

CURRICULUM VITAE ABREVIADO (CVA)

IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

Part A. PERSONAL INFORMATION

First name	Javier		
Family name	Márquez Ruiz		

(*) Mandatory

A.1. Current position

Position	Associate Professor (Profesor Titular Universidad)		
Institution	Universidad Pablo de Olavide		
Department/Center	Physiology, Anatomy and Cell Biology	Faculty of Experimental Sciences	
Country	Spain		
Key words	Electrophysiology, Transcranial electrical stimulation, Non-invasive brain stimulation, Neuromodulation, Cerebellum, Memory and Learning		

A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
2002-2007	PhD student/University of Seville/Spain
2007-2010	Assistant Professor/University Pablo de Olavide/Spain
2010	PhD Assistant Professor/University Pablo de Olavide/Spain
2010-2024	PhD Associated Professor/University Pablo de Olavide/Spain (Profesor Contratado Doctor)
2024-Present	PhD Associated Professor/University Pablo de Olavide/Spain (Profesor Titular de Universidad)

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Licensed in Biological Sciences	University of Seville/Spain	2002
PhD in Physiology and Neuroscience	University of Seville/Spain	2008

Part B. CV SUMMARY (max. 5000 characters, including spaces)

My research has made significant contributions in the fields of motor control, sleep mechanisms, cerebellar plasticity, and brain stimulation. My early work focused on the integrative properties of the oculomotor system, describing the roles of acetylcholine and nitric oxide in generating eye position and vestibular eye-position signals (Navarro-López et al., 2004; Márquez-Ruiz et al., 2007). During my PhD at the University of Seville, I examined motor system behavior during spontaneous and pharmacologically induced sleep, demonstrating tonic inhibition and bilateral activation–inhibition patterns of extraocular motoneurons (Márquez-Ruiz and Escudero, 2008; Escudero and Márquez-Ruiz, 2008). I also showed that local pharmacological manipulation of brainstem nuclei induces oculomotor patterns similar to those of REM sleep (Márquez-Ruiz et al., 2009, 2010).

During my postdoctoral work at Université Libre de Bruxelles (Belgium), I collaborated with Prof. Guy Cheron, providing the first evidence that long-term depression (LTD) can be induced in the cerebellum of alert animals in response to peripheral sensory input (Márquez-Ruiz and Cheron, 2012). We also discovered a novel 600-Hz “buzz UP” state of Purkinje cells (Cheron et al., 2014).



As an Assistant and later Associate Professor at the Department of Physiology, Anatomy and Cell Biology (University Pablo de Olavide, Seville), I developed new animal models for studying the effects and mechanisms of non-invasive brain stimulation. My research combines electrophysiology, pharmacology, optogenetics, histology, and behavior to explore how transcranial electrical (tDCS, tACS, tRNS) and magnetic (tSMS) stimulation modulate neural activity in the somatosensory cortex and cerebellum. I have described the effects of transcranial electric current on sensory evoked potentials (Sun et al., 2020; Sánchez-León et al., 2021), the involvement of A1 adenosine and GABA receptors in long-term changes (Márquez-Ruiz et al., 2012), and orientation-dependent modulation of Purkinje cell activity by tDCS (Sánchez-León et al., 2025). I also demonstrated polarity-dependent effects of tDCS on associative learning and synaptic plasticity in the sensory cortex (Márquez-Ruiz et al., 2016). Some of these works have received more than 300 citations in Google Scholar.

I founded and currently direct the Translational Brain Stimulation Laboratory (<https://translationalbrainstim.com/>) at Pablo de Olavide University, establishing the necessary infrastructure for animal brain stimulation studies. I also serve as Co-Director of the Master's Program in Fundamental and Translational Neuroscience, Deputy Director of the Unified Animal Facility Service, and Principal Investigator of the PAIDI Research Group "Translational Neuroscience tNeuro" (BIO-368). My work has been published in international journals (n=32) including *Annals of Neurology*, *PNAS*, *eLife*, and *J. Neurosci.*, and presented in 84 national and international meetings. I have participated in 23 research projects, acting as PI in national (BFU2014-53820-P, BFU2017-89615-P, PID2022-141997NB-I00) and international initiatives (RF1MH114269, NIH BRAIN Initiative; Neurotwin-101017716, H2020-FET). The result of my research has been recognized with four research 3 evaluation periods ("sexenios"). My lab collaborates with international partners such as Guy Cheron (ULB, Belgium), Fabrice Wendling (INSERM, France), Roi Cohen Kadosh (Surrey, UK), and Alexander Rotenberg (Harvard, USA).

Beyond basic science, my research has translational implications for neurological disorders, particularly through modeling and optimizing stimulation protocols for Alzheimer's disease and epilepsy, and investigating neurophysiological alterations in animal models of Autism, Alzheimer's, and Angelman syndrome. I actively participate in outreach initiatives such as the Discovering Our Brain course, Coffee with Science, and neuroscience workshops in schools.

I have 18 years of teaching and mentoring experience, lecturing on Animal Physiology and Evolution of Human Nutrition in undergraduate programs, and supervising 17 bachelor's and 25 master's theses. My teaching activity has been recognized with three five-year evaluation periods ("quinquenios"). I have trained five PhD students (two now postdocs in tDCS research centers and three ongoing). I serve as a reviewer for international journals and research agencies in Spain, France, Belgium, Canada, the UK, India, and the USA.

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications (see instructions)

- Sánchez-León, C. A., Sánchez-Garrido Campos, G., Fernández, M., Sánchez-López, Á., Medina, J. F. and **Márquez-Ruiz, J.** (2025). Somatodendritic orientation determines tDCS-induced neuromodulation of Purkinje cell activity in awake mice. *eLife*, 13, RP100941.
- Sánchez-León C.A., Cordones I., Ammann C., Ausín J.M., Gómez-Climent M.A., Carretero-Guillén A., Sánchez-Garrido Campos G., Gruart A., Delgado-García J.M., Cheron G., Medina J.F. and **Márquez-Ruiz J.** (2021) Immediate and after effects of transcranial direct-current stimulation in the mouse primary somatosensory cortex. *Scientific Reports*, 11:3123. IF: 4.380. Category: Ciencias multidisciplinares 17/71 Q1
- Sun Y., Dhamne S.C., Carretero-Guillén A., Salvador R., Goldenberg M.C., Godlewski B.R., Pascual-Leone A., Madsen J.R., Stone S.S.D., Ruffini G., **Márquez-Ruiz J.**, Rotenberg A. (2020) Drug-responsive inhomogeneous cortical modulation by direct current stimulation. *Ann Neurol*, 88(3):489-502. IF: 10.422 (2020) Category: Clinical Neurology 9/208 Q1
- Cheron G., **Márquez-Ruiz J.**, Cheron J., Prigogine C., Ammann C., Lukowski R., Ruth P., Dan B. (2018) Purkinje cell BK channel ablation induces abnormal rhythm in deep cerebellar

- nuclei and prevents LTD. *Scientific Reports*, 8(1):4220. IF: 4.122. Category: Multidisciplinary sciences 12/64 Q1
- Ammann C., Spampinato D., **Márquez-Ruiz J.** (2016) Modulating motor learning through transcranial direct-current stimulation: an integrative view. *Front Psychol*, 7:1981. IF: 2.323. Category: Psychology 33/128 Q2
- Ammann C., **Márquez-Ruiz J.**, Gómez-Climent M.A., Delgado-García J.M., Gruart A. (2016) The motor cortex is involved in the generation of classically conditioned eyelid responses in behaving rabbits. *J Neurosci*, 36(26):6988-7001. IF: 5.988. Category: Neurosciences 29/258 Q1
- Márquez-Ruiz J.**, Ammann C., Leal-Campanario R., Ruffini G., Gruart A., Delgado-García J.M. (2016) Synthetic tactile perception induced by transcranial alternating-current stimulation can substitute for natural sensory stimulus in behaving rabbits. *Scientific Reports*, 6:19753. IF: 4.259. Category: Multidisciplinary sciences 10/64 Q1
- Molae-Ardekani B., **Márquez-Ruiz J.**, Merlet I., Leal-Campanario R., Gruart A., Sánchez-Campusano R., Birot G., Ruffini G., Delgado-García J.M., Wendling F. (2013) Effects of transcranial Direct Current Stimulation (tDCS) on cortical activity: A computational modeling study. *Brain Stimul.* 6:25-39. IF: 4.538. Category: Clinical neurology 16/194 Q1, Neurociencia 36/251 Q1
- Márquez-Ruiz J.**, Cheron G. (2012) Sensory stimulation-dependent plasticity in the cerebellar cortex of alert mice. *PLoS One.* 7(4): e36184. IF: 3.730. Category: Multidisciplinary sciences 7/56 Q1
- Márquez-Ruiz J.**, Leal-Campanario R., Sánchez-Campusano R., Molae-Ardekani B., Wendling F., Miranda P.C., Ruffini G., Gruart A., Delgado-García J.M. (2012) Transcranial direct-current stimulation modulates synaptic mechanisms involved in associative learning in behaving rabbits. *PNAS USA.* 109(17):6710-5. IF: 9.737. Category: Multidisciplinary sciences 4/56 Q1

C.2. Research projects

- PID2022-141997NB-I00 “*Effects of transcranial electrical stimulation on neuronal spatiotemporal dynamics, glial cell activation, and learning and memory processes in mice (E-Brain)*”
PIs: Javier Márquez Ruiz (Coordinator), Raudel Sánchez Campusano
Ministerio de Ciencia e Innovación - FEDER
Duration: 2023–2027 Funding: 187.500,00 € Status: Granted
- 101017716 “*Digital twins for model-driven non-invasive electrical brain stimulation (NEUROTWIN)*”
PI UPO: Javier Márquez Ruiz (Project Coordinator Giulio Ruffini, Neuroelectronics)
FET H2020 European Commission
Duration: 2021–2024 Funding: 698.875,00 € for UPO € Status: Granted
- UPO-1380701 “*Effects of static magnetic fields on cortical brain excitability*”
PI: Javier Márquez Ruiz Co-IP (Coordinator)
Proyectos I+D+i H2020 FEDER Andalucía
Duration: 2021–2023 Funding: 22.116,00 € Status: Granted
- P18-HO-4359 “*Improvement of the "chronologist" project by fine-tuning a virtual reality system for mice*”
PI: Javier Márquez Ruiz
Junta de Andalucía
Duration: 2020–2022 Funding: 40.000,00 € Status: Granted
- EQC2019-006419-P “*Expansion of the Central Animal Facility Service of the Pablo de Olavide University.*”
PI: Ángel Manuel Carrión Rodríguez
Ministerio de Economía y Competitividad – FEDER
Duration: 2019–2021 Funding: 952.778,30 € Status: Granted



6. BFU2017-89615-P “*Characterization of transcranial electrical stimulation effects on the excitation-inhibition balance in the cerebral cortex.*”
PI: Javier Márquez Ruiz
Ministerio de Economía y Competitividad - FEDER
Duration: 2018–2021 Funding: 108.900,00 € Status: Granted
7. RFMH114269 “*The impact of cerebellar tDCS in local and downstream brain circuits: how much is neural activity modulated in the resting state and during sensorimotor processing*”
PI UPO: Javier Márquez Ruiz por parte de la UPO (Coordinator USA: Javier Medina)
National Institutes of Health (EEUU) - BRAIN Initiative
Duration: 2017–2021 Funding: 144.976,00 \$ for UPO Status: Granted
8. BFU2014-53820-P “*Characterization of the neuronal mechanisms mediating transcranial electrical stimulation effects in awake mice*”
PI: Javier Márquez Ruiz
Ministerio de Economía y Competitividad - FEDER
Duration: 2015–2018 Funding: 116.160,00 € Status: Granted

C.3. Stays in foreign centers

UNIVERSITÉ LIBRE DE BRUXELLES, UNIVERSITÉ D'EUROPE. Institut des Sciences de la motricité. Laboratory of Neurophysiology and Movement Biomechanics (LNMB). Brussels (Belgium). Dates: 15/2/09 – 15/6/09.

Title: “Study of the neuronal activity underlying the rapid oscillations of the cerebellum in transgenic mice with motor and learning disorders”

Funding: José Castillejo postdoctoral grant. Spanish Government.

C.4. Awards

VII Real Maestranza de Caballería Research Award – University Pablo de Olavide. Experimental modality. Year 2014.

C.5. Direction of doctoral theses

Claudia Ammann: *The role of the cerebral cortex during classical eyeblink conditioning in the rabbit*. University Pablo de Olavide. June 14, 2017. International mention thesis.

Carlos Andrés Sánchez León: *The effects of transcranial electrical stimulation on cortical excitability in mice*. University Pablo de Olavide. November 15, 2019. International mention thesis.

Guillermo Sánchez-Garrido Campos: *Modulation of cortical excitability and oscillatory dynamics by transcranial electrical stimulation*. University Pablo de Olavide. December 5, 2025. International mention thesis.

Marta Estévez Rodríguez: *Exploring the effects of transcranial Direct Current Stimulation on the cortical excitation/inhibition balance: an optogenetic approach*. University Pablo de Olavide. December, 2025. Thesis submitted.

C.6. Membership in Networks of Excellence

SAF2017-90713-REDT “Spanish Brain Stimulation Network” Duration: 1/7/2018-30/06/2020

RED2022-134660-T “Spanish Brain Stimulation Network” Duration: 2023-2024

C.7. Reviewer for journals

Annals of Neurology, Journal of Neuroscience, eLife, Brain Stimulation, Neuroscience and Biobehavioral Review, Scientific Reports, PLoS One, PLoS in Computational Biology, European Journal of Neuroscience, Neural Plasticity, Experimental Brain Research, Cerebellum, Frontiers in Human Neuroscience, Frontiers in Systems Neuroscience, Current Opinion in Biomedical Engineering.