazil, Singapore and Mexico; she has done 20 invited talks and directly worked and co-operated with research groups from 11 different countries (US, France, Germany, Ireland, Italy, Spain, Lithuania, Singapore, Qatar, Brazil and Mexico) and taught and mentored students in 4 different countries. Outstanding international co-operations include names and institutions such as: Jean-Luc Gauvain from LIMSI-CNRS, Hermann Ney from RWTH Aachen, Chris Quirk from Microsoft Research, Holger Schwenk from University of Le Mans, Haizhou Li from Institute for Infocomm Research, Marcelo Finger from Universidade de São Paulo, Alexander Gelbukh from Instituto Politécnico Nacional, Paolo Rosso from Universidad de Valencia; Lluís Màrquez from Qatar Foundation and Srinivas Bangalore from AT&T Labs.

Marta counts with many quality research publications: 24 journal papers indexed in JCR/ISI; 12 other journal papers; 59 international conferences or workshops; and 5 books or chapters. She has over 600 cites (based on Google Scholar Citations). She is currently editor of 1 book accepted for publication in Springer and guest editor of special issues in Computer Speech and Language and Journal of Artificial Intelligence Research (both journals indexed in JCR/ISI). She has participated as program committee in international conferences and workshops and reviewed in indexed JCR/ISI journals. She has taught 3 courses in international summer schools and done 18 invited talks -in recognized research centers, associations (such as IEEE) and universities around the world- which include 2 tutorials in international conferences, 2 keynotes and 1 round table. Currently, she is developing a MOOC course, which has received a competitive grant from the AGAUR. She is co-author of a Technology Disclosure in Institute for Infocomm Research (Singapore), which is in process of patenting. She has experience as a consultant of companies such as BMMT, UniversalDoctor and Tauyou. She is one of the main promoters of the (under construction) Chinese-Spanish MT on-line translator at [www.chispa.me](http://www.chispa.me).



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She has received prestigious and competitive fellowships (which have between 5-20% of success rate) like: FPU and Juan de la Cierva, BEDGR (Grants for Abroad Research, from Catalonia), FAPESP Visiting Professor (from São Paulo research foundation) and an IOF Marie Curie Action (from the European Commission). She has participated in 13 research projects including European and national from Spain, France and Brazil. Her research has received prizes including ♦Best Paper♦ from Red de Tecnologías del Habla, ♦Best Demo Award♦ from Iberspeech 2012 Microsoft and Iberspeech 2009. Other achievements in other fields include the publication of a novel at the age of 17 in a leading publisher and the publication of a paper in the large Spanish newspaper El País.



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**Nombre:** ALCARAZ TELLO, CRISTINA  
**Referencia:** RYC-2014-16031  
**Área Científica:** Ciencias de la Computación y Tecnología Informática  
**Correo Electrónico:** alcaraz@icc.uma.es

### Título:

Research achievements: Extended abstract

### Resumen de la Memoria:

As stated in the attached memory, her research career has always been linked to the issues and challenges belonging to the field of Critical (information) Infrastructure Protection (CIIP), and more specifically to the protection of the control systems in charge of monitoring other critical infrastructures. This research line has been developed through the following lines of research:

- (i) WASA, aimed at prevention, detection, response and recovery for self-healing.
- (ii) Controllability, observability and protection measures through the structural controllability method and power dominance using the capacities of the Power Dominating Set (PDS) technique.
- (ii) Power network stability through resilience and WASA solutions.

Within the CIIP field, there exists a special motivation in defending particular application contexts, such as SCADA systems, control substations, power networks and Smart Grid environments, and through a set of technologies for protection such as: the Internet for remote control; cloud computing for maintaining backup instances and ensuring data recovery; and wireless networks for local control such as mobile Ad-hoc networks, with particular focus on Wireless Sensor Networks (WSNs) and industrial WSNs.

Her research career on CIIP started with her doctorate in 2007. The thesis was structured in three different execution phases: (i) knowledge acquisition by looking at specific security and protection aspects and SCADA systems; (ii) research on topics of observation and warning through the study of alarm management systems, sensory technologies such as WSNs, and standards; and (iii) research on themes of situational awareness and prevention through the design of preventive approaches based on early warning systems.

Three months after her VIVA (2011), she worked for the NIST's Division Computer Division to deal with topics related to the security and protection of Smart Grid environments. During her visit, she contributed with members of the NIST and participated in the Smart Grid Interoperability Panel-Cybersecurity Working Group and the SGIP 2.0 Smart Grid Cybersecurity Committee to provide feedback and advice on aspects of security and protection in Smart Grid domains, covering both control systems and substations.

In 2012, she started her fellowship (2012-2015), visiting at the Royal Holloway University of London (RHUL) for two years (Aug. 2012-Aug. 2014) and under the supervision of Professor Stephen Wolthusen, with whom she still collaborates and contributes, today. This collaboration was endorsed by the modelling and simulation of large virtual control networks, created through the structural controllability and the dominance technique called PDS. Through these networks, she experimented numerous attacks and provided several restoration heuristics. This visit was key to additionally contribute with other International researchers and collaborate in the development of the FACIES European project for the exploration of stealth attacks, in the organisation of several International events, the editing of papers, and in the elaboration of project proposals under evaluation (e.g., CHIST-ERA or DG-HOME Affairs).

Today, C. Alcaraz continues her fellowship in the University of Malaga (Aug. 2014-Aug. 2015) under the supervision of Profesor Javier Lopez, with whom has actively contributed throughout her research career.

### Resumen del Currículum Vitae:

Cristina Alcaraz is currently a Marie-Curie postdoctoral researcher, working in the Network, Information and Computer Security (NICS) Lab research group of the University of Malaga (UMA). She visited the Royal Holloway University of London (U.K.) for two years (Aug 2012 - Aug 2014) and was guest researcher in the U.S. National Institute of Standards and Technology (NIST) from November 2011 to July 2012. She was awarded her PhD in Computer Science by the University of Malaga in 2011, and her M.Sc. degree in Computer Science by the same university in 2006. Moreover, she obtained her specialist degree in Information Theory and Coding from UNED (Universidad Nacional de Educación a Distancia) in 2013.

C. Alcaraz is co-author (principally as first author) of approximately 40 papers published in different journals (most of them as JCR) and conferences in her area of expertise. Likewise, she is currently a co-advisor of an ongoing PhD thesis by L. Cazorla (UMA), focusing on prevention and protection aspects for Smart Grid control environments, in addition to co-supervising two master's thesis, one of them



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awaiting its final assessment.

Regarding her collaboration in projects, the candidate is (and has served) as an external advisor and as an active researcher in 4 European Projects (FACIES, SMEPP, ♦), 20 national research projects funded by the different Spanish governmental institutions (Industrial, Educación, Ciencias e Innovación, Junta de Andalucía ♦) where it is important to stress her participation in three CICYT projects (SPRINT, PERSIST and CRISIS), two of the Junta de Andalucía (PISCIS and FISICO) and one CONSOLIDER (ARES), as well as four research projects under contract (TIGRIS, ATENEA, ♦).

She is a member of 8 journal editorial boards, for example, the Computers & Electrical Engineering Journal, where she also worked as guest editor and was awarded ♦one of the top performing reviewers♦ in 2010. She has served as program committee member of about 90 international conferences related to Information Security and CIIP, has participated in the organisation of 10 international events (6 as publicity chair), and has worked as an external reviewer in 22 conferences, as well as reviewer of more than 30 international journals.

The applicant is (and has been) a member of the technical program committee of around 90 international conferences related to her research areas, such as CRITIS, CPSS, ISPEC, Inscrypt, TrustComm, TrustBus, among others (cf. the attached CVN for more information). She is also a member of the Editorial Board of the Ad Hoc Networks journal, Journal of Computer Science, European CIIP Member Newsletter, Computers & Electrical Engineering Journal, Revista Ibérica de Sistemas y Tecnologías de Información, Information Security Journal: A Global Perspective, and the International Journal of Information and Network Security; and she belongs (or has belonged) to associations and working groups such as AENOR, SIGP-CSWG and the SGIP 2.0 Smart Grid Cybersecurity Committee, IFIP Working Group 11.10 on Critical Infrastructure Protection, CryptoRed, ISA or IEEE.

She has attended approximately 25 international conferences and 6 national conferences, and has participated in 13 specialised training courses. For further details, see: <http://www.nics.uma.es/alcaraz>



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**Nombre:** FORNES BISQUERRA, ALICIA  
**Referencia:** RYC-2014-16831  
**Área Científica:** Ciencias de la Computación y Tecnología Informática  
**Correo Electrónico:** afornes@cvc.uab.es

### Título:

Análisis y Reconocimiento de Documentos Manuscritos

### Resumen de la Memoria:

My research career in the field of Computer Vision started with the PhD on Computer Science at the Universitat Autònoma de Barcelona. My thesis work was focused on symbol recognition and writer identification of music scores, which received the best thesis award 2009-2010 from the IAPR-AERFAI (Image Analysis and Pattern Recognition Spanish Association).

After the PhD, my research interests moved towards handwriting recognition, although the research on graphics recognition was still active. I organized two competitions on music scores in international conferences, and since 2011, I am the newsletter editor of the IAPR-TC-10 ("IAPR Technical Committee on Graphics Recognition").

I am currently a postdoctoral researcher at the Computer Vision Center, focused on the recognition of historical text manuscripts. I am working under the framework of the European ERC Project "5CofM: Five Centuries of Marriages", being the responsible of the handwriting recognition task. I am the co-supervisor of 3 PhDs works on this topic (2 finished, 1 PhD in progress). Concerning the recognition of handwritten documents, I have stable collaborations with researchers from the University of La Rochelle (France), the University of Florence (Italy), INSA Lyon (France), Uppsala University (Sweden) and the University of Montreal (Canada). I have given talks at several Universities abroad, international Seminars, Tutorials and Summer School.

From the collaboration with the document analysis research group, I have participated in 14 projects (including 2 European projects). I am the principal investigator of 2 competitive research projects and one technology transfer project. My interest in technology transfer is mainly in the field of handwriting recognition. In June 2013 I was acting as a consultant for the company "Icar Vision Systems" referring the automatic recognition of documents. Moreover, in April 2014, I started the co-supervision of an industrial PhD student with the company "Scytl Secure Electronic Voting", focused on handwriting recognition in heterogeneous election documents.

I have published 12 journal articles indexed at ISI-JCR (6 of them in the first Quartile), and 36 conference papers. According to Google Scholar, I have about 600 citations, with h-index=14. My current research interests include document analysis, graphics recognition, historical documents and handwriting recognition.

### Resumen del Currículum Vitae:

Alicia Fornés received the PhD degree on writer identification of old music scores from the UAB in 2009. She was the recipient of the AERFAI best thesis award. She is currently a postdoctoral researcher at the Computer Vision Center, supervising 3 PhD theses (2 finished, 1 in progress). She is the newsletter Editor of the IAPR TC-10 (International Association for Pattern Recognition, Technical Committee 10 on Graphics Recognition). She has done research stays at the University of Bern (Switzerland), University of La Rochelle (France), Osaka Prefecture University (Japan), Uppsala University (Sweden). She has given talks at several Universities, Workshops, Tutorials and Summer School. According to Google Scholar, she has 600 citations, with h-index=14.

She has participated in 14 research projects, including two European projects:

- Five Centuries of Marriages. Advanced Grant of the European Research Council. 2011-2016 (1.847.400 €).
- Administrative Document Automate Optimization. 7th framework program of European Union. 2009-2013 (363.182 €).

She is the head researcher of 2 competitive research projects and 1 technology transfer project:

- Election Optical Tabulator. Ministerio de Industria, Energía y Turismo, Avanza I+D. 2014-2015 (150.000 €).
- Center of Competence in ubiquitous interpretation of images of visual alphabets. Generalitat de Catalunya. 2011-2013 (14.570 €).
- Sistema para traducir rollos de pianolas a Midi. Dept. de Musicologia de la UAB. 2012-14 (16.000 €).

Awards:

- Best paper of the International Workshop on Document Imaging and Processing (HIP), 2013.
- Best thesis award 2009-2010 by the IAPR-AERFAI (Spanish branch of the International Association for Pattern Recognition).





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- Best paper of the Iberian Conference on Pattern Recognition and Image Analysis, 2007.

She has published 36 conference papers and 12 journal articles (6 in the first Quartile):

- J.Almazán, A.Gordo, A.Fornés, E.Valveny. Word Spotting and Recognition with Embedded Attributes. IEEE PAMI,2014.
- D.Fernández, J.Lladós, A.Fornes. A graph-based approach for segmenting touching lines in historical handwritten documents. IJDAR,2014.
- J.Almazán, A.Gordo, A.Fornes, E.Valveny. Segmentation-free Word Spotting with Exemplar SVMs. PR,2014.
- V.Romero, A.Fornés, et al. The ESPOSALLES Database: An Ancient Marriage License Corpus for Off-line Handwriting Recognition. PR,2013.
- A.Gordo, A.Fornés, E.Valveny. Writer identification in handwritten musical scores with bags of notes. PR,2013.
- J.Lladós, M.Rusiñol, et al. On the influence of word representations for handwritten word spotting in historical documents. IJPRAI,2012.
- J.Almazán, A.Fornés, E.Valveny. A non-rigid appearance model for shape description and recognition. PR,2012.
- A.Fornes, A.Dutta, et al. CVC-MUSCIMA: A Ground-truth of Handwritten Music Score Images for Writer Identification and Staff Removal. IJDAR,2012.
- S.Escalera, A.Fornes, et al. Circular Blurred Shape Model for Multiclass Symbol Recognition. IEEE SMC-B,2011.
- A.Fornes, J.Lladós, et al. A combination of features for symbol-independent writer identification in old music scores. IJDAR,2010.
- A.Fornes, J.Lladós, et al. Rotation invariant hand-drawn symbol recognition based on a dynamic time warping model. IJDAR,2010.
- S.Escalera, A.Fornés, et al. Blurred Shape Model for Binary and Grey-level Symbol Recognition. PRL,2009.



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**Nombre:** KOPF , BORIS  
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**Área Científica:** Ciencias de la Computación y Tecnología Informática  
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### Título:

Reasoning about Side channels in Cryptographic Protocols

### Resumen de la Memoria:

The pervasiveness of software systems opens up tremendous opportunities for society, economy, and individuals, but it also exposes users to new threats against their security and privacy. Cryptographic protocols are a key enabler for counteracting these threats, because they can achieve secure and private computation and communication in adversarial contexts.

To apply cryptographic protocols means to implement them. Unfortunately, there is a considerable gap between the implementations of cryptographic protocols and the abstract models of computation that are used for reasoning about their security. This gap explains why we are faced with novel attacks on a regular basis, even against protocols that are proven to be secure: To abstract from implementations details such as memory layout, error messages, and execution time means to abstract from attack vectors such as Heartbleed, padding oracles, or timing side-channels, respectively.

My research aims to deliver the foundations and tools that are required for establishing the security of cryptographic protocols, based on executable code and accurate models of the platforms on which they are executed.

My central contributions towards this goal are threefold:

1) I contributed the first method for the precise and automatic computation of information-theoretic confidentiality properties of programs. The method relies on the computation of the confidentiality property as a logical assertion over program variables, and a subsequent quantification step based on counting the models of that assertion. I showed how existing techniques for software verification and model counting can be leveraged for automating this process. This insight opened up an active line of research that leverages and extends both kinds of techniques for the problem.

2) I pioneered the quantitative information-flow analysis of side-channel attacks, which are exploits that leverage information that is revealed by physical characteristics of the programs' execution. This research led to the first countermeasure against RSA timing attacks that is provably secure and efficient at the same time, and to CacheAudit, the first tool for the automatic, static quantification of cache side channels. In particular, CacheAudit was able to establish the first proofs of security of commonly suggested countermeasures against AES cache attacks, based on executable code and accurate cache models.

3) I contributed the first program logic for reasoning about differential privacy, a quantitative confidentiality guarantee that is suitable for protecting personally identifiable information. One highlight of this work is the first machine-checked proof of the Laplacian mechanism, which is the key enabler for achieving differential privacy in practical systems.

### Resumen del Currículum Vitae:

A) I have served/am serving on the program committee of the most important venues in foundations of computer security and programming languages, such as

1. ACM Symposium on Principles of Programming Languages (POPL) 2016
2. IEEE Computer Security Foundations Symposium (CSF) 2011, 2013, 2014, 2015
3. ETAPS Conference on Principles of Security and Trust (POST) 2013, 2015
4. International Conference on Quantitative Evaluation of Systems (QEST) 2011, 2013, 2014, 2015

B) I have published 24 papers in international, peer-reviewed conferences and journals, including flagship venues such as the IEEE Symposium on Security and Privacy, the USENIX Security Symposium, the ACM Conference on Computer and Communications Security, the IEEE Computer Security Foundations Symposium, the Internet Society's Network and Distributed Systems Symposium, the ACM Symposium on Principles of Programming Languages, and the International Conference on Computer Aided Verification. My publications have so far attracted 735 citations and amount to an h- index of 14, according to Google Scholar.



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C) I have won a competitive grant from Microsoft Research for funding a PhD student (100.000EUR), a fellowship from the EU FP7 Marie Curie Action AMAROUT (68.000EUR), and prestigious scholarships from the German National Academic Foundation and the German Academic Exchange Service. I have participated in several roles in European, Spanish national, and Madrid regional projects.

D) I have given 3 invited keynotes at international workshops, 4 invited tutorials at international conferences and summer schools, more than 20 invited talks at universities and research institutes, and more than 10 presentations at international conferences.

E) I have received the Venia Docendi of the Universidad Politecnica de Madrid. I have so far taught 14 lectures, seminars, and tutorials at UPM, ETH Zurich, and Saarland University. I am currently supervising 1 Ph.D. thesis and have so far supervised 3 M.Sc. theses, 4 B.Sc. theses, and 9 internships and semester theses.



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**Nombre:** GOÑI CORTES, JOAQUIN  
**Referencia:** RYC-2014-15636  
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### Título:

Conectividad y Redes Complejas en el Cerebro Humano

### Resumen de la Memoria:

Mi trayectoria de investigación ha estado basada en el estudio de distintas sub-áreas de las Ciencias de la Computación (incluyendo especialmente aquellas relacionadas con Sistemas Complejos) y en su aplicación a sistemas relacionados con el ser humano (incluyendo expresión génica, cognición y lenguaje, neurociencias y neuroimagen y enfermedades neurodegenerativas). Este tipo de aproximaciones requirió de una amplia profundización en materias tales como teoría de grafos, teoría fractal, teoría de la información y procesos de Markov y también del aprendizaje de conocimientos relacionados con Biología y Neurociencias. Fruto de este interés, a lo largo de mi carrera e interactuado con investigadores nacionales e internacionales procedentes de otras áreas como Biología, Neurociencias, Psicología, Física e Ingeniería, con el consiguiente enriquecimiento personal y profesional.

En los últimos años, mi principal línea de investigación ha sido el estudio del cerebro humano desde el punto de vista de estructura, conectividad y función. Es decir, tratar de comprender relaciones entre el Conectoma Humano y la actividad neural a lo largo de la corteza cerebral. Dicho interés se extiende a estadios de salud, envejecimiento, neurodegeneración y otros fenómenos que de una u otra manera alteran el equilibrio de estructura y función tanto en sustancia blanca como en sustancia gris, y que también afectan a capacidades cognitivas del ser humano (como por ejemplo memoria a corto plazo, memoria episódica, funciones ejecutivas o toma de decisiones). Esta línea de investigación ha tenido como principales elementos de modelización a la teoría de grafos, la teoría fractal y la teoría de la información, y se podría englobar en las áreas de Neurociencia Computacional y Neuroinformática. Además, cabe destacar mi constante interés por el desarrollo teórico de medidas basadas en teoría de grafos y en teoría de la información que permitan cuantificar distintas propiedades de sistemas complejos.

El constante desarrollo de tecnologías para la adquisición de datos referentes a la estructura y función del cerebro humano está dando lugar a un camino de largo recorrido para áreas de investigación tales como la Neurociencia Computacional, la Neuroinformática y la aplicación de técnicas basadas en Sistemas Complejos. Es en este ámbito donde voy a continuar mi carrera científica, y el motivo de mi candidatura a esta convocatoria ♦Ramón y Cajal♦, con el fin de traer mi experiencia y conocimiento a una institución española donde poder conformar un grupo de investigación.

### Resumen del Currículum Vitae:

Mi formación académica incluye Ingeniería Superior en Informática (San Sebastián, Octubre 2003), así como la obtención del título de Doctor por el Departamento de Física y Matemática Aplicada de la Facultad de Ciencias de la Universidad de Navarra (Pamplona, Diciembre 2008). Durante el doctorado, realice tres estancias en otros centros. Dos de ellas en Harvard Medical School (2006,2007 Computational Biology Initiative) y otra en la Universitat Pompeu Fabra (2008 Ricard V. Solé, Lab. de Sistemas Complejos). Tras la obtención del doctorado, realice un post-doctorado en el Laboratorio de Neuroimagen del Departamento de Neurociencias del Centro de Investigación Médica Aplicada (2009-2011) y obtuve una posición como Research Associate (Junio 2011, hasta Junio 2014) en Department of Psychological and Brain Sciences de Indiana University en Bloomington, Indiana, USA, dirigido por el profesor Olaf Sporns. Tras promocionar en ese mismo lugar a Assistant Research Scientist, desde Agosto 2014 tengo una posición en Indiana University Network Science Insititute como Associate Research Scientist.

Esta trayectoria en diversas instituciones me ha permitido publicar 35 artículos (9 de ellos de primer autor, y tener un total de más de 750 citas; fuente: Google Scholar) en revistas internacionales, en su mayoría de primer cuartil, incluyendo revistas de alto impacto de interés general (3 en PNAS, 4 en PLoS ONE, 1 en Journal of the Royal Societe ♦ Interface), de Sistemas Complejos (Phisical Review E, Network Science), de Biología de Sistemas (2 en BMC Systems Biology), y de Neurociencias y Neuroimagen (1 en Journal of Neuroscience, 5 en NeuroImage) entre otras.

En lo respecta a actividad docente, he impartido más de 300 horas lectivas en la Universidad de Navarra bajo distintas figuras (Profesor Ayudante, Profesor Adjunto y Profesor Asociado). Fruto de esta actividad investigadora y docente, obtuve acreditación por la ANECA en Ciencias de la Computación para Profesor Ayudante Doctor y Profesor Contratado Doctor (Mayo 2012).



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Toda esta actividad investigadora y docente ha sido desarrollada con diversas becas y contratos, entre los cuales caben destacar dos conseguidos mediante convocatoria pública: beca del Gobierno de Navarra para el desarrollo de tesis y contrato postdoctoral del Ministerio de Educación y Ciencia para una posición postdoctoral en Indiana University.

Finalmente, en lo que se refiere a proyectos internacionales, he participado como colaborador en el proyecto Europeo EU 6thFP - Complex Dis♦ COMPLEXDIS (ref. NEST-043241) ♦Unravelling Complex Diseases with Complexity Theory: from Networks to the Bedside, donde aplicamos conceptos de teoría de grafos y Biología de sistemas en procesos autoinmunes, y en el proyecto Brain Network Recovery Group (Brain NRG) Phase II - The Virtual Brain Project, financiado por la James S. McDonnell Foundation (ref. JSMF22002082) donde aplicamos teoría de grafos y modelos neurales para simular y predecir conectividad funcional.



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### Título:

Combining Web and Mobile technologies

### Resumen de la Memoria:

I am active in two research lines: the Web and Mobile Computing, with red threads: use of Semantic Web technologies, and adaption, personalization & contextualization.

My work on the Web covers the complete engineering cycle of Web applications, from requirements to code & deployment. I am the main contributor of the Web Semantics Design Method (WSDM), and later contributed to other frameworks such as Hera-S (TU Eindhoven), OOH and OOH4RIA (University of Alicante), and OOWS (Politecnical University of Valencia). Within and outside the context of these methods, I tackled several topics, with focus on the use of Semantic Web technologies, and adaptation, personalization & context-awareness. For the first, I showed the benefits of ontology-driven web engineering. This includes automatic generation of semantic annotations, rendering websites accessible for the visually impaired, improving adaptation and adding context-awareness to existing websites. For the latter, I developed techniques to automatically correct flawed website structures, formally described adaptation, proposed personalization strategies and adaptation patterns, explored personalization in RIAs, described how to render existing websites context-aware, and innovated website adaptation using aspect-oriented programming. I also tackled issues such as requirement engineering, ontology evolution and localization. Currently, my Web research covers specific challenges in RIAs, semantics and linked (open) data, with focus on mobility, context-awareness, web augmentation, and technical issues related to HTML5. I am also applying semantic web technology to other fields, such as enterprise IS and GIS. My recent work in this research line received 1 best paper nomination and 1 best demo award and was published in ACM Transactions on the Web (JCR Q1).

5 years ago, I initiated a research line in mobile computing, where the aim is to connect the physical and virtual world using sensing/detection technologies and (semantic) Web technologies. I developed SCOUT, a novel mobile framework for context- and environment-aware applications. Under the umbrella of SCOUT, I explored (semantic) mobile querying and mobile data management, and develop a novel mobile semantic querying engine to query (millions of) small RDF(S) sources. Next, I showed how this query engine can be employed to develop environment-aware mobile applications, by exploiting semantic and social data. My current research in mobile computing is in the context of smart cities, and focuses on mobile services, e.g., the development of unobtrusive mobile services and mobile, semantic service detection and composition. I am also applying my knowledge to advance mobile GIS. My recent work in Mobile Computing received 2 best paper awards (1 CORE A conference) and was published in IEEE Internet Computing (JCR Q1).

Finally, I am combining my expertise in Web and Mobile Computing to create a symbiosis between methods, techniques and technologies developed and used in both fields. This is leading to useful results, where context information captured by mobile users enhances usability of state-of-the-art Web applications, semantic data are used to facilitate mobile apps to integrate and query environment data, and to describe, detect and use ambient services in a mobile environment. Among others, this work was published in 3 CORE A conferences.

### Resumen del Currículum Vitae:

I obtained my Phd (2005, highest honors) and master degree (1999, high honors) in Computer Science from the Vrije Universiteit Brussel (VUB), Belgium. I worked 6 years as a research & teaching assistant, and 5 years as a post-doc at VUB. As a post-doc, I initiated a new research line in Mobile Computing, and led the mobile computing group at VUB (2 phd students, several master students). Next, I was awarded a European Marie Curie IEF personal fellowship (one of the EU's most prestigious and competitive), based on CV and research proposal. The Marie Curie grant was performed at the Universidad Politécnica de Valencia (UPV), 2010-2012. At UPV, I led the Web Engineering research group (1 post-doc, several master students). Next, I became a full-time professor at VUB (2012-2013), where I was director of the Information Systems research group (1 post-doc, 2 phd students, 10 master students). Since October 2013, I am a post-doc at the Universitat Jaume I, Castellon, where I initiated research lines in Web and Mobile Computing in the GEOTec group. I combine this with a 10% professor position at VUB, and since 2014 I am also co-owner & Chief Scientific Officer of the start-up spin-off company UBIK. Throughout my career, I wrote the scientific part for my respective research group in 4 EU projects (1 FP7 STREP, 1 FP7 IEF Marie Curie, 1 Horizon2020 Marie Curie ITN network, 1 Erasmus+) and 6 national projects, for a total of +/- 2M EURO allocated budget for my research group (1,3M EURO in the past year). I participated in 9 EU projects (FP4, FP5, FP7 Marie Curie, FP7, FP7 STREP, ESPON, Erasmus+ and Lifelong Learning) as WP & task leader, manager or researcher, and 5 national projects. I was director of 1 phd thesis (finished 2013), and 30+ master theses; I am currently directing two phd students.



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I published 2 books, 2 book chapters, and 40+ articles in int. journals, conferences and workshops, including all top venues in the field: Journal of Web Semantics (impact factor 3.410, Q1 ranked 2/84), IEEE Internet Computing (impact factor 2.514; Q1 ranked 7/99), ACM Transactions on the Web (impact factor 1.595, Q1, ranked 21/105) and 13 CORE A conferences. I have a combined citation count of 902, my top 5 publications are cited 102, 81, 69, 60, 51 times. My recent research (2011-2014) received 2 best paper awards (1 CORE A conference), 1 best paper nomination and 1 best demo award in int. conferences.

I am internationally considered an expert in my field of expertise. I was PC Chair of the ICWE conference (CORE B), PC Track Chair of MobiWIS 2014 and ICWE 2015, and demo chair at ICWE (CORE B, 3x) and RCIS (1x). Since 2006, I coorganize a yearly int. workshop (AEWSE and Composable Web series, EMOTions; 10 in total). Since 2004, I edited 1 int. conference proceeding, 10 workshop proceedings and 1 special issue of a JCR ranked journal (JWE). I am a PC member for over 50 int. conferences and workshops, including most top venues in my field, and reviewer for several JCR-ranked journals. Since 2004, I have given 13 invited talks in 10 int. universities, and 1 keynote talk at an int. conference (ICWE 2009). Since 2007, I acted as jury member in 9 Phd commissions in 5 different universities. Since 2008, I acted regularly (8x) as scientific expert and reviewer for the Belgian government, judging research proposals with budget between 0,1M and 2M EURO.