Oriol Pavón Arocas, PhD

Website | Email | LinkedIn | ORCID | Google Scholar | GitHub

Professional experience

01. 2023 – present **Advanced Bioinformatics Data Scientist |** Benevolent AI

» Omics data ingestion to support target identification and hypothesis validation.

09. 2022 – 12. 2022 **Bioinformatics Data Scientist Intern |** Benevolent AI

» Designed, tested, and optimised a data processing pipeline for Perturb-seq single-cell omics data to support target identification and hypothesis validation.

» Worked effectively under Agile/Scrum frameworks in a multidisciplinary team.

» Presentation of results and knowledge sharing across teams and stakeholders.

09. 2016 – 08. 2022 **Researcher in Neuroscience |** University College London

» Designed and completed two parallel projects, contributed to several collaborations, and secured and managed independent funding (~215,000 GBP).

» Used a range of data analysis and machine learning techniques (dimensionality reduction, k-means and graph-based clustering, linear regression) to gain insights from single-cell transcriptomics and electrophysiological data.

» Prepared two first author publications and wrote high-quality abstracts, protocols, and grant proposals, collating and synthesising complex quantitative data.

» Established regular meetings with stakeholders to convey results and assess research strategy. Regularly presented at internal and international conferences.

» Trained and managed three students during their MSc thesis, supervising the design, execution, and completion of multiple projects.

Skills & Competences

Python programming [GitHub] Pandas, NumPy, SciPy, Matplotlib, Seaborn, and Brainrender for processing and analysis of electrophysiological data and 3D-rendering of neuroanatomical data.

R programming [GitHub] STAR, FastQC, Scater, Scran, Seurat, t-SNE, UMAP, SC3, ggplot2, pheatmap, limma, DESeq2, and edgeR for single-cell RNA-sequencing data analysis, including cleaning, quality control, dimensionality reduction, clustering, differential expression analysis, and data visualisation.

Other programming skills Git, Bash, MATLAB, Jupyter, Markdown, Docker, Kubeflow, Kubernetes, WDL, DNAnexus, Amazon Web Services, Redshift, cloud computing.

Research Project design, data acquisition, quantitative analysis, and interpretation of results. Patch-clamp recordings and calcium imaging in acute brain slices, single-cell RNA sequencing, confocal and two-photon laser scanning microscopy, optogenetics, stereotaxic surgeries for injection of viral constructs and implantation of optic fibres, behavioural assays, cryostat and vibratome slicing, fluorescent in situ hybridization, immunohistochemistry, molecular biology.
Animal models: rat, mouse, zebrafish, catfish, *Xenopus laevis, Drosophila,* leech.

Soft skills Effective oral and written communicator to specialist and non-specialist audiences. Agile, Scrum, collaborative working, project and stakeholder management. Supervising, mentoring, and teaching in multidisciplinary and multicultural teams.

Software Document processing: MS Office (Word, Excel, PowerPoint).
Statistics and figure design: GraphPad, Illustrator, Affinity Designer & Photo.
Microscopy: ImageJ, Fiji, and Zeiss Zen (image processing), PrairieView and ScanImage (two-photon), Leica LASX (confocal), NeuroPlex (calcium imaging).

Languages Native in **Catalan** and **Spanish,** Fluent in **English**, Basic **German** (A2).

Education

2016 – 2022 **Doctor of Philosophy (Ph.D.), Neuroscience**
Sainsbury Wellcome Centre for Neural Circuits and Behaviour
University College London, UK

2013 – 2015 **Master of Science (M.Sc.), Neuroscience**
Graduate School of Systemic Neurosciences
Ludwig-Maximilians-Universität München, Germany

2009 – 2013 **Bachelor of Science (B.Sc.), Biomedical Sciences**
Universitat Autònoma de Barcelona, Spain

Publications

Nature | 2023 A cortico-collicular circuit for orienting to shelter during escape
Campagner D, Vale R*, Tan YL, Iordanidou P,* ***Pavón Arocas O****, Claudi F, Stempel AV, Keshavarzi S, Petersen RS, Margrie TW, Branco T*

Plos One | 2022 Preparation of acute midbrain slices containing the superior colliculus and periaqueductal gray for patch-clamp recordings
Pavón Arocas O*, Branco T*

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

eLife | 2020 Ca^{2+} entry through Nav 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*

Conference presentations

25. 07. 2022 "Biophysical properties and gene expression profile of single Periaqueductal Gray neurons in the mouse brain". Poster at the 14th International Congress of Neuroethology, held in Lisbon [link to event]
Pavón Arocas O*, Olesen SF, Branco T*

11. 07. 2022 "Biophysical properties and gene expression profile of single Periaqueductal Gray neurons". Poster at the 13th FENS Forum of Neuroscience, held in Paris [link]
Pavón Arocas O*, Olesen SF, Branco T*

05. 11. 2021 "Inhibition in a midbrain circuit controlling instinctive escape decisions". Poster at the 19th Congress of the Spanish Society of Neuroscience, selected for a Short Oral Teaser Talk [link to event]
Pavón Arocas O*, Stempel V, Olesen SF, Branco T*

15. 06. 2021 "Topographic gene expression profiling of single Periaqueductal Gray neurons". Poster at the 12th UCL Neuroscience Symposium, selected for a short live presentation [link to event]
Pavón Arocas O*, Olesen SF, Branco*

30. 09. 2020 Invited speaker at the "Career Paths: Research trajectories" event organised by the Universitat Autònoma de Barcelona [link to event and video in Catalan]

24. 04. 2020 Invited speaker at 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, held in Barcelona [link to event]
Pavón Arocas O*, Olesen SF, Branco T*

Advanced 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

Fellowships & Awards

07. 2022 — Bursary to present at the 13th FENS Forum of Neuroscience in Paris | £ 182.50
British Neuroscience Association (BNA)

11. 2021 — Travel Grant to present at the 19th Congress of the SENC in Spain | € 350.00
Sociedad Española de Neurociencia (SENC)

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 – 2021 — Wellcome Trust 4-Year PhD in Neuroscience | £ 210,314.35
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
fully funded by 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

Teaching & Mentoring

09. 2021 – 07. 2022 — Supervised Tinya Chang during her Master Thesis project, M.Sc.i. Neuroscience, University College London

2021 & 2022 — Volunteer at the Social Mobility Foundation's personal statement checking service

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

1-12. 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

Research experience

09. 2017 – 08. 2022 **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
Combined electrophysiology and single-cell RNA sequencing to investigate the molecular and biophysical properties of midbrain neurons critical to the computation and selection of defensive behaviours to innately threatening stimuli.
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.
Supervisor: **PD Dr Carsten Wotjak**

Writing & Editing

10. 2015 – present — Blogger & scientific writer at La Neurona Errant | A neuroscientist's point of view
My writing has appeared in the SWC Blog, the UCL Blog, Neuromag, Phenotype, Principia, GSN Munich, and En Clave Biomédica

10. 2021 – present — Proof-reader, page editor, and writer for Principia Magazine

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 — Science Communicator and Web Designer of Asociación Juvenil de Biomédicos

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

Planning & Management

11. 2018 – 09. 2019 — Co-organised the first GCNU-SWC PhD Student Retreat*, London, UK*
Designed schedule, raised funds, booked venue and transport, helped run activities.

09. 2018 – 08. 2019 — President of the University of London Judo Club, *London, UK*
Managed a team of three, planned and allocated tasks, maintained website and social media, liaised with coaches, members, and University, captained the team in competitions.

03. 2018 – 10. 2018 — Co-organised the 2018 NEUReka! and SWC joint Symposium: "What is the quantum of neural computation?", *London, UK*
Designed event, invited and liaised with speakers, advertisement and registrations, ran event.

03. 2018 – 09. 2018 — Co-organised the 2018 SWC Systems Seminar: "Cross-Species Conversations: integrating findings across nervous systems", *London, UK*
Designed event, invited and liaised with speakers, advertisement and registrations, ran event.

09. 2017 – 08. 2018 — Treasurer of the University of London Judo Club, *London, UK*
Managed grant funds, financial planning, budgeting, processed payments and expense claims, record keeping, helped members with registration, membership issues, and fees.

04. 2014 – 07. 2014 — Organised and coordinated a weekly Journal Club on Learning and Memory for the M.Sc. Neurosciences at the GSN-LMU in Munich

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

Courses & Certifications

09. 2022 "Agile Foundations" and "Scrum: The Basics", *LinkedIn Learning*

14-16. 07. 2021 La Divulgación Científica: un relato transmedia, *Universidad de Murcia [online]*

03. 2017 Home Office Licensee Training Modules PIL A&B for Zebrafish and Medaka, *Royal Society of Biology via University College London*

10. 2016 Home Office Licensee Training Modules E1/L and PIL ABC for Rat and Mouse, *Royal Society of Biology via University College London*

01. 2016 – 04. 2016 Escriptura de Blogs, *Laboratori de Lletres [online]*

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

10. 2015 – 12. 2015 Iniciació a la Narrativa, *Escola d'Escriptura de l'Ateneu Barcelonès*

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

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*

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

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*

10. 2012 – 06. 2013 Research internship with **Dr Pilar Segura Torres** performing stereotaxic surgeries for electrode implantation (medial forebrain bundle) and electrolytic lesions (lateral amygdala), as well as behavioural training (two-way active avoidance-conditioning and intracranial self-stimulation in a Skinner box) within the project **Potentiation and recovery of memory by intracranial self-stimulation in rats**. *Institute of Neurosciences, Universitat Autònoma de Barcelona, Spain*

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*