



## AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2016

### Turno de personas con discapacidad

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#### Título:

Exposición humana a mezclas de contaminantes ambientales y su papel en el desarrollo de enfermedades crónicas

#### Resumen de la Memoria:

Desde que obtuve la Licenciatura en Farmacia he trabajado durante 14 años en el estudio de la exposición a contaminantes ambientales y sus efectos sobre la salud humana, con un énfasis especial en aquellos con actividad hormonal.

Mi actividad científica se podría enmarcar en tres líneas principales: 1) evaluación de la exposición humana y predictores de la misma en la población general, así como en subgrupos particularmente expuestos; 2) exposición humana a contaminantes ambientales con actividad disruptora endocrina y riesgo de enfermedades crónicas, fundamentalmente cáncer y patologías metabólicas; 3) desarrollo de biomarcadores para evaluar efecto combinado de los contaminantes.

Realicé mis estudios de doctorado en la Universidad de Granada, dentro del programa de doctorado "Epidemiología y Salud Pública". He disfrutado de contratos de investigación en la Universidad de Granada, Escuela Andaluza de Salud Pública, así como en los hospitales universitarios San Cecilio y Virgen de las Nieves. Durante mi etapa postdoctoral he centrado mi línea de investigación en la evaluación de los efectos derivados de la exposición desde un punto de vista global, combinando metodologías complejas de análisis de datos (como elastic-net regression o weighted quantile sum regression) con la aplicación de bioensayos de laboratorio para la cuantificación de efectos combinados. Gracias a la financiación obtenida en diferentes convocatorias de investigación he podido completar mi formación con estancias en instituciones nacionales e internacionales y conformar un grupo de investigación emergente y multidisciplinar formado por investigadores vinculados a diversas instituciones.

#### Resumen del Currículum Vitae:

Durante mi carrera investigadora, he participado en 3 proyectos regionales, 9 nacionales y 6 internacionales, todos ellos financiados en convocatorias competitivas (5 de ellos por la UE), siendo investigador principal (IP) o co-IP en 5 de ellos. Hasta la fecha, soy autor de un total de 54 artículos de investigación publicados en revistas indexadas en el JCR, 40 de ellos en el primer cuartil de JCR (14 en primer decil), y he sido primer autor, senior o autor de correspondencia en 20 de ellos. Del total de mis publicaciones indexadas en el JCR, 21 han sido resultado de colaboraciones internacionales. Mi índice H es 11 (ISI Web of Knowledge) y mi producción científica acumula un total de 518 citas. Además, he disfrutado de cuatro contratos de investigación financiados en convocatorias competitivas.

Como muestra mi lista de publicaciones y proyectos, mantengo colaboraciones activas con prestigiosas instituciones de España, Reino Unido, Dinamarca, Bolivia, Túnez, Portugal, Alemania, Estados Unidos y Eslovenia, y he realizado estancias de investigación muy productivas en Bolivia, Dinamarca y el Reino Unido. Actualmente soy miembro activo de la Sociedad Internacional de Epidemiología Ambiental (ISEE), Instituto de Investigación Biosanitaria IBS.GRANADA y del Consorcio de Investigación Biomédica de Epidemiología y Salud Pública (CIBERESP) y coordino un consorcio internacional formado por seis instituciones de cinco países iberoamericanos con el objetivo de evaluar la exposición a los plaguicidas y sus efectos sobre la salud en los trabajadores agrícolas.

En relación a mi actividad académica, tengo experiencia docente en estudios de grado y posgrado en dos universidades, he sido ponente invitado en 7 conferencias, dirigido 3 tesis doctorales y 2 trabajos de fin de master, y he sido miembro del tribunal en 4 tesis doctorales. Además, cuento con la acreditación como "Profesor Ayudante Doctor", "Profesor Contratado Doctor" y "Profesor de Universidad Privada" por la Agencia Nacional de Evaluación de Calidad y Acreditación (ANECA).



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#### Título:

Complex Systems: models, simulations and data

#### Resumen de la Memoria:

My career is devoted to the study of complex systems. The leitmotiv of my research is the modeling of networked systems, typically characterized by multi-scales and nonlinear interactions. Following an interdisciplinary approach, I combine theoretical tools offered by statistical mechanics, numerical methods of computational physics, and the analysis of large datasets typical of data-science, to tackle problems that range from mathematical epidemiology to diffusion phenomena in social and technological systems.

My scientific career started in 2006 when, as master student, I joined ENEA (Italian agency for new technologies, energy and sustainability) for a 6 months internship and, after my graduation, when I spent 3 months at the Barcelona Supercomputing Center thanks to a grant awarded by the European Commission. During this period my research covered the study of traffic and congestion in communication networks developing a framework for the study of interdependent systems, making the first observation of what has been defined the fragility of interdependency .

From 2007 to 2011 I pursued my doctoral studies at the University of Rome Roma Tre with a three-year competitive fellowship. During this period, I opened a research line that, since then, has been a constant in my career: the modeling of epidemic and information diffusion on networks. I have also built a large international collaboration network with visits at renowned institutions (e.g. University of Catania, ETHZ).

Since 2011 I am at the University of Zaragoza, first as a postdoctoral researcher and, from 2014, as a Juan de la Cierva Fellow at the Department of Theoretical Physics. In this period, I have widened my interests focusing on evolutionary dynamics both at the theoretical level and experimentally with experiments involving human subjects. Currently, along with my two main lines (diffusion processes and evolutionary dynamics), I am exploring the possibilities offered by the analysis of large datasets for the understanding of social and biological systems.

Summarizing, over my career I focused on three main research lines, all related to the broader field of complex networks:

- Traffic and congestion phenomena. My main contributions have been: a theoretical work on the relationship between mean flows and fluctuations in traffic networks and one of the first studies on interdependent networks that paved the way for more than 100 papers.
- Epidemic and information diffusion processes. Here my contributions include: a new mathematical formalism for disease spreading based on Markov Chains theory, the modeling of dynamical interactions via traffic dynamics and, more recently, the study of competition between infectious agents with a series of works on both meta-population and contact networks. The latter problems not only presents several theoretical challenges some of which I have addressed-, but also have huge implications for real world epidemics.
- Evolutionary dynamics and human behavior. Here I studied the effects of dynamical interactions in evolutionary games like the Prisoner s Dilemma (PD) and Public Goods Games (PGG), proving that realistic activity patterns induce instability in the classical PD and, recently, conducting a series of large-scale experiments with human subjects to explore cooperation and competition in real-world scenarios.

#### Resumen del Currículum Vitae:

I finished my master studies at the University of Rome Roma Tre in Italy in 2006. Immediately afterward I spent three months at the Barcelona Supercomputing Center in Spain working on simulations of large-scale physical systems thanks to a competitive grant funded by the European Commission.

At the end of 2007 I came back to the University of Rome Roma Tre to enroll in the doctoral program in informatics and automation awarded with a competitive 3 years fellowship. I received a Ph.D. title with greatest distinctions in 2011.

During my doctoral training I specialized in the modeling of complex systems and networks with long stays in renowned institutions in the field, such as, the Institute for Bio-Computation and Physics of Complex Systems (Zaragoza, Spain. 8 months in total) and the University of Catania (Italy, 3 months).



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In 2011 I moved to the Institute for Bio-Computation and Physics of Complex Systems (BIFI) of the University of Zaragoza where I held a post-doctoral position till 2013. Since 2014 I am a Juan de la Cierva fellow at both the Department of Theoretical Physics and BIFI of the same university.

During my career I have built a large network of scientific collaborations both as part of my group (i.e. Northeastern University in Boston or Inserm in Paris) and as independent researcher (i.e. University of Florida or University of Manchester). Despite a permanent disability (33% impairment) till now I co-authored 35 publications being the first/co-first author in more than 10 of them, including papers in PNAS, PRX and PRL. Taken together my scientific production received more than 1000 citations with an H-index of 16 according to ISI-WoK and Scopus.

All these works have been developed in the framework of 11 funded projects at the European and national level including 2 FET-OPEN, 2 FET-PROACTIVE initiatives and 3 national projects funded by MINECO and MICINN. Since 2012, I am also the executive coordinator of the Spanish node of the InfluenzaNet consortium: a European initiative for the study of influenza-like-illness involving 10 countries and a total of more than 20K users.

I have given 11 invited talks and seminars at renowned institutions (i.e. EPFL, Lausanne; Inserm, Paris) and international schools in addition to other 14 contributions at international conferences. I have also been the main co-organizer of NetSci2015, the flagship conference in network science, with more than 500 participants.

My work has also been recognized by the international community. In 2015, I was elected member of the council and of the steering committee of the Complex Systems Society and, since 2016, I am a board member of the Network Science Society; the two most important scientific societies in the field.

I have co-directed 3 Ph.D. and a Master thesis and supervised 3 summer internships at our institute. I have also been teaching at the bachelor and master levels summing up more than 250 teaching hours and, since 2016, I am accredited as Professor Contratado Doctor and Professor Ayudante Doctor by ANECA.



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#### Título:

Contemporary Transatlantic Ethnohistory: Itinerant Cultures

#### Resumen de la Memoria:

The experience previously presented as an expert within the area of Contemporary Transatlantic Ethnohistory, with special attention on the study of itinerant Atlantic cultures. I have always sought to provide transnational solutions for local and regional troubles, listed below and materialised in the scientific production previously referred, as well as to deepen into the theoretical analysis of the various research projects in which I have been involved. My principal contribution to the field of social and human sciences has been channelled by a main axis of research (history and anthropology), implemented through different lines closely interconnected:

1. SPANISH ETHNOHISTORICAL MARITIME HERITAGE.- At the beginning of my career as researcher (maritime ethnohistory and anthropology) I had already experience in the field of sociocultural studies at an empirical level, since I had concurrently developed my investigations with the professional praxis within the governmental ambit. The methodological plurality implemented throughout those team researches (Pascua de la et. al., 2004; Broullón, 2005; Pérez Murillo and Broullón, 2009), widened my knowledge by means of a meticulous exploration and combination of archive sources, improving at the same time my ethnographic skills, mainly on the communities of the Atlantic Andalusian littoral and the peninsular northwest (Broullón, 2003; 2004; 2006a). In the next R&C Programme, in relation to the experience acquired in such line, we expect to progress in different sub-lines into which we have made incursions. Those are summed up as follows: 1.1. Historiographies and Work through Cultures; 1.2. Gender Cultures and Ethnic Cultures.
2. IBERO-AMERICAN TRANSATLANTIC CULTURES.- The main field of action of this line has been the study articulated around three main themes: population, diaspora narratives and transnational political imaginary. Proof of my experience are the involvement in several scientific meetings, the organization and coordination of conferences (2008; 2009; 2010; 2011; 2012; 2013) and lectures at congresses, as well as a prolific scientific production during the last period of career (Broullón, 2009b; González and Reguera, 2010; Pérez Murillo, 2012; González, 2015; Broullón 2015b; Gonzalez, 2016). Scope which we expect to widen through the following innovative sub-line: 2.1. Maritime Cultures of the American South Atlantic Ocean. Colonial and Contemporary Periods.
3. MEMORY AND IDENTITY.- Some of my researches on different aspects of Atlantic nomadic cultures: miscegenation, itineracy, diaspora, migration, exile and/or return have been analysed in relation to patrimonialization processes (Broullón, 2012d). We have deepened into the role of cultural patrimony (material and immaterial) for the construction of both memory and identity. During the last period of our career we have contributed to the edition and study of documents of ethnographic interest and also Iberoamerican written, oral and visual literature (Filippi, 2011; Broullón, 2012a; 2013a; Broullón, 2016b; Navarro, 2016a), providing new results interconnected with the field of research and methodological means, and contributing to the multidisciplinary complex debate about the state of the art that has persisted within this line internationally: 3.1. Memory and History; 3.2. Transculturation and Cross-border Identities.

#### Resumen del Currículum Vitae:

My full-time career as researcher, once I had completed the Doctorate in June 2007. The innovative research line I started and the prolific scientific production achieved during the PhD phase, merited the Outstanding Doctoral Award in History at Cadiz University (2007-2008). The following academic course I won the JAE-doc Prize, a hardly competitive contest, by means of which I worked for three years as postdoctoral researcher in the CCHS-CSIC, Madrid.

I have been contracted as PhD professor (assistant) and accredited as University Tenured Professor (ANECA, 2015). I have already been granted the positive certification by Programme I3 (ANEP, 2016), a critical success that has boosted my career to a level of excellence. I have developed my academic and professional career through different contracts, in the ambit of private and state-run enterprise, and I am qualified as active member and leader thanks to this solid ethnographic experience. The leadership exercised in international work groups together with overseas invitations have consolidated my scientific authority during the last period of my career, and the research outcome of these activities spread and translated into several languages: Spanish, English, Galician and Portuguese.

My studies have been materialised as three self-authorship books (Broullón, 2007; 2008; 2010), both noticeably remarked and referentially incorporated into the field of Applied Anthropology and Comparative History of communities at European and Ibero-American Atlantic Littorals. Works that provide regional questions with transnational answers and that have opened unexplored lines of research under a future interdisciplinary potential in relation to the new challenges of a global society. As well as the co-authorship of a monography, that



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represents a reference within the ambit of academical and university studies regarding the relationships in colonial and contemporary times between Europe and America, taking as a base the use of visual culture as a source for learning and for the knowledge of Euro-American History and Ethnology. (Pérez Murillo and Broullón, 2012).

In the last years, my work has been praised and recognised by the English-speaking scientific community, particularly in the USA and the UK; also remarkable is the favourable feedback that my work has received from European and American countries like France, Italy, Ireland, Brazil and Argentina. I have contributed with sixteen self-authorship chapters to fifteen collective works and the axis of my constant researching labour has been transferred into the scientific debate through the publication of twenty three articles in national and international peer-reviewed scientific journals of great impact, for enhancing the progressive and specialised study in the matter.

Within the editorial area I have been appointed as member of the publishing board of the editorial service of Cadiz University, where I perform tasks concerning consultancy and scientific assessment. In achieving these goals, the continuous unconditional support and trust that I have received by so many publishing houses throughout my career have played a decisive role in the strengthening of my skills and abilities, and the consolidation of my profile as coordinator, consultant, assessor and publisher.