ORIOL PAVÓN AROCAS

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Education

2016 – present
Doctor of Philosophy (Ph.D.), Neuroscience
Sainsbury Wellcome Centre for Neural Circuits and Behaviour
University College London, UK
Supervisor: Prof Dr Tiago Branco

2013 – 2015
Master of Science (M.Sc.), Neuroscience
Graduate School of Systemic Neurosciences
Ludwig-Maximilians-Universität München, Germany
GPA: 1.31 (German system)

2009 – 2013
Bachelor of Science (B.Sc.), Biomedical Sciences
Universitat Autònoma de Barcelona, Bellaterra (Barcelona), Spain
GPA: 8.39/10

Publications

[Google Scholar]

bioRxiv | 2020
A cortico-collicular circuit for accurate orientation to shelter during escape
Vale R, Campagner D*, Iordanidou P, **Pavón Arocas O**, Tan YL, Stempel AV, Keshavarzi S, Petersen R, Margrie T, Branco T*

eLife | 2020
Ca^{2+} entry through Na_V channels generates submillisecond axonal Ca^{2+} signalling
Hanemaaijer NAK, Popovic MA*, Wilders X, Grasman S, **Pavón Arocas O**, Kole MHP*

Neuron | 2019
The neuropeptide Galanin is required for homeostatic rebound sleep following increased neuronal activity
*Reichert S, **Pavón Arocas O**, Rihel J*

Skills & Competences

Technical skills
Loose-seal and whole-cell patch clamp recordings in acute brain slices.
Single-cell RNA sequencing from manually aspirated cells via patch pipettes.
Two-photon laser scanning microscopy, photoactivatable GFP tracing.
Simultaneous patch-clamp recordings and calcium imaging in acute brain slices.
Optogenetics, behavioural and pharmacological assays, stereotaxic surgeries.
Confocal microscopy, cryostat and vibratome slicing.
Immunohistochemistry and fluorescence in situ hybridization (FISH).
Molecular biology (PCR, DNA/RNA extraction, western blot, electrophoresis).
Animal models: rat, mouse, zebrafish, catfish, *Drosophila,* leech, *Xenopus laevis.*

Programming skills & Software
[GitHub]
Python for electrophysiology data analysis.
R and Bioconductor for single-cell RNA sequencing data analysis.
MATLAB for data analysis, *in silico* screening for *Drosophila* transgenic lines, and registration of larval zebrafish brain stacks and mouse brain sections.
LabView, Axograph, IGOR Pro, and pCLAMP for electrophysiology.
PrairieView, ScanImage, and Neuroplex-IDL for calcium imaging and two-photon microscopy.

Languages
Native in **Catalan** and **Spanish**
Proficient in **English** (CAE Grade B), Basic **German** (A2)

Teaching & Mentoring

13. 10. 2020 — Teaching Assistant for the Experimental Neuroscience Course on Fundamentals of Electrophysiology, part of the SWC-PhD Programme at UCL [online]

01. 2020 – 07. 2020 — Supervised Lucille Duquenoy during her Master Thesis project, Interdisciplinary Master's in Life Sciences, École Normale Supérieure - PSL Université Paris

01. 10. 2018 – 12. 10. 2018 — Teaching Assistant for the Experimental Neuroscience Course on Fundamentals of Electrophysiology, part of the SWC-PhD Programme at UCL

10. 2017 – 09. 2018 — Supervised Sarah F. Olesen during her Master Thesis project, M.Sc. Neuroscience, University College London

Summer Semester 2014 — Organised and coordinated a weekly Journal Club on Learning and Memory for the M.Sc. Neurosciences at the GSN-LMU in Munich

Protocols

Protocols.io | 2021 — Visually guided aspiration of fluorescently labelled single neurons from acute midbrain slices followed by Smart-seq2
Pavón Arocas O*, Olesen SF, Branco T*

Protocols.io | 2021 — Preparation of acute midbrain slices for patch-clamp recordings
Pavón Arocas O*, Branco T*

Protocols.io | 2021 — Fluorescent In Situ Hybridization (FISH - RNAscope) in mouse brain sections
Tan YL, ***Pavón Arocas O****, Duquenoy L, Branco T*

Fellowships & Awards

06. 2019 — External Training Course Fund towards CSHL Ion Channels course | £1,000.00
School of Life and Medical Sciences, University College London

06. 2018 — External Training Course Fund towards NSAS Cell Types course | £802.00
School of Life and Medical Sciences, University College London

2016 – 2020 — Wellcome Trust 4-Year PhD in Neuroscience | £133,252.00
University College London

Wellcome Trust 4-Year Doctoral Programme in Neuroscience (M.Sc. + DPhil)
University of Oxford (Declined)

DPhil in Ion Channels and Membrane Transport in Health and Disease (OXION)
funded by the University of Oxford (Declined)

MRes/PhD in Developmental Neurobiology
King's College London (Declined)

03. 2015 – 09. 2015 — Erasmus+ Traineeship Scholarship, M.Sc. Thesis Project in Oxford | £2,425.4
European Commission

08. 10. 2014 — Poster Award – Rookie of the Year 2014 (best poster for a M.Sc. student)
GSN Symposium, Graduate School of Systemic Neurosciences, LMU Munich

10. 2014 – 12. 2014 — Erasmus+ Traineeship Scholarship, M.Sc. Rotation 2 in Amsterdam | £924.3
European Commission

Research experience

09. 2017 – present **PhD Thesis | Biophysical properties and gene expression profile of single Periaqueductal Gray neurons**
Sainsbury Wellcome Centre for Neural Circuits and Behaviour, University College London, UK
I am combining electrophysiology and single-cell RNA sequencing to investigate the contribution of midbrain inhibitory neurons to the computation and selection of defensive behaviours to innately threatening stimuli and identify molecular signatures of biophysical properties critical for computing such behaviours.
Thesis director: **Prof Dr Tiago Branco**

05. 2017 – 07. 2017 **PhD Rotation 3 | Whole-brain activity maps of drug-induced sleep rebound in larval zebrafish**
Department of Cell and Developmental Biology, University College London, UK
Followed a combinatorial approach including behavioural assays, immunohistochemistry, two-photon imaging, and registration of whole-brain activity maps to investigate sleep regulation in zebrafish.
Supervisor: **Prof Dr Jason Rihel**

02. 2017 – 04. 2017 **PhD Rotation 2 | Inhibition in the Periaqueductal Gray**
Sainsbury Wellcome Centre for Neural Circuits and Behaviour, University College London, UK
Employed targeted somatic cell-attached and whole-cell recordings, ChR2-assisted circuit mapping, electrical stimulation, and pharmacology to study the properties and connectivity of VGAT+ neurons in a midbrain circuit involved in the computation of innate defensive behaviours.
Supervisor: **Prof Dr Tiago Branco**

11. 2016 – 01. 2017 **PhD Rotation 1 | Noradrenergic modulation of astrocytic glutamate uptake currents**
Department of Neuroscience, Physiology and Pharmacology, University College London, UK
Combined whole-cell patch-clamp recordings with pharmacology in acute brain slices of rat hippocampus to study the glutamate uptake currents of astrocytes and their regulation by neuromodulators.
Supervisor: **Prof Dr David Attwell**

03. 2015 – 09. 2015 **M.Sc. Thesis | Sleep regulation in *Drosophila***
Centre for Neural Circuits and Behaviour, DPAG, University of Oxford, UK
For my M.Sc. Thesis I established a photoactivatable GFP-based tracing method combined with two-photon laser scanning microscopy to map the neuronal circuitry involved in the homeostatic regulation of sleep in *Drosophila.*
Thesis directors: **Prof Dr Gero Miesenböck** and **Prof Dr Alexander Borst**

01. 2015 – 03. 2015 **M.Sc. Rotation 3 | Neuronal mechanisms of vocal patterning in the catfish *Ariopsis seemani***
Division of Neurobiology, Faculty of Biology, LMU München, Germany
Establishment of a whole-brain preparation for *in vitro* electrophysiology to study the neuronal mechanisms of vocal patterning in the catfish *Ariopsis seemani.*
Supervisor: **Prof Dr Boris Chagnaud**

10. 2014 – 12. 2014 **M.Sc. Rotation 2 | Calcium dynamics in the axon initial segment**
Dept. Axonal Signalling, Netherlands Institute for Neuroscience, Amsterdam, Netherlands
Combined whole-cell patch-clamp recordings with OGB-1-based calcium imaging and pharmacology to study the calcium dynamics underlying action potential generation in the axon initial segment of layer V pyramidal neurons of somatosensory cortex in acute brain slices of mice and rats.
Supervisors: **Prof Dr Maarten H.P. Kole** and **Dr Marko Popovic**

02. 2014 – 04. 2014 **M.Sc. Rotation 1 | Optogenetic manipulation of the lateral septum in mice selectively bred for high anxiety-related behaviour**
Neuronal Plasticity Group, Max Planck Institute of Psychiatry, München, Germany
Performed bilateral injections of AAV constructs carrying Archaerhodopsin to ventral hippocampal cells projecting to the lateral septum to assess the effects of optogenetic inhibition of these projections on anxiety-related behaviour in the open field and elevated plus maze tests.
Supervisor: **PD Dr Carsten Wotjak**

10. 2012 – 06. 2013 **B.Sc. Thesis | Potentiation and recovery of memory by ICSS in rats**
Institute of Neurosciences, Universitat Autònoma de Barcelona, Spain
Stereotaxic surgeries to implant electrodes in the medial forebrain bundle in the lateral hypothalamus and to perform electrolytic lesions in the lateral amygdala. Performed behavioural training of rats in a two-way shuttle box active avoidance-conditioning task followed by intracranial self-stimulation (ICSS) in a Skinner box.
Supervisor: **Dr Pilar Segura Torres**

Additional experience

04. 2014 – 10. 2014 Research assistant at the group of **Prof Dr Benedikt Berninger** investigating the role of Sox2 in direct lineage reprogramming of astroglia and pericytes to neurons.
Institute of Physiology, Dept. Physiological Genomics, LMU München, Germany

08. 2012 Research exchange student (IFMSA) with **Prof Dr M. Zafer Gören** studying the effects of the GABAergic system in DMH of rats with haemorrhagic shock.
Dept. of Medical Pharmacology, Faculty of Medicine, Marmara University, Istanbul, Turkey

10. 2011 – 12. 2011 Research internship with **Dr Elisa Martró** investigating the genetic variability of the hepatitis C genotype 1 virus in relation to the antiviral treatment response.
Dept. of Microbiology, Hospital Universitari Germans Trias i Pujol, Badalona, Spain

08. 2011 – 09. 2011 Summer internship at the group of **Dr Ruben López-Vales** learning molecular biology and histology techniques to study a murine model of spinal cord injury.
Institute of Neurosciences, Universitat Autònoma de Barcelona, Spain

07. 2011 Summer internship with **Dr Rosa Mirapeix** performing micro- and macro-dissections of the human Central Nervous System.
Faculty of Medicine, Universitat Autònoma de Barcelona, Spain

Additional courses

4-24. 06. 2019 Ion Channels in Synaptic and Neural Circuit Physiology
Cold Spring Harbor Laboratory, New York, US

8-12. 04. 2019 RNA-Sequence Analysis
EMBL European Bioinformatics Institute, Wellcome Genome Campus, Hinxton, UK

23-30. 06. 2018 Cell Types, Coding and Cognition: neuronal connectivity and functional activity
Neuroscience School of Advanced Studies, Venice, Italy

10. 2015 – 12. 2015 Introduction to Programming with MATLAB, *Vanderbilt University via Coursera*

03. 2013 – 07. 2013 Synapses, Neurons and Brains, *Hebrew University of Jerusalem via Coursera*

Winter 2012 Drugs and the Brain, *California Institute of Technology via Coursera*

07. 2011 "The Neurodegenerative Disease" and "Stem Cells: from theory to clinics"
Two 20-hour Courses, *III University of Barcelona International Summer School, Spain*

Writing & Editing

10. 2015 – present — Blogger at La Neurona Errant | A neuroscientist point of view
I have also collaborated with and written for Neuromag, Phenotype, Principia, GSN Munich, and En Clave Biomédica

07. 2017 – 08. 2018 — Section editor at Bright Brains, newsletter by the British Neuroscience Association

10. 2016 – 06. 2019 — Page editor at Bright Brains, newsletter by the British Neuroscience Association

06. 2018 — Official blogger for the 2018 UCL Neuroscience Symposium

06. 2017 — Official blogger for the 2017 UCL Neuroscience Symposium

05. 2016 — Finalist at YabberXDivulgame, a science writing and communication competition

07. 2015 – 02. 2017 — Page editor at Phenotype, Journal of the Oxford University Biochemical Society

09. 2014 – 11. 2015 — Member, Science Communicator and Web Designer of Asociación Juvenil de Biomédicos (UAB) – En Clave Biomédica

05. 2007 — Finalist at Ficcions, a writing competition for High School students

Talks & Posters

30. 09. 2020 — Invited talk as part of the "Career Paths: Research trajectories" event organised by the Universitat Autònoma de Barcelona [link to event in Catalan]

24. 04. 2020 — Took part in the event "STEM E-Talks: Let's Talk Science" organised by the Stella Network and XhM Foundation [link to event]

14-15. 09. 2019 — "Topographic, single-cell gene expression profiling of Periaqueductal Gray neurons". Poster at the 18th CRG Symposium: "Single cell and single molecule Biology", Barcelona [link to event]
Pavón Arocas O*, Olesen SF, Branco*

Extracurricular activities

11. 2018 – 09. 2019 — Co-organised the first GCNU-SWC PhD Student Retreat*, London, UK*

09. 2018 – 08. 2019 — President of the University of London Judo Club, *London, UK*

03. 2018 – 10. 2018 — Co-organised the 2018 NEUReka! and SWC joint Symposium: "What is the quantum of neural computation?", *London, UK*

03. 2018 – 09. 2018 — Co-organised the 2018 SWC Systems Seminar: "Cross-Species Conversations: integrating findings across nervous systems", *London, UK*

09. 2017 – 08. 2018 — Treasurer of the University of London Judo Club, *London, UK*

13. 07. 2013 — Judo black belt 2nd DAN, *Real Federación Española de Judo y Deportes Asociados*

07. 2012 — Volunteer staff at the **8th FENS Forum of Neuroscience**, *CCIB, Barcelona, Spain*

06. 2008 — Physis 2008, 1st Physics Summer Camp, *University of Barcelona, Spain*

1994 – 2007 — Clarinet and music student at *Music School of Sant Joan de Vilatorrada, Spain*