



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

Nombre: GANTY , PIERRE
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Área Científica: Ciencias de la Computación y Tecnología Informática
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Título:

Algorithmic Analysis of Infinite-State Systems

Resumen de la Memoria:

Computers are invading our lives: cars, thermostats, pacemakers, toys, etc. A bad design decision, an unforeseen use case, poor security or a programming error, to cite a few causes, can lead to catastrophes. Those problems often go undetected until end users interact with the product. How prevent these problems before the product is in the hands of end users? Because of the number of possible scenarios is too large, testing the system provides insufficient guarantee about its functional correctness. One approach is to build an idealized mathematical model of the system and exhaustively analyze all of its possible behaviors to ensure they comply with the designer's intentions.

My research aims at performing such compliance checks between a system implementation and a designer specification. In simplistic terms, the check boils down to establish that a property (representing the specification) holds on a graph (whose paths represent the system behaviors). For instance, there is no path between nodes X and Y. A distinguishing feature of my research is that I define approaches where the check is performed by a computer without human intervention. Incidentally, I consider infinite graphs which arise naturally when the specification has parameters. For instance, a sorting algorithm for an array of size n should return a sorted array for every possible value of n. My contributions range from theoretical results (decidability, complexity) all the way down to implementation of checkers including algorithmic aspects (e.g. efficient data structures).

Resumen del Currículum Vitae:

I joined the IMDEA Software in Fall 2009 as tenure-track assistant professor and was promoted to associate research professor in late 2015 after a thorough evaluation. I hold a joint PhD degree in Computer Science from the Univ. of Brussels, Belgium and from the Univ. of Genoa, Italy awarded in Fall 2007. Prior to join IMDEA, I spent 20 months as a postdoc at the Univ. of California, Los Angeles. From 2010 to 2013, I also held a Marie Curie Fellowship.

My research focuses on the algorithmic analysis of systems with infinitely many states, that is, the analysis by a computer program whose goal is to determine whether or not a given infinite-state system comply with a given property. For instance, an analysis that answers the question: "Does a given program has an execution that violates a code assertion?". This analysis problem, often referred to as the model-checking problem, is of high practical importance when computers make critical decisions like how to drive cars on the roads, or medical instruments into patients. I study the mathematical properties of the model-checking problems by answering questions like "Is there an algorithm to solve model-checking problem X?" or "How much computational resources is needed/enough to solve X?".

In recent years, I primarily focused on concurrent systems where several computing processes engage in complex interactions: from multithreaded procedural programs to parametrized asynchronous shared-memory systems, asynchronous programs, and population protocols. All those systems have one or more unbounded dimensions (data, control flow, number of processes) which makes them infinite-state. In 2015, I solved a long-standing problem for population protocols (deciding whether a given protocol computes a predicate and if so which one). Population protocols are a general model for interacting processes with applications in distributed systems, biology and social sciences. On a related topic, I introduced new techniques for asynchronous programs which enabled to clarify the decidability and complexity status of various analysis problems. Asynchronous programs are at the heart of widely used programming frameworks like node.js.

On the technological side, I am the author of a tool for the analysis of infinite-state systems (<https://github.com/pierreganty>). I helped implementing several prototypes of analyzers (<https://github.com/filipkonecny/flata> and <http://software.imdea.org/~pierreganty/vanocka.html>) and an input validator (<https://github.com/pevalme/HTTPValidator>).

In the medium term, I am deepening the study of population protocols because the model remains poorly understood. It remains unclear what is their power as a computation model, whether a normal form exists for the protocols computing predicates or how to synthesize a protocol for a given predicate to cite a few research problems.

My plan in the long term is to use my expertise in language theory beyond the area of model-checking. Towards that goal we implemented a proof of concept input validator for network messages using only context-free grammars and regular expressions even though this was



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AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

claimed not possible. I believe there are many more opportunities for such contributions. Assembling a larger research group (we are three at the moment) will enable me to be more ambitious when it comes to proof-of-concept/prototype/tool building.



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

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Título:

Data processing techniques for rational decision making

Resumen de la Memoria:

Santiago Mazuelas Franco is an internationally recognized researcher (1055 citations, 15 h-index), has a multidisciplinary academic background and research experience (2 BS degrees, 2 PhD degrees), and has worked for several years in some of the major technological research institutions.

At Qualcomm R&D, San Diego (USA), (2014-Today), he has performed research on machine learning for context awareness in smart phones, energy management in smart houses, and ego-positioning in autonomous cars. In particular, he has led the machine learning research effort for the intelligent energy management system developed by Qualcomm's Smart Cities division. This work has resulted in new technological features currently commercialized and protected with four filled international patents. At the Massachusetts Institute of Technology (MIT), Cambridge (USA), (2009-2014), he performed research on wireless localization, nonlinear/non-Gaussian filtering, and machine learning; developed projects and prepared proposals for different government agencies and private companies; supervised graduate and visiting students; and assisted teaching. His research at MIT resulted in 7 journal papers (IEEE Comm. Soc. Fred W. Ellersick Prize), 9 conference papers (3 best papers awards), and one accepted international patent. At the University of Valladolid and CEDETEL (Spain) (2006-2009), he performed research on wireless localization in harsh propagation environments. He was Lecturer Professor and co-directed one doctoral thesis, published 3 book chapters, 12 journal papers, 23 conference papers (Young Scientists Prize in URSI XXII, Spain), and two accepted patents.

Santiago has obtained several important theoretical and algorithmic research results. He has implemented such results and demonstrated their benefits by using technologies such as navigation networks and smart distributed devices. His multidisciplinary background is reflected in the scope of topics addressed and results obtained, from theoretical performance limits to algorithmic development and implementation. Regarding theory, he has developed a theoretical framework for complex localization systems, put forward the concept of information coupling in cooperative localization, and proposed the paradigm of network navigation. Dr. Mazuelas results provide performance benchmarks for navigation networks and guidelines for network design and operation. Regarding algorithms, he has developed a new methodology for Bayesian filtering in hidden Markov models called belief condensation filtering, techniques for wireless localization based on ranging likelihood, and methods to characterize the suitability of anchors topologies and to mitigate distance errors. These results have been transferred to practical systems implemented by using commercial technologies.

Building on his research experience and academic background, Dr. Mazuelas plans to develop efficient and highly accurate machine learning algorithms based on a decision/game theory approach. This conceptual framing as decision problems helps to unify machine learning problems and provides rich results from the fields of decision theory, comparison of experiments, and game theory. Dr. Mazuelas will use a threefold interdisciplinary methodology covering three interrelated aspects: theoretical foundation, algorithm design, and technological demonstration.

Resumen del Currículum Vitae:

EDUCATION

- PhD Telecommunications Engineering. 2007-2011 (cum laude and best thesis award)
- PhD Mathematics. 2002-2009 (cum laude)
- BS in Telecommunication Technical Engineering. 2003-2006 (best student record)
- BS in Mathematics. 1996-2002

WORK EXPERIENCE

- Staff Engineer. Qualcomm Inc. R&D. San Diego (USA). 2014-Present
- Postdoctoral Fellow and Associate. Massachusetts Institute of Technology (MIT). Cambridge (USA). 2009-2014
- Research Manager. CEDETEL. Valladolid. 2006-2009
- Lecturer Professor. University of Valladolid. 2008-2009

RESEARCH RECORD

- 19 JCR journal papers: 11 Q1 impact factor, 6 first author, 7 second author



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

-7 patents: 3 accepted, 5 PCT
-29 International conferences: 8 first author, 7 second author. 3 book chapters
-1055 citations, 15 h-index (Google Scholar)
-2012 IEEE Communications Society Fred W. Ellersick Prize; Best paper awards in the IEEE ICC 2013, IEEE GLOBECOM 2011, and IEEE UCUWB 2011; Young Scientists Prize URSI XXII Simp., Spain. 2007
-Supervised 3 grad. students at MIT, co-directed one PhD thesis at U. Valladolid, co-directed 4 end of degree theses at U. Valladolid, 7 invited talks, and 2 PhD committees

RESEARCH PROJECTS

-3 international projects at Qualcomm Inc. (internal). AWARE: Context awareness for mobile devices based on machine learning, eZERO: Learning, distributed, and comprehensive energy management, AVANTE: Autonomous driving cars, perception and control
-4 international projects at MIT (competitive): one 5 years joint project performed by MIT, University of Southern California, and University of California Santa Barbara funded by the Office of Naval Research; one 3 years project funded by the National Science Foundation (NSF)
-8 national projects at the University of Valladolid and CEDETEL

PROFESIONAL SERVICE

-Panel reviewer for the NSF program Communication and Information Foundations
-Associate Editor for IEEE Communications Letters, first quartile (Q1), IF 1.29
-Technical program co-chair 2015 IEEE ICC and 2014 IEEE GLOBECOM Symposiums on Wireless Communications
-Technical program committee in near 40 international conferences
-Reviewer of John Wiley & Sons Books and near 15 prestigious journals

SELECTED PUBLICATIONS

-S. Mazuelas et al, "Belief condensation filtering" 2013. IEEE TSP, Q1, IF 2.79
-M. Z. Win, A. Conti, S. Mazuelas et al, "Network localization and navigation" 2011. IEEE CM, Q1, IF 4.01. IEEE Communications Society Fred W. Ellersick Prize. 234 citations
-S. Mazuelas et al "Robust indoor positioning" 2009. IEEE JSTSP, Q1, IF 2.37. 247 citations
-S. Mazuelas et al, "Information coupling" 2011. IEEE CL, Q1, IF 1.29
-S. Mazuelas et al "Topology assessment" 2010. IEEE TSP, Q1, IF 2.79
-S. Mazuelas et al "Prior NLOS" 2009. IEEE TVT, Q1, IF 1.98. 64 citations
-Y. Shen, S. Mazuelas et al, "Network navigation" 2012. IEEE JSAC, Q1, IF 3.45. 71 citations
-J. Prieto, S. Mazuelas et al, "Context-aided" 2016. IEEE TSP, Q1, IF 2.79
-F. Montorsi, S. Mazuelas et al, "On the performance limits" 2013. IEEE TIT, Q1, IF 2.32
-J. Prieto, S. Mazuelas et al, "Adaptive data fusion" 2012. IEEE TSP, Q1, IF 2.79
-S. Mazuelas et al "Belief condensation for" Proc. IEEE ICUWB 2011. Best paper award
-H. Lu, S. Mazuelas et al "Ranging likelihood" Proc. IEEE ICC 2013. Best paper award
-Y. Shen, S. Mazuelas et al "A theoretical foundation" Proc. IEEE GLOBECOM 2011. Best paper award



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

Nombre: CHICA SERRANO, MANUEL
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Título:

Managing Complexity with Computational Intelligence (MACOI)

Resumen de la Memoria:

Manuel Chica, BSc, MSc in Computer Science, obtained his PhD degree cum laude by the University of Granada in 2011. He was awarded as best MSc curriculum and outstanding PhD thesis in Engineering.

From October 2016, he is at The University of Newcastle, Australia, as a post-doctoral Endeavour Research Fellow, sponsored by the Australian Government. He obtained the position by a prestigious and competitive international call. He is a member of Dr. Chiong's lab at the School of Engineering and Computing and works with Australian researchers in the application of evolutionary game theory and agent-based modeling for understanding complex phenomena. Dr. Chica is also a senior researcher at the IN3 (UOC).

Between 2012 and 2016 Dr. Chica was Deputy Principal Researcher at the European Centre for Soft Computing (ECSC), an international research center. This position comprised the direction of R&D teams for developing soft computing based projects, writing project proposals, and setting the future directions of his unit. During that time, he was in three prestigious international universities: University of Auckland (New Zealand, 2012), Smith School of Business of Maryland University (USA, 2014), and Wroclaw University of Technology (2015 and 2016). Between 2008 and 2012 he led the Intelligent Systems group of Inspiralia for FP7 projects. He was previously hired as pre-doctoral researcher by the ECSC for a year, and worked for Apple in Ireland (2007).

His research line, called Managing Complexity with Computational Intelligence (MACOI), focuses on applying computational intelligence techniques for solving complex real-world applications. The set of advanced computational techniques includes metaheuristics for single and multi-objective optimization problems, machine learning, simulation, agent-based modeling, and social network analysis.

He is co-inventor of an international patent registered in the EU and USA, and under exploitation, linked to the European EPOBED project, for which Manuel was the Principal Investigator. He has published more than 55 peer-reviewed scientific contributions. Among them, 18 papers published in JCR-indexed journals (14 as first author) with collaborators from 13 different countries. Nine of these journals were top-10 and 14 were Q1 JCR-ranked. He has a record of more than 420 citations in Google Scholar with an h-index of 12. He is co-supervising 2 PhD students granted by Spanish Ministry, who will present their dissertations in Dec. 2017 and 2018.

Manuel Chica has participated in 18 research projects (13 competitive R&D projects and 5 research contracts with companies). Among them, he was Principal Investigator in 2 European FP7 projects and 3 National ones, with a budget of more than 3 mill. €. He also led 4 research contracts with a budget of more than 290.000€.

The internationalization of his profile is clear. Apart from the 2 European FP7 projects he led, he is still and has been more than 18 months in 5 international institutions: University of Newcastle (currently and from October 2016), Wroclaw University of Technology (2015-16), School of Business at University of Maryland (2014), University of Auckland (2012), and Apple (2007). Finally, he is a scientific advisory partner of a Spanish SME, ROD, which applies computational intelligence and agent-based modeling to marketing.

More at manuchise.com

Resumen del Currículum Vitae:

CURRENT POSITIONS FROM 2016

- Endeavour Research Fellow, Univ. of Newcastle (Australia)
- Senior researcher (IN3 Research Center at UOC, Barcelona)

PAST POSITIONS

- 2012-16: Deputy Principal Researcher (European Centre for Soft Computing)
- 2008-12: Research engineer (Inspiralia, Madrid)
- 2007-08: Research assistant (European Centre for Soft Computing)

INTERNATIONAL RESEARCH STAYS



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

- From Oct. 2016: University of Newcastle (post-doctoral Endeavour Fellow in a competitive call)
- 2015-16: Wroclaw University of Technology, PL (3 months)
- 2014: R. H. Smith School of Business, University of Maryland, USA (5 months)
- 2012: University of Auckland, NZ (3 months)
- 2007: Apple Computer, IE (3 months)

EDUCATION

- 2011: PhD cum laude in Computer Science, Univ. of Granada (outstanding PhD thesis)
- 2009: Adv. Master in Soft Computing and Intelligent Systems, Univ. of Granada
- 2006: MSc in Computer Science, Univ. of Jaén
- 2004: Tech. Eng. in Computer Science, Univ. of Jaén

RESEARCH RECORD

- 56 peer-reviewed publications
- 18 JCR journal publications, 9 of them in top-10 and 14 in Q1
- 14 JCR journal publications as first-author
- International patent in EU and USA
- Joint publications with co-authors from 13 different countries (USA, PL, NZ, FR, GR, DE, etc.)
- Supervision of 2 PhD students (on-going, tentative dates in 2017 and 2018). 1 MSc student

EUROPEAN FP7 & NATIONAL RESEARCH PROJECTS AS PRINCIPAL INVESTIGATOR

- APIFRESH. FP7-SME. 2010-12. 1.674.127€
- EPOSBED. FP7-SME. 2008-10. 1.150.488€
- PROGRAMA ASTURIAS. Regional project. 2014-16. 176.887€
- PROGRAMA ASTURIAS. Regional project. 2013-14. 32.974€
- EUROPA INVESTIGA. National project. 2014-15. 12.600€

RESEARCH CONTRACTS AS PRINCIPAL INVESTIGATOR

- ZIO. Private research contract. 2015-16. 30.000€
- TOXDTECT. Private research contract. 2014-16. 75.625€
- IDENTIMOD. Private research contract. 2013-14. 140.000€
- EDPR. Private research contract. 2013, 9 months. 50.000€

PARTICIPATION IN OTHER RESEARCH PROJECTS

- IPAN. FP7-ENV-2012. 2012-14.
- EPOSBED-DEMO. FP7-SME-CP. 2011-13. 313.000€
- FORFIRE. FP7-SME. 2009-11. 1.099.560€
- CAPSCHED. FP7-SME. 2008-10. 773.982€
- NEWSOCO. Spanish national project 2016-18. Ref: MEC TIN2015-67661-P
- SOCOVIFI2. Spanish national project 2013-15. Ref: MEC TIN2012-38525-C02-02
- SIMMRA. Spanish national project 2010-12. Ref: MICINN TIN2009-07727

AWARDS AND SCHOLARSHIPS

- Endeavour research fellowship (competitive call by the Australian Government, 2016)
- Outstanding PhD in Engineering (2015)
- Best applied research paper award at MAEB conference (2012)
- Best MSc record by Univ. of Jaén (2006)
- Research scholarships at Univ. of Jaén (2005/06)
- ANECA positive evaluation (ayudante doctor and contratado doctor)

OTHER ACTIVITIES

- Scientific partner of ROD Brand Consultants (since 2016)
- Data scientist for a European R&D project (2016)
- Program committee member (ICSI 2012/13/16/17, ACIIDS 2016, AITIC 2016, MICS 2017)
- Co-organizer Special Session at IEEE WCCI 2016, Symposium Big Data and Marketing (F. R. Areces, Univ. of Oviedo)
- Invited speaker by F. R. Areces (Univ. of Oviedo) for the Annual Consumer and Marketing Symposium
- Reviewer for more than 20 JCR journals (Information sciences, PLOS One, IEEE T. Ev. Comp., IEEE T. Cybernetics)
- Media appearance (DailyScience.com, Euronews channel, EU R&I bulletin, RTVE Radio, etc.)



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

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Título:

Automatic Decision-Making under Partial, Incomplete, Uncertain and Vague Information

Resumen de la Memoria:

In the past decades, computer science has been massively growing both in its theory and applications encompassing a plurality of reasoning patterns. One heavily entrenched tradition in AI, especially in knowledge representation and reasoning, is to rely on Boolean logic. However, many epistemic notions in common-sense reasoning are perceived as gradual rather than all-or-nothing. Indeed, inadequacies of classical logic became apparent in contexts involving probabilistic reasoning, as well as uncertainties, belief updates, vagueness and gradual reasoning.

The need of formal systems in contexts where classical logic is inadequate boosted the development of new logics, collectively named many-valued logics. Among them, Lukasiewicz logic plays a leading role thanks to its excellent trade-off between expressivity and computational complexity.

My main research interest concerns modal expansions of Lukasiewicz logic for the quantitative treatment of uncertainty and knowledge representation. I introduced a modal logic for probabilistic reasoning on fuzzy events (formulas of Lukasiewicz logic). Non-probabilistic uncertainty measures - possibility and necessity measures, belief functions, upper and lower probabilities - appear in the literature of measure theory and artificial intelligence. In a series of papers I explored these uncertainty measures as logical modalities in the Lukasiewicz realm.

Besides uncertainty measures I also investigated fuzzy autoepistemic logics as modal expansions of Lukasiewicz logic. These formalism, a key instrument for nonmonotonic reasoning, was shown to be strongly related with fuzzy modal logics and, importantly, with a generalization of Levesque's notions of stable expansions, belief sets, and the only knowing operators.

Another main research direction concerns de Finetti's foundation of classical probability theory in terms of coherent betting games and a logical description of de Finetti's notion of event. I intensively studied the geometry of uncertainty measures on Lukasiewicz events. Taking advantage of this geometric perspective, I introduced an operational semantics a la de Finetti for several uncertain measures on MV-algebras.

The logical formalisms that I developed in the last years from one side, and the game-theoretical foundation of uncertainty measures that I more recently investigated from the other, stand at the theoretical borders of several areas of theoretical and applied research spanning from multi-agent systems to knowledge representation, probabilistic reasoning and, more in general, reasoning under/about uncertainty. Indeed, the theoretical tools that these (modal) logics offer, constitute the backbone of another area of research that we will call "Automatic Decision-Making under Partial, Incomplete, Uncertain and Vague Information" and which constitute the main challenge I propose for the next years. Indeed, logics for uncertain reasoning are key to the formalization of core foundational aspects in the social sciences, information systems and economics, such as decision-theoretic problems, uncertainty, beliefs and information aggregation.

Resumen del Currículum Vitae:

Tommaso Flaminio obtained his PhD in Mathematical Logic and Theoretical Computer Science in 2006 at the department of Mathematics at the University of Siena. During his PhD he started developing and intensively studying modal expansions of the infinite-valued Lukasiewicz logic for the treatment of uncertainty measures such as probability measures, necessity and possibility measures, upper and lower probabilities, belief functions. Besides this main interest, he also studied and strongly contributed to the development of the algebraic analysis of many-valued logics. These topics constituted the backbone of his PhD thesis "A Fuzzy-Modal Approach to Probability: from Crisp to Fuzzy Events" supervised by Franco Montagna.

Flaminio's research activity is twofold: while he has always been active from the foundational perspective, he started several collaborations with people from the Department of Computer Science and the Department of Chemistry in Siena. During his PhD he also began fruitful collaborations with Lluís Godó, Francesc Esteva and other people from the IIIA-CSIC institute at the Universitat Autònoma de Barcelona, Bellaterra. The latter collaboration was strengthened in the years 2010-2013 when he got funded by the Juan de la Cierva research program to spend three years at the IIIA-CSIC.

Flaminio has been postdoc researcher at the University of Siena, at the IIIA-CSIC institute in Bellaterra where he was PI for the Juan de la



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AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

Cierva research project "Reasoning under uncertainty: a measure-theoretical, logical and algebraic approach". Currently he is Senior postdoc at the University of Insubria within the national project "Probability Theory of Nonclassical Events".

He has served as national coordinator for the Marie Curie Action MaToMuVI (Mathematical Tool for the Management of Uncertain and Vague Information) and he took part of 8 Italian and Spanish research projects. Since January 2017 he is coordinating the EUSFLAT international working group on Mathematical Fuzzy Logic.

Flaminio published 28 papers in international journals most of which are in class "A" for Mathematical Logic and Computer Science; 22 short papers in proceedings of international conferences (one of which have been awarded as one of the best five papers and another one has been shortlisted for the best paper award); 3 book chapters. 41 extended abstracts have been presented at national and international meetings. He has been invited speaker at 7 international conferences and he gave 13 invited seminars.

As advisor of PhD students Tommaso Flaminio supervised two thesis one of which has been defended on December 21, 2016 at the University of Insubria and another one is currently under review and is expected to be defended on March 1, 2017 at the Scuola Normale Superiore di Pisa. Currently he is supervising a PhD student in Computer Science at the University of Pisa. He has been member of the evaluation board for a PhD Thesis Proposal and he co-supervised two Bachelor thesis in Computer Science.

He spent long and short research periods in Campinas (Brazil), Santa Fe (Argentina), Amsterdam (The Netherlands), Bucharest (Romania), Pisa and Salerno (Italy), Prague (Czech Republic).

In 2014 he obtained the Italian National Scientific Habilitation in Mathematical Logic for Associate Professorship.



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

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Título:

High Performance Architectures

Resumen de la Memoria:

Miquel Moreto has a large experience in high-performance parallel architectures with a solid track of publications, projects, awards and international collaborations. During his career, he has worked in a wide range of internationally recognised institutions (UPC, UC Berkeley and BSC) and performed short visits of 3 months to three institutions (Univ. of Cantabria, IBM T.J. Watson, and Univ. of Edinburgh). In all these institutions, he has been in contact with renowned researchers leading to multiple international collaborations.

He combines a good theoretical knowledge and an inter-disciplinary background in Maths, Electrical Engineering and Computer Sciences, thanks to his solid education (BSc&MSc'2005 in Maths, BSc&MSc'2005 in Telecommunications Eng., PhD'2010 in Comput. Archit.). Under the supervision of Prof. Mateo Valero and Dr. Francisco J. Cazorla, his PhD proposed novel techniques to improve the management of shared hardware resources in multi-core processors, receiving the Best Thesis Award in the area of Information and Communications Technology at UPC (Premio Extraordinario de Doctorado). Thanks to a Fulbright Postdoctoral Fellowship, he spent 15 months as a postdoc in the International Computer Science Institute, affiliated with UC Berkeley. In the group of Prof. Asanovic, he worked on cache mechanisms and the operating system support to ensure quality of service to applications running on future multi-cores.

Thanks to a Juan de la Cierva grant, Moreto joined BSC in 2014, where he had the opportunity to contribute to an ERC Advanced Grant awarded to Prof. Valero. This project is designing novel high performance parallel architectures in tight collaboration with the runtime system. At BSC, he has contributed to several tools for simulating large-scale parallel architectures, notably the MUSA methodology published at SC 2016, and the open-source PARSECs, the most advanced benchmark suite with tasking support in the community.

Since his arrival at BSC, the researcher helped attracting funding to the host institution, becoming work package leader and principal researcher of several projects and building his own research team. Currently, he is leading a team of 2 Post-Docs, 7 PhD students and 1 support engineer to develop his research activities, co-advising only one PhD student with his PhD advisors.

The researcher has also led research projects both in industrial and academic environments. He has participated in 9 European (FP6, FP7, H2020), 3 American (DoE, DARPA), 6 Spanish (CICYT, Severo Ochoa), 1 local (SGR) and 5 industrial (IBM) projects. The researcher has a strong ability to conduct practical applicability of research results, resulting in a significant amount of technology transfer activity with his industrial partners in the past. In fact, the combination of a wide experience in both environments guarantees the balanced view to face ground-breaking research for those challenges that will become real problems in the industry.

The researcher, who currently has open collaborations with some of the most relevant industrial and academic international institutions, has the background, the contacts and the potential required to start a research topic in the area of high-performance parallel architectures for genomics data analytics, and create a new research group within a powerful research institution such as BSC.

Resumen del Currículum Vitae:

The research profile of Miquel Moreto shows an H-index of 15 (According to Google Scholar as of Jan 19 2017), 19 publications in peer-reviewed international journals, 26 publications in peer-reviewed proceedings in international conferences, and 19 publications in workshops and poster abstracts. His work has been cited 787 times, out of which 700 in his post-doctoral phase, and his most cited paper (IEEE MICRO'08) has received 105 citations.

Concerning the journal publications, 14 journals are indexed in the Journal Citation Report, with 5 in the first quartile (Q1), 3 in Q2, 5 in Q3 and 1 in Q4. Concerning the conference publications, he has published in the most relevant conferences in his research area: ISCA, MICRO, ASPLOS, PACT, IPDPS, ICS and SC. According to the CORE ranking, he has published 16 articles in Core A conferences and 3 in Core A+ conferences, with the SC'15 paper being nominated to the Best Paper Award, and the ISCA'15 receiving a HiPEAC Paper Award.

Thanks to an extensive mobility, he obtained significant publications with many international researchers. In the last ten years, he published papers with relevant researchers from 14 different institutions (including 7 universities, 4 companies and 3 research centres). Also, it is worth noting that many of these publications do not include his PhD advisors in the authors list. In fact, three out of his five most cited papers were written without them. Two of these papers are the result of the postdoctoral experience with Prof. Asanovic at UC Berkeley, and the other one is the result of a collaboration with Prof. Beivide (Univ. of Cantabria) and Prof. Gabidulin (Moscow Institute of



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AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

Phys. and Tech.). In total, he has published 18 papers without Prof. Valero and 33 without Dr. Cazorla. His most cited publication without his PhD advisors (IEEE ToC'08) has received 54 cites since 2007.

As a result of his work, the researcher has served in 8 program committees (ICS'17, CF'17, CCGRID'17, HPCA'17, IAAA'16, PACT'16, CF'16, RoMoL'16) 5 External Reviewer Committees (ISCA'17, MICRO'16, ISCA'16, HPCA'16, MICRO'15), and given 8 invited talks. He has done reviewer work for several top tier international conferences and workshops, including ASPLOS, EuroPar, HiPEAC, HPCA, ICS, IPDPS, ISCA, ISPLED, MICRO, PACT, SC and SPAA, among others. Also, he has been a reviewer for several top tier international journals, including ACM Trans. Archit. Code Optim., IEEE Comput. Archit. Lett., IEEE J. Emerg. Sel. Topics Circuits Syst., IEEE MICRO, IEEE Trans. Comput., IEEE Trans. Parallel and Distrib. Syst., J. Parallel and Distribut. Comput. among others. Also, he has co-organized multiple scientific events, like the RoMoL 2016 Workshop with 191 attendees, and the Thematic Session 'European Initiative on Runtime Systems and Architecture Co-Design' at HiPEAC CSW, Oslo, Norway, May 2015, with 30 attendees.

Moretó has advised 3 PhD, 9 Master and 6 Bachelor Theses at UPC since 2011, and he has taught 645 hours in the Computer Sciences Faculty and the Telecommun. School since 2007.

Finally, since 2016 he is in the Board of Directors of the Spanish Society of Computer Architecture and Technology (SARTECO), and the Technical Representative of BSC in the OpenPOWER Foundation. Since 2015 he is a Full Member of the HiPEAC European Network (Affiliated Member since 2005), and a Member of the ETP4HPC think tank. Since 2011 he is a Member of the ACM.



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

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Título:

Cryptography for Ensuring Privacy and Integrity of Remote Computation

Resumen de la Memoria:

Due to phenomena like the ubiquity of the Internet and cloud computing, it is increasingly common to store and process data on third-party machines. In spite of its attractive aspects, this trend raises a number of security concerns, including:

How to ensure that the results computed by third parties are correct (integrity), and no unauthorized information is leaked (privacy)?

The current way to deal with these problems is to trust third parties under legislation guarantees. This approach assumes that third-party machines stay honest all time, even if they get hacked! This is unrealistic and contradicted by the numerous security incidents that are regularly reported. In contrast, my vision is that any computing device must be able to store and process data on untrusted machines without risking for privacy and integrity and without the need of trusting these machines.

My research aims to realize this vision by developing a new generation of cryptographic protocols for computing securely on untrusted machines in a way that is cost-effective and suitable for future application scenarios. To achieve this goal, my work focuses on developing new design methodologies and cryptographic techniques that allow to scale up the performance of these cryptographic primitives.

I conduct my research at the IMDEA Software Institute in Madrid, where I have a position as Assistant Research Professor. I obtained my PhD in 2010 from University of Catania, Italy. Before joining IMDEA in 2013, I held postdoc positions at the Ecole Normale Supérieure de Paris (France), the New York University (USA), and the Max Planck Institute for Software Systems (Germany). During my PhD I was also a visiting student at the IBM T. J. Watson Research Center, NY (USA).

During my nine years of research activity I published 43 papers in highly prestigious international conferences and journals, including CRYPTO, Eurocrypt, the ACM Conference on Computer and Communications Security the IEEE Symposium on Security and Privacy, the Journal of Cryptology and the IEEE Transactions on Information Theory. My work has attracted over 1000 citations, with an h-index 19.

Resumen del Currículum Vitae:

I am an Assistant Research Professor at the IMDEA Software Institute in Madrid. I obtained my PhD in 2010 from University of Catania, Italy. Before joining IMDEA in 2013, I held postdoc positions at the Ecole Normale Supérieure de Paris (France), the New York University (USA), and the Max Planck Institute for Software Systems (Germany). During my PhD, I was also a visiting student at the New York University and the IBM T.J. Watson Research Center (USA).

My research interests are on theoretical and practical aspects of cryptography, and its applications to real-world systems. My research especially focused on advancing the efficiency of cryptographic protocols, with the ultimate goal of reducing the gap between theory and practice. During my nine years of research activity I published 43 papers in highly prestigious international conferences and journals, including CRYPTO, Eurocrypt, the ACM Conference on Computer and Communications Security the IEEE Symposium on Security and Privacy, the Journal of Cryptology and the IEEE Transactions on Information Theory. My work has attracted over 1000 citations, with an h-index 19, according to Google Scholar. I have given 8 invited talks at international workshops and summer schools, more than 20 invited seminars at universities and research institutes worldwide, and more than 15 presentations at international conferences.

I have been awarded a fellowship "Juan de la Cierva Incorporación" (for years 2016-2017) from the Spanish "Ministerio de Economía y Competitividad", and a fellowship from the EU FP7 Marie Curie Action AMAROUT-II (2013). I won a PhD scholarship at University of Catania (2007-2009) from the Italian Ministry of Education. I am the recipient of the 2016 CNILINRIA Award for Privacy Protection, and I received a best paper award at the I Jornadas de Investigación en Ciberseguridad (JNIC 2015).

Scientific Service. I have served (am serving) on the program committee of most important venues in Cryptography and Computer Security, such as the IACR conferences EUROCRYPT (2016), CRYPTO (2015), PKC (2011, 2015-2017), the ACM Conference on Computer Security (ACM CCS) (2015-2016), the IEEE European Symposium on Security and Privacy (EuroS&P) (2016-2017). On June 2015, I have been invited to join the Editorial Board of the IET Information Security Journal. Since 2014, I serve as Vice-chair and Management Committee member (representing Spain) of the COST Action IC1306 "Cryptography for Secure Digital Interaction". Overall, I was also able to attract funding for a total of 870K Euros from both Spanish and European agencies, being the PI or co-PI of two European projects and one Spanish project.



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AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

Turno de acceso general

Teaching and supervising. I have received the Venia Docendi of the Universidad Politecnica de Madrid. I have so far taught 7 courses and seminars at UPM, Saarland University, New York University and University of Catania. I have supervised and co-supervised 4 master thesis, and I am currently supervising one PhD student (Luca Nizzardo) and co-supervising two PhD students from external institutions (Anca Nitulescu, Ecole Normale Superieure, and Elena Pagnin, Chalmers University). I have also supervised 4 research internships.