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AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2020

Turno de acceso general

Nombre: KAPLAN , RAPHAEL
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Área Temática: Psicología
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Título:

The role of cognitive maps in human memory and decision processes.

Resumen de la Memoria:

A key issue in cognitive neuroscience is how the Nobel Prize-winning discovery of map-like environmental coding by the rodent hippocampus relates to the human hippocampus putative role in declarative memory. My research has helped bridge these research lines and more recently highlighted that hippocampal internal models of the world, known as cognitive maps, play an important role in human memory and decision making.

My initial PhD work at University College London(UCL) with Neil Burgess provided fMRI and magnetoencephalography evidence that the apparently disparate human and rodent hippocampal literatures are linked by self-directed learning. Further multi-modal neuroimaging thesis work yielded insights on learning in novel environments, dynamic spatial imagery, and cued spatial memory retrieval. Taken together, my PhD thesis helped reconcile seemingly incompatible findings in rodents and humans to better understand the human hippocampus role in spatial memory.

In my Sir Henry Wellcome Fellowship at UCL and Universitat Pompeu Fabra (2013-2017), I extended my research program to interrogate the hippocampus' role in everyday learning and decision making computations. I leveraged my knowledge about the hippocampal cognitive map and related phenomena like sharp-wave ripples, prospective coding in multi-step planning, and the dynamic adjustment of reference frames to investigate their influence on human learning, memory, and decision processes beyond the spatial domain.

In 2018, I accepted an Associate Professor position at the Kavli Institute for Systems Neuroscience in Norway and started my lab, the Decision and Memory group, to continue pursuing related issues. I am co-supervising two PhD students. The students are currently wrapping up theses on temporal processing during episodic memory and using immersive virtual reality to test spatial learning strategies in non-spatial domains.

My research program has empirically and theoretically highlighted how cognitive map-like neural coding mechanisms could generally guide learning and decision processes beyond spatial processing. Nevertheless, the generalizability of spatial computations namely reference point usage and the mental simulation of spatial trajectories to other domains of learning and decision making remains a mystery. These aspects of cognition are important since orienting oneself in relation to reference points, like landmarks and boundaries, doesn't only occur when exploring the physical world. For instance, people draw upon reference prices in order to assess the value of novel goods and use knowledge of familiar reference individuals to inform their expectations for new people. Addressing this gap in the literature, I hypothesize that overlapping neural coding mechanisms guide people's use of spatial and non-spatial points of reference during learning and decision making. Using naturalistic model-informed behavioral and brain imaging paradigms, I'll test how human subjects use reference points during real-world situations like economic decisions and social interactions. In the future, these ecologically realistic paradigms could then be transferred to the clinic, where more sensitive behavioral diagnostics for detecting neurodegenerative and psychiatric pathophysiology can be implemented.

Resumen del Currículum Vitae:

I'm currently an Associate Professor in the Kavli Institute for Systems Neuroscience at the Norwegian University of Science & Technology and a Visiting Lecturer in the Department of Psychology at Princeton University. My research uses behavioral, computational, and brain imaging approaches to study the cognitive neuroscience of human learning, memory, and decision making.

My research has been recognized with international awards including the Rising Star in Psychological Science designation by the Association for Psychological Science this past year and the Laird Cermak Young Investigator Award by the Memory Disorders Research Society in 2017. I'm an author on 18 publications (incl. a book chapter), many of which are published in very selective Q1 journals (yearly impact factors >7) including Brain, Current Biology, PLoS Biology(3x), and Trends in Neurosciences. In these publications, I am first author for 9 of the empirical publications and joint senior author for 1. My work has been cited over 875 times (Google Scholar) and my H-index is 12 (Google Scholar & WoS). I have secured >450k in grant money and fellowships as PI from funding bodies like the NIMH, Wellcome Trust, and Human Frontiers Science Program. I have served as an invited peer reviewer for 6 different national and international scientific funding bodies including the European Research Council and 23 mostly Q1 research journals. I'm also serving as a Guest Academic Editor at



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PLoS Biology and I have given invited talks at 26 different universities/research centers in 9 different countries. In my research group, I currently co-supervise two PhD students and have supervised a full-time research technician. I have successfully supervised numerous undergraduate, MSc, and clinical research projects. I have also served as a PhD thesis examiner and midterm evaluation committee member for 5 predoctoral researchers in Norway, Spain, and the UK.

I was the first student in a joint neuroscience PhD program between the NIMH (USA) and University College London (UCL) Institute of Cognitive Neuroscience, where I instigated the collaboration and project that secured the funding for the collaboration between my respective supervisors at each institute. I received a Sir Henry Wellcome Postdoctoral Fellowship from the Wellcome Trust in 2013 to work at the UCL Wellcome Centre for Human Neuroimaging and Universitat Pompeu Fabra. During the fellowship, I developed my independent research program merging computational and empirical approaches to study memory-guided decision-making. After a brief Katz Visiting Fellowship at the University of Toronto's Rotman Research Institute in Canada, I was hired as an Associate Professor at the Kavli Institute for Systems Neuroscience in Trondheim, Norway and began the Decision and Memory research group there in 2018.

Throughout my career, I have overseen a number of projects from inception to completion, including supervision of trainees, experimental design, ethical approval, data collection, data analysis, novel analyses, and dissemination via publications, invited lectures, and conference presentations. Managing these projects has involved coordination in multiple languages (Spanish, Catalan, and English) across multiple institutes, which have almost exclusively been self-initiated.



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Turno de acceso general

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Título:

Neural mechanisms of predictive processing: insights from cognitive and computational neuroscience

Resumen de la Memoria:

The ongoing theme throughout my work is the joint use of multiple neuroimaging methods, electrophysiology techniques and computational models to gain insights into neural mechanisms of perception and cognition. I am currently funded by the Marie Skłodowska-Curie Global Fellowship for my work on neural mechanisms of prediction signalling. I am hosted by the Neuroscience Department of the MPI for Empirical Aesthetics, Frankfurt am Main, and co-heading a research group in Auditory Neuroscience at City University of Hong Kong (together with Prof. Jan Schnupp). Earlier, in my doctoral research (supervised by Felix Blankenburg, Freie Universität Berlin), I elucidated the role of interactions between brain regions in perception, working memory, and decision making. More recently, I worked in the world's leading cognitive and computational neuroscience groups at University College London (Prof. Karl Friston) and Oxford University (Prof. Kia Nobre). Together with my previous postdoctoral supervisors and collaborators, I have published several papers offering a unified mechanistic explanation of the dissociations between top-down cognitive influences on perception, including expectation of different perceptual features and attention. Currently, together with my advisors Lucia Melloni, David Poeppel (Max Planck Institute for Empirical Aesthetics), and Jan Schnupp (City University of Hong Kong), we are testing some of these hypotheses using direct electrocorticographic and laminar recordings from humans and rodents, to elucidate the cortical mechanisms of sensory predictions. The overarching goal of this line of research is to understand the commonalities and boundary conditions of expectation signals across species, multiple domains, and levels of complexity, from basic sensory processing to higher cognition such as speech processing. This research is co-funded by two competitive grants from the Research Grants Council Hong Kong, as well as an Ideas Grant from NHMRC Australia, which I have secured as a named co-investigator.

Resumen del Currículum Vitae:

Ryszard Aukstulewicz conducts empirical and theoretical work at the interface of cognitive, computational, and systems neuroscience, focusing primarily on the neural mechanisms of predictive coding and their modulation by cognitive factors. He is currently funded by the European Commission's Marie Skłodowska-Curie Global Fellowship (2018-2021) for his work on neural mechanisms of prediction signalling, and is hosted by the Neuroscience Department of the MPI for Empirical Aesthetics, Frankfurt am Main (working closely with Prof. Lucia Melloni and Prof. David Poeppel), and the Department of Neuroscience, City University of Hong Kong (Prof. Jan Schnupp). He is also a co-investigator on two competitive grants awarded by the Research Grants Council Hong Kong and an Ideas grant from NHMRC Australia.

Previously, Ryszard obtained his MA in Psychology from Adam Mickiewicz University, Poznan, Poland (2008) and MSc in Brain and Cognitive Sciences from the University of Amsterdam, The Netherlands (2009). He completed his doctorate in Psychology at the Berlin School of Mind and Brain, Humboldt University Berlin (2013). Following his doctorate, Ryszard worked in the world's leading cognitive and computational neuroscience groups at University College London (Prof. Karl Friston, 2013-2015; funded by the Postdoctoral Fellowship of the German Science Foundation) and Oxford University (Prof. Kia Nobre, 2015-2017), spearheading empirical and modelling studies of the neural mechanisms of prediction error signalling. Most of his previous and ongoing work is directly related to predictive coding and auditory mismatch signalling in the brain. He has also presented the work dedicated to predictive coding at international conferences, symposia, and in invited talks on over 25 occasions. His publication record (h-index 14, Google Scholar) includes 25 papers in international peer-reviewed journals, including Plos Biology, Current Biology, Progress in Neurobiology, Cerebral Cortex, Journal of Neuroscience, and others. He has co-supervised 4 doctoral students at City University of Hong Kong and the University of Oxford, and 4 predoctoral students at University College London. He has also served as a guest editor for two special issues of peer-reviewed journal (Hearing Research; Frontiers in Human neuroscience), as well as a reviewer for numerous publications, grant applications, and a doctoral thesis at the University of Salamanca.



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Turno de acceso general

Nombre: SANCHEZ RUIZ, MARIA JOSEFA
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Título:

Personalidad y Diferencias Individuales; Inteligencia Emocional

Resumen de la Memoria:

After finishing my MA in Clinical Psychology, I completed my PhD Personality and Individual Differences, and since then I have closely examined two character strengths in my research, namely trait emotional intelligence (trait EI) and creativity.

I have been working extensively with the trait emotional intelligence program at the University College of London and other international institutions with leading experts in the field. My research contributions have helped in the establishment of a nomological network for trait EI and I have investigated its construct, predictive and cross-cultural validity. The outcomes of my studies demonstrate that trait EI is an important predictor of academic performance, successful adaptation at school, adjusted peer-relationships, and a protective factor against eating disorders, body image dissatisfaction, aggressive behavior and psychological distress. Overall, my work shows that trait EI is linked to psychological well-being across cultures (e.g., Lebanese, Spanish, Cypriot and British).

My research has also helped clarifying the connection between creativity, personality, and emotion. I have presented integrative and heuristic models to study the link between creativity and particularly the influence of stress states and trait EI on creative performance. In addition, I have focused on creative-cognitive processes, such as metaphorical thinking, advanced its applications for educational contexts and developed a tool to assess creativity in children, published by TEA.

Recently, my interest in character strengths has led me to the field of Existential Positive Psychology. This is the framework adopted in the evidence-based training on Emotional Intelligence I have developed for vulnerable youth, which has been recently funded by Grand Challenges Canada - Global Mental Health and Wellbeing. The program focuses on enhancing emotional awareness, acceptance and adaptive coping, while empowering youth to effectively transform their unique challenges into personal growth. I am currently investigating mindfulness as a psychological tool within this and other projects. In addition, I have ongoing projects exploring meaning-centered coping with the COVID-19 pandemic worldwide, as well as post-traumatic growth in the Lebanese population after trauma (e.g., Beirut blast).

Resumen del Currículum Vitae:

Academic path, research record, and international collaborations:

Dr. Maria-Jose Sanchez-Ruiz completed her BA and MA in clinical psychology at the Universidad Complutense de Madrid, and her PhD in personality was conducted mainly at the Institute of Education and the University College of London (UCL), and presented at the Universidad Autonoma de Madrid. She graduated with unanimous Summa Cum Laude with European mention. She joined the Lebanese American University as an Assistant Professor of psychology in 2010 and was promoted to Associate Professor based on research merits. Over the years, she has worked extensively with the London Psychometric Lab, home to the trait emotional intelligence program at UCL, where she was an Honorary Assistant Research Fellow (2008/09) and later spent her sabbatical year (2017/18) as an Honorary Senior Research Associate. She has also visited recognized institutions for professional development (e.g., University of Cambridge) and research purposes (e.g., Imperial College of London).

Maria-Jose's work has received more than 1400 citations in Google Scholar (1114 since 2016), and she has published almost 30 empirical articles in reputable journals in psychology (more than half as first author), as well as book chapters, on personality, trait emotional intelligence, and creativity. Some of her papers have been widely cited; one of them published in *Emotion Review* (Q1) has 160 citations in Scopus and 304 in Google Scholar, and another one in *British Journal of Educational Psychology* (Q1) has 102 citations in Scopus and 288 in Google Scholar (see section C.1. for details).

She continues to work with her long-term collaborators at the UCL, Imperial College of London, (UK), University of Louvain (Belgium), and UNED (Spain). She has recently expanding her collaborations to CUNY University in the US (in a publication in *Autism*, Q1), and Universidad de Almeria, with a team associated with the Meaning-Centered Counselling Institute (Canada) in a worldwide research (N=12.000) on psychological coping with the COVID-19 pandemic, currently under review in *Clinical Psychological Science*, Q1.

Maria-Jose is a regular peer-reviewer of reputable journals such as *Personality and Individual Differences*, and consistently disseminates her research at international conferences since 2007, such as the ones organized by the International Study of Individual Differences (ISSID).



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Accomplishments since last year's application to the Ramon y Cajal fellowship program:

Last year, Maria-Jose was the first candidate in the waiting list for the RYC contracts in psychology, with a grade of 90/100 (the cut-off was 91). Following the comprehensive evaluation report received, she has worked on different areas in order to improve that score. Her achievements during this year include: a) An awarded international grant as the Principal Investigator from Grand Challenges Canada Global Mental Health and Wellbeing (\$250.000 CAD) for her Emotional Intelligence training program; b) The Research Excellence Award 2020 at the Lebanese American University; c) The appointment as Associate Editor of Frontiers in Psychology-Personality and Social Psychology; and d) The publication of two articles on journals listed in JCR (Q2), as well as a book chapter in the Wiley-Blackwell encyclopedia of personality and individual differences.



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Título:

Neural correlates of word learning and language recovery in healthy and post-stroke aphasia persons

Resumen de la Memoria:

In the course of my career I have pursued a coherent research line in cognitive and clinical neuroscience trying to understand different brain and cognitive- sources of variability in language learning in healthy adults on the one hand, and on the other how the brain recover affected functions through different plastic compensation mechanisms in post-stroke aphasia (difficulties in the production or comprehension of language secondary to brain damage). During my PhD at the University of Barcelona, I developed pioneering work on the individual differences in language learning abilities. In this period, I got expertise in the design and development of behavioral experiments (language learning paradigms) and magnetic resonance imaging (MRI), including Tractography, a method that is at the forefront of cognitive and clinical neuroscience research. During my first postdoctoral period I was interested in gaining further understanding of how brain reacts to training in populations with different backgrounds. I moved to Paris (France) just after my PhD when I was attracted by an offer from the Brain and Spine Institute (ICM). I had the opportunity to study differences in resting state functional connectivity networks of people with different levels of expertise in language and reading abilities, including adult illiterate subjects before and after of learning to read through a literacy course. After this, I was selected in Spain for the competitive position of Juan de la Cierva Formación, thank to which I was able to join the Cognitive Neurology and Aphasia Unit (University of Malaga) and move my research interests to the study of clinical population (post-stroke aphasia). During this period (2016- present), I have further been granted with 3 more postdoctoral competitive positions, including the renowned Juan de la Cierva Incorporación. Recently, I developed a short research stay at New York University (USA) to collaborate with Dr. David Poeppel in an fMRI project related to the neural substrates of word learning (work under review, currently accessible through bioRxiv: doi: <https://doi.org/10.1101/2020.07.03.187260>). This last four-years period has provided me fine skills and independence on the performance of neuropsychological evaluations and therapeutic interventions, as well on neuroimaging analyses in persons with brain damage.

In the last two years, I have been involved in a big research aimed to strengthen brain plasticity in persons with post-stroke aphasia through combining language therapy, pharmacological intervention and transcranial direct current stimulation (tDCS) (ClinicalTrials.gov identifier: NCT04134416). As well, I am working as principal investigator in two Spanish projects aimed to study the effect of single session tDCS on different language learning paradigms in healthy subjects. These projects have enabled me to acquire advanced tDCS skills.

My current goal is to progress in my career as an independent researcher and develop my own research group in order to further potentiate a research line focused on finding (cognitive and brain) predictors to: (1) guide neurorehabilitation of naming deficits in aphasia; and (2) potentiate word learning in healthy subjects. My current interest goes beyond the state of the art and intends to face the variability problem by trying to predict it.

Resumen del Currículum Vitae:

During my scientific career I have published 23 articles in high quality JCR international peer- reviewed journals (15 Q1) and 3 book chapters. I am the first author of 7/23 articles (6 Q1), senior author of 6/23 (2 Q1), and corresponding author in 5. My work has been cited 804 times, and I have an h-index of 11 and a i10 index of 14 (Google scholar, date: 20/01/2021). The average number of citations per year in my postdoctoral period (2014-present) is 96.4. I have presented my work in more than 40 conferences (most of them international), including posters and oral sessions. I have been invited to give talks at different universities. I have participated in 7 competitive research projects (2 as a PI), including one international in which I was a team member. I am an editor reviewer in an international peer-reviewed JCR journal, a guest editor of a research topic and I act frequently as reviewer in highly influential journals such as NeuroImage, Cerebral Cortex, Brain and Language or Nature Communications Biology.

I have been granted with different prestigious competitive grants along my research career in different institutions in the area of basic and clinical neuroscience, including a 4-years predoctoral grant funded by Generalitat de Catalunya and the European Social Fund (FI) at the Brain Plasticity and Cognition Unit (University of Barcelona); and 5 postdoctoral grants: Postdoctoral grant at the Brain and Spine Institute (Hospital de la Salut, Salpêtrière, Paris, France) funded by Creteil Agricole de France; Postdoctoral grant at the Brain and Spine Institute (Hospital de la Salut, Salpêtrière, Paris, France) funded by Creteil Agricole de France; Postdoctoral grant at the Brain and Spine Institute (Hospital de la Salut, Salpêtrière, Paris, France) funded by Creteil Agricole de France; Postdoctoral Grant for Incorporation of Doctors (University of Malaga) (1 year); Juan de la Cierva Incorporación (Instituto de Investigación Biomédica de Málaga) (10 months), and a Emergent Researcher grant funded by FEDER Funds (2019-2021). In addition, I have obtained two travel grants (BE) to develop two short research stays at different laboratories in United Kingdom: at the University of York (4 months, 2009) and at the King's College London (3 months, 2010). Recently I have done a 6 weeks research stay at the Poeppel Lab (New York University).



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I have supervised several master thesis and final degree projects, and I am currently directing the doctoral thesis of 2 PhD students (to be defended in 2023 and 2022). In addition to my research labors, I teach in the Degree of Psychology (University of Malaga) and in a Master Degree since 2016. I have the ANECA accreditation of Contratado Doctor since 2019. I have been invited to lead teaching duties in several courses (UMA, UB). I was awarded with the prize of the best publication in 2013 granted by the Spanish Society for Experimental Psychology (SEPEX).



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Turno de acceso general

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Área Temática: Psicología
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Título:

Investigating the neural mechanisms and potential benefits of music-induced pleasure

Resumen de la Memoria:

I received my Ph.D. in Psychology six years ago at the University of Barcelona. During my Ph.D., my work focused on understanding the neuronal and oscillatory correlates of reinforcement learning, acquiring a solid background in computational modeling, and fMRI and EEG analysis. Early in my Ph.D., I became particularly intrigued by the question of how the brain translates music into emotion and pleasure and decided to pursue my research career in this topic. In parallel with my Ph.D. plan, I led a new line of research on individual differences in musical reward sensitivity, identifying, for the first time, healthy individuals with a specific lack of sensitivity to music, a condition known as specific musical anhedonia. My Ph.D. s research excellence was graded Cum Laude and I obtained the Special Doctoral award.

After my Ph.D., I got, consecutively, two highly competitive postdoctoral grants from one of the most prestigious centers for brain research, the Montreal Neurological Institute (McGill University), to continue my research career at Dr. Zatorre s lab. During my postdoctoral research period (2015-2020), I went further into studying the neural mechanisms of musical reward. In particular, I provided causal evidence for the contribution of striatal dopaminergic circuits in music-induced reward combining several states of the art methods: from modulating fronto-striatal function through transcranial magnetic stimulation to actively manipulate dopaminergic function using pharmacological interventions.

My pioneering research has led to several publications in high-impact journals (Nature Human Behaviour, PNAS, Current Biology, and Journal of Neuroscience, among others) and accumulates more than 700 citations. Furthermore, I have received several awards and fellowships during my career and two research grants, reflecting my capacity to attract funding. My mobility record has also allowed me to establish a solid worldwide network of researchers from the music neuroscience community and other backgrounds, essential for tackling the challenge of setting a new research group and successfully obtaining international funding.

My solid background in reinforcement learning and music neuroscience, together with the technical, methodological, and leadership skills acquired through my career, place me in the perfect position to develop a pioneering line of research in Spain on the study of emotion and reward processing, using music-induced pleasure and emotions as a model, and combining computational modeling, brain stimulation, and neuroimaging techniques. This pioneering approach will help to understand complex cognitive and affective functions and characterize their neural substrates.

Resumen del Currículum Vitae:

During my career, I have developed broad research capacities and a great experience. I have a strong publication record, publishing in world-leading journals such as Nature Human Behaviour, Current Biology, PNAS, Journal of Neuroscience, Cerebral Cortex, or eLife. I have published 22 scientific papers (13 as the first author) cited more than 700 times, with an h-index of 13 and i10-index of 16 (source: Google Scholar).

During my Ph.D., under the supervision of Dr. Marco-Pallarès, my work focused on understanding the neuronal and oscillatory correlates of reinforcement learning, using either EEG and/or fMRI combined with computational modeling. I performed two research stays at the Donders Institute for Brain, Cognition, and Behaviour (Nijmegen University), where I established collaboration with Dr. Roshan Cools and Dr. Guillaume Sescousse, well-known researchers on the field of reward processing and addiction. I also developed a strong interest in understanding the neuronal circuits involved in musical reward. In parallel with my Ph.D. plan, I developed a questionnaire to assess individual differences in musical reward and later identified a group of individuals with a specific lack of sensitivity to music a condition called specific musical anhedonia. The study of these individuals using psychophysiological measures, fMRI, and DTI, has provided relevant insights into how the brain turns music into reward. This research line has led to several publications and generated considerable interest among the news media, covered by the most prestigious journals in Europe, U.S, and worldwide.

After my Ph.D., I got two highly competitive postdoctoral grants from one of the most prestigious centers for brain research, the Montreal Neurological Institute (MNI), under the supervision of Prof. Zatorre, one of the most prestigious researchers in the field of auditory processing and music. As a postdoc, I studied the contribution of striatal dopaminergic circuits in musical reward by combining fMRI, TMS, and pharmacological approaches. Besides, during my postdoc at McGill, I got a research grant from the Grammy Museum Foundation to study the role of opioid circuits in musical reward (20.000\$).



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In 2019, I got a Sara Borrell (ranked 1st among all the candidates) to continue my postdoctoral studies in the Bellvitge Biomedical Research Institute with my former Ph.D. supervisor, Dr. Marco-Pallares. In 2020, I got the Junior Leader Incoming Grant (one of the most competitive grants for young researchers in Spain) from La Caixa Foundation (305.000 €), and hence, renounced to the Sara Borrell grant as well as the Beatriu de Pinós that I also got in 2020. I am currently working at the Institute of Neuroscience of the University of Barcelona, starting a three-year project investigating the role of auditory cognitive and learning abilities in music-induced pleasure by combining behavioral, physiological, EGG, and fMRI methods.

Furthermore, (i) I have presented my work in many international and national conferences, (ii) my research has been awarded several times, (iii) I have experience teaching and supervising students (courses for MSc, supervision of master thesis, Ph.D., and undergraduate students), and (iv) I have acted as a reviewer in many prestigious journals (such as Neuroimage, Human Brain Mapping, Psychological Science, or Plos One, among others).