

# María Pérez Zabalza

---

Biomedicine, Ph.D, specialized in biomedical signal processing with broad knowledge in linear and no linear signal processing techniques. Very motivated person with extensive experience working in multidisciplinary and multicultural teams

## Education

- November 2013 **PhD in Biomedicine.** University of Barcelona (UB), Barcelona, Spain. European awarded Doctoral Thesis: Synaptic and intrinsic mechanisms involved in the generation of cortical slow rhythms. Final qualification: Excellent cum laude.
- July 2007 **M.S., Biomedical Engineering.** Polytechnic University of Catalonia (UPC), Barcelona, Spain.
- September 1999 **B.S., M.S., Telecommunications Engineering.** Public University of Navarre (UPNA), Pamplona, Spain.

## Experience

### Research experience

- 2018 - Present **Biomedical engineer** in LocSense (<http://locsense.nl/>), Enschede, Netherlands.  
I am the engineer responsible for the development of the software in Java and the data analysis.
- 2017 - 2018 **Postdoctoral fellow** in the Bios lab on a chip in the University of Twente, Enschede, Netherlands.  
Developing an end user interface in Java for a biodetector.
- 2016 - 2017 **Postdoctoral fellow** in the Engineering Technology Department at University of Twente, Enschede, Netherlands.  
I studied different biomedical signals to investigate mechanisms of action of High Flow Therapy and the physiological impact on respiratory mechanics, to find possible Biomarkers which help clinicians deliver this technique in a more optimal and efficient way.
- 2013 - 2014 **Postdoctoral fellow** in the Systems Neuroscience laboratory lead by Dr. María Victoria Sánchez-Vives at August Pi i Sunyer Biomedical Research Institute
- 2008 - 2013 **phD Student** in the Systems Neuroscience laboratory lead by Dr. María Victoria Sánchez-Vives at August Pi i Sunyer Biomedical Research Institute (IDIBAPS), Barcelona, Spain.  
My thesis work focused on the study and mathematical analysis of brain

*Pintor Asarta 7 – 31007, Pamplona, Spain*

☎ +34 652490514 • ✉ [mariapzabalza@gmail.com](mailto:mariapzabalza@gmail.com)

1/6

signals to understand the mechanisms that modulate the slow wave activity, a specific brain rhythm occurring during NREM sleep and under anesthesia, and their possible alterations triggered by different types of pathologies (e.g. Alzheimer, Fragile X).

- 2005 - 2008 **Researcher** in the Research Department at Institut Guttmann - Neurorehabilitation Hospital, Barcelona, Spain.  
I investigated the evolution of patients performing, analyzing and studying multichannel surface electromyography (sEMG) of patients with incomplete spinal cord injury. I carried out this work in collaboration with engineers from the Biomedical Engineering Research Centre (CREB) at the UPC.

### Professional experience

- 2004 -2005 **Software developer** at Norma Consulting, Barcelona, Spain.  
*Client:* Nissan Europe  
*Database:* Oracle  
*Programming Languages:* Natural, Java, Struts, XML, JSP.
- 2001 -2003 **Software developer** at Alten Group, Madrid, Spain.  
*Client:* RACC  
*Database:* Oracle  
*Programming Languages:* PLSQL and XML.  
*Client:* Telefonica I+D  
*Database:* Oracle  
*Programming Languages:* C++ and SQL.
- 2000-2001 **Telecommunication engineer** at the Automatic Control Department at Cetenas Foundation, Pamplona, Spain.

### Research stays performed at other institutions

- Istituto Superiore di Sanita, Rome, Italy. Duration: 3 months. **Aim:** To develop new algorithms for analyzing neuronal signals with Dr. Maurizio Mattia.

### Honours

- Grant at Institut Guttmann - Neurorehabilitation Hospital, Spain. 2005.
- Grant in the Department of Electrical and Electronic Engineering at (UPNA), Spain. 1998.

### Publications

#### Journals

- Patricia Castano-Prat, Lorena Perez-Mendez, **Maria Perez-Zabalza**, Coral Sanfeliu, Lydia Giménez-Llort, Maria Sanchez-Vives, " Altered slow (<1Hz) and fast (beta and gamma) neocortical oscillations in the 3xTg-AD mouse model of Alzheimer's disease" *Neurobiology of Aging* (in press).

- Beatriz Rebollo, **Maria Perez-Zabalza**, Marcel Ruiz-Mejias and Maria V. Sanchez-Vives, "Beta and gamma oscillations in prefrontal cortex during nmda hypofunction: an in vitro model of schizophrenia features". *Neuroscience*. doi.org/10.1016/j.neuroscience.2018.04.035
- Patricia Castano-Prat, **Maria Perez-Zabalza**, Lorena Perez-Mendez, R Eschoriuela and Maria V. Sanchez-Vives, "Slow and fast neocortical oscillations in the senescence-accelerated mouse model SAMP8". *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2017.00141.
- Maria Victoria Sanchez Vives, Maurizio Mattia, Albert Compte, **Maria Perez Zabalza**, Milena Winograd, Vanessa Fernandez Descalzo and Ramon Reig, "Inhibitory modulation of cortical Up states". *Journal of Neurophysiology*. 104 - 3, pp. 1314 -1324. 01/09/2010.
- Hatice Kumru, Joan Vidal Samsó, **Maria Perez**, Pedro Schestatsky and Josep Valls-Sole, "Sympathetic skin responses evoked by different stimuli modalities in spinal cord injury patients". *Neurorehabilitation and Neural Repair*. 23 - 6, pp. 553 - 558. 01/07/2009.

#### Under review

- Maurizio Mattia, **Maria Perez-Zabalza**, Nuria Tort-Colet, and Maria V. Sanchez-Vives, "Multi-scale dynamics underlying neocortical slow oscillations" submitted to *Nature Communications* (NCOMMS1609029T).

#### Works in progress

- **Maria Perez-Zabalza**, Jesus Manrique, Ramon Reig, Milena Winograd, Nestor Parga, Maria Victoria Sanchez Vives, "GABA<sub>B</sub> modulation of cortical rhythmicity: an experimental and computational study".
- M Ruiz-Mejias, **M Perez-Zabalza**, B Rebollo, L Perez-Mendez, L Kargieman, MV Sanchez-Vives, "Control of network oscillations and excitability by the persistent sodium current".
- **M Perez-Zabalza**, R. Hagmeijer, B.J. Thio, J. Bors, X. Hoppenbrouwer, A. Garde, "Analysis of heart rate variability in children during High flow nasal cannula therapy".

#### Conferences

- Rob Hagmeijer, Boony Thio, **María Pérez Zabalza**, Joanne Goorhuis, Steven Wanrooij, Stefan Klooster, Rutger Hebbink, Hidde ter Woord, "In-vitro pressure analysis in nasal high flow therapy for infants". ERS International Congress 2017, 9-13 September 2017 in Milan, Italy.
- Maurizio Mattia, **María Pérez Zabalza**, Núria Tort Colet, María Victoria Sánchez Vives, "Metastable dynamics underlying the multiscale organization of slow oscillations". 46th Annual meeting of the Society of Neuroscience (SfN 2016), 12-16 November 2016 in San Diego, USA.
- **María Pérez Zabalza**, Jose Antonio Sanz, Aranzazu Jurio, Marisol Gómez, Humberto Bustince, "Tackling Brain Computing Interface problems using Fuzzy Rule-Based Classification Systems". XVIII Congreso Español sobre Tecnologías y Lógica Fuzzy. ESTYLF 2016, 25-27 May in San Sebastian, Spain. (Oral presentation by MPZ).
- **María Pérez Zabalza**, Maurizio Mattia, Núria Tort Colet, María Victoria Sánchez Vives, "Slow oscillations: laminar dynamics and role of thalamus". Quantitative Biomedicine for Health and Disease, 24-25 February 2016 in Bilbao, Spain. (Oral presentation by MPZ).

*Pintor Asarta 7 – 31007, Pamplona, Spain*

☎ +34 652490514 • ✉ mariapzabalza@gmail.com

- **María Pérez Zabalza**, Maurizio Mattia, Núria Tort Colet, María Victoria Sánchez Vives, “On the cortical origin of Up states”. Computational and Systems Neuroscience (BARCSYN 2015), 18-19 June 2015 in Barcelona, Spain.
- Beatriz Rebollo, Marcel Ruiz Mejías, **María Pérez Zabalza**, María Victoria Sánchez Vives. “Increased beta/gamma oscillations in prefrontal cortex in an in vitro model of schizophrenia” Computational and Systems Neuroscience (BARCSYN 2014), 16-17 June 2014 in Barcelona, Spain.
- Patricia Castaño Prat, **María Pérez Zabalza**, Rosa Escorihuela, María Victoria Sánchez Vives. “Physical exercise restores prefrontal cortex emergent spectral properties in early aging mouse model SAMP8” Computational and Systems Neuroscience (BARCSYN 2014), 16-17 June 2014 in Barcelona (Spain).
- María Victoria Sánchez Vives, **María Pérez Zabalza**, Beatriz Rebollo, Laura Ciria Suarez, Marcel Ruiz Mejías. “Role of persistent sodium current on cortical rhythms and excitability” 43th Annual meeting of the Society for Neuroscience (SfN 2013), 9-11 November 2013 in San Diego, USA.
- María Victoria Sánchez Vives, Patricia Castaño Prat, **María Pérez Zabalza**, Marcel Ruiz Mejías, Lydia Gimenez. “Altered spontaneous oscillatory activity in the neocortex of a mouse model of alzheimer disease” XV Congreso de la Sociedad Española de Neurociencia (SENC 2013), 25-27 September 2013 in Oviedo, Spain.
- Beatriz Rebollo, Marcel Ruiz Mejías, **María Pérez Zabalza**, Julia Weinert, Lorena Pérez Mendez, María Victoria Sánchez Vives. “Modulating increased high frequency oscillations in the prefrontal cortex in an in vitro model of schizophrenia” XV Congreso de la Sociedad Española de Neurociencia (SENC 2013), 25-27 September 2013 in Oviedo, Spain.
- **María Pérez Zabalza**, Maurizio Mattia, Núria Tort Colet, María Victoria Sánchez Vives. “Cortical origin of Up state onsets and offsets in anesthetized rats” 22th Annual Computational Neuroscience Meeting (CNS 2013), 13-18 July 2016 in Paris, France.
- Marcel Ruiz Mejías, **María Pérez Zabalza**, Beatriz Rebollo, Laura Ciria Suarez, Lucila Kargieman, María Victoria Sánchez Vives. “Control of Cortical Oscillations and Network Excitability by Persistent Sodium Current” Computational and Systems Neuroscience (BARCSYN 2013), 13-14 June 2013 in Barcelona, Spain.
- Julia Weinert, Lorena Pérez Mendez, **María Pérez Zabalza**, María Victoria Sánchez Vives. “Modulating emerging cortical activity with electric fields in brain slices” 5th International Conference on Non-invasive Brain Stimulation, 19-21 March 2013 in Leipzig, Germany.
- Beatriz Rebollo, Marcel Ruiz Mejías, **María Pérez Zabalza**, María Victoria Sánchez Vives. “Increased high frequency oscillatory activity in the prefrontal cortex in an in vitro model of schizophrenia” 8th FENS Forum of Neuroscience, 14-18 July 2012 in Barcelona, Spain.
- María Victoria Sánchez Vives, **María Pérez Zabalza**, Beatriz Rebollo, Laura Ciria Suarez, Albert Compte, Lucila Kargieman, Marcel Ruiz Mejías. “Slow and fast cortical oscillations in the presence of Na<sup>+</sup>-persistent channel blockers” 8th FENS Forum of Neuroscience, 14-18 July 2012 in Barcelona, Spain.

- **María Pérez Zabalza**, Maurizio Mattia, Núria Tort, Marcel Ruiz Mejías, Lucila Kargieman, María Victoria Sánchez Vives. "Spatiotemporal Layer Activation During Cortical Up States" 8th FENS Forum of Neuroscience, 14-18 July 2012 in Barcelona, Spain.
- María Victoria Sánchez Vives, **María Pérez Zabalza**, Jesús Manrique, Ramón Reig, Milena Winograd, Nestor Parga. "*GABA<sub>B</sub>* modulation of emergent cortical rhythms: an experimental and computational study" Computational and Systems Neuroscience (BARCSYN 2011), 14-15 June 2011 in Barcelona, Spain.
- María Victoria Sánchez Vives, **María Pérez Zabalza**, Jesús Manrique, Ramón Reig, Milena Winograd, Nestor Parga. "*GABA<sub>B</sub>* modulation of emergent cortical rhythms: an experimental and computational study" 40th Annual meeting of the Society for Neuroscience (SfN 2010), 13-17 November 2011 in San Diego, USA.
- **María Pérez Zabalza**, Maurizio Mattia, Ramón Reig, Albert Compte, María Victoria Sánchez Vives. "Inhibitory modulation of cortical up states" The Monte Verita' Workshop on the Frontiers in Neuroengineering, 5-9 September 2010 in Ascona, Switzerland.
- María Victoria Sánchez Vives, Ramón Reig, **María Pérez Zabalza**, Vanessa Fernández Descalzo, Milena Winograd, Albert Compte. "Inhibitory modulation of up and down states in the cerebral cortex" 39th Annual meeting of the Society for Neuroscience (SfN 2009), 17-21 October 2009 in Chicago, USA.
- María Victoria Sánchez Vives, Maurizio Mattia, **María Pérez Zabalza**, Vanessa Fernández Descalzo, Ramón Reig. "Inhibitory control of up states and their propagation in the cortical network" 18th Annual Computational Neuroscience Meeting (CNS 2009), 18-23 July 2009 in Berlin, Germany.
- **María Pérez Zabalza**, Miguel Ángel Mañanas Villanueva, Mónica Rojas Martínez, Joan Vidal Samso. "Viabilidad de la Electromiografía Multicanal en pacientes con Lesión Medular Incompleta" XXVI Congreso Anual de la Sociedad Española de Ingeniería Biomédica (CASEIB 2008), 15-17 October 2008 in Valladolid, Spain. (Oral presentation by MPZ).
- Hatice Kumru, Joan Vidal, Pedro Schestatsky, Jesús Benito, **María Pérez Zabalza**, Josep Valls Solé. "Sympathetic skin responses of the in spinal cord injury patients" 13th European Congress of Clinical Neurophysiology, 4-8 May 2008 in Istanbul, Turkey.
- María Victoria Sánchez Vives, Maurizio Mattia, Milena Winograd, **María Pérez Zabalza**, Ramón Reig. "Heterogeneities Of Recurrent Excitation And Spike Frequency Adaptation In The Prefrontal Cortex In Vitro", VII Simposi de Neurobiologia Experimental, Barcelona, Spain.

## ■ Courses attended

- Python for Data Science (<https://www.edx.org/school/uc-san-diegox>), May 2018.
- Intro to Python for Data Science (<https://www.edx.org/school/microsoft>), April 2018.
- Intro to Python for Data Science (<https://campus.datacamp.com>), April 2018.
- "Machine Learning" by Stanford University (<https://www.coursera.org>), March 2016.

Pintor Asarta 7 – 31007, Pamplona, Spain

☎ +34 652490514 • ✉ [mariapzabalza@gmail.com](mailto:mariapzabalza@gmail.com)

5/6

- Mathematical Neuroscience Workshop at International Centre for Mathematical Sciences (ICMS), April 2011 in Edinburgh, United Kingdom.
- XI National Course Of Neuroscience (40 hours), June 2010 in Carmona, Spain.
- Winter School Multichannel Surface EMG in the Laboratory of Engineering of Neuromuscular System and Motor Rehabilitation at Politecnico di Torino, February 2007 in Torino, Italy.
- Course of Java in Academy Adedma, Centre Col-laborador del Departament de Treball de la Generalitat de Catalunya (380 hours), April-July 2003 in Barcelona, Spain.
- HTML, DHTML Course in Academy Adams (60 hours), March 2002 in Madrid, Spain.
- Course of Linux (40 hours) in Centre Ifes (40 hours), May 2000 in Pamplona, Spain.

### Science dissemination

- Les Il·lusions del cervell, 28 October 2008 in Barcelona, Spain
- Salo Del Ensenyament, En El Espai Ciencia Y Tecnologia, 18-23 March 2009 in Barcelona, Spain
- VI Fira Les Il·lusions del Cervell, 8 May 2009 in Barcelona, Spain.
- VII Fira Les Il·lusions del Cervell, 20 December 2010 in Barcelona, Spain

### Languages

- Spanish. Mother tongue.
- English. Fluent written and spoken.
- French. Fluent written and spoken.

### Computer skills

- Operating systems: Windows, Linux.
- Document processing: LaTeX, Microsoft Word.
- Programming Languages: MATLAB, Java, C/C++, Python.
- Graphic Design: CorelDraw, Adobe Illustrator.