



# ORIOL PAVÓN AROCAS, PhD

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## Professional experience

01. 2023 – present **Advanced Bioinformatics Data Scientist** | Benevolent AI
- » As part of the Omics Data team, responsible for the end-to-end strategy for Next-Generation Sequencing data, a solution to simplify and scale the capture, processing, and storage of Omics data to support and enable drug discovery.
  - » Develop and maintain a robust bulk RNA-seq data analysis and ingestion pipeline. Refactor components to be reusable and unpluggable, support testing and orchestration to facilitate the scale up and automation of the pipeline.
  - » Fulfil Omics data ingestion requests to support target identification and hypothesis validation for our disease programmes (incl. Oncology, Diabetes, Osteoarthritis). Collaborate with experimentalists, bioinformaticians, software engineers, and drug discovery scientists, as well as project partners to ensure timely delivery of results.
  - » Support the Genetic Engineering team in the establishment of CRISPR assays and metadata capture workflow. Scope and develop a PoC pipeline, laying the basis for an end-to-end workflow to analyse and ingest pooled CRISPR screens data.
  - » Prepare and present analysis reports to stakeholders, participate in code reviews, write thorough documentation to share knowledge within and beyond our team.
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.
  - » Presented results in knowledge sharing sessions across teams and stakeholders.
09. 2016 – 08. 2022 **Researcher in Neuroscience** | University College London
- » Designed and completed two parallel projects, trained and managed three students during their MSc thesis, secured and managed independent funding (~£215,000).
  - » 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.
  - » 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.

## 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

## Skills & Competences

Programming languages	Fluent in Python, R, and Bash; fundamentals of SQL, Markdown, MATLAB, WDL.
Databases & Cloud computing	Amazon Web Services (S3, Redshift), CLI, Databricks, DataGrip, DNAnexus, Docker, GraphQL, Jupyter Notebooks, Kubeflow, Kubernetes.
Bioinformatic analysis of Omics data	FastQC, MultiQC, Cutadapt, STAR, Bowtie2, RSEM, Scater, Scran, Seurat, t-SNE, UMAP, SC3, ggplot2, pheatmap, limma, DESeq2, edgeR, and MAGeCK for end-to-end analysis of Omics data ( <b>bulk and single-cell RNA-seq, Perturb-seq, pooled CRISPR screens</b> ), including cleaning, quality control, dimensionality reduction, clustering, differential expression analysis, data visualisation, ingestion.
Data analysis and visualisation	Pandas, NumPy, SciPy, Matplotlib, Seaborn, and Brainrender for processing and analysis of electrophysiological data and 3D-rendering of neuroanatomical data.
Other programming skills	Version control (Git, GitLab, GitHub, Pull/Merge requests), unit testing (PyTest). Pipeline automation and scalability on high-performance computing clusters.
Software	Collaborative working: Jira, Confluence, Google Workspace, LucidChart. 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).
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, <i>Xenopus laevis</i> , <i>Drosophila</i> , leech.
Soft skills	Strong oral and written communicator to specialist and non-specialist audiences. Collaborative working in cross-functional teams under Agile/Scrum frameworks. Project and stakeholder management, attention to detail, proactive problem solver. Supervising, mentoring, and teaching in multidisciplinary and multicultural teams.
Languages	Native in <b>Catalan</b> and <b>Spanish</b> , Fluent in <b>English</b> , Basic <b>German</b> (A2).

## Advanced training

4–24. 06. 2019	Ion Channels in Synaptic and Neural Circuit Physiology <i>Cold Spring Harbor Laboratory, New York, US</i>
8–12. 04. 2019	RNA-Sequence Analysis <i>EMBL European Bioinformatics Institute, Wellcome Genome Campus, Hinxton, UK</i>
23–30. 06. 2018	Cell Types, Coding and Cognition: neuronal connectivity and functional activity <i>Neuroscience School of Advanced Studies, Venice, Italy</i>

## Publications

Nature   2023	A cortico-collicular circuit for orienting to shelter during escape <i>Campagner D*, Vale R*, Tan YL, Iordanidou P, <b>Pavón Arocas O</b>, [...], Branco T</i>
Plos One   2022	Preparation of acute midbrain slices containing the superior colliculus and periaqueductal gray for patch-clamp recordings <i><b>Pavón Arocas O</b>, Branco T</i>
Protocols.io   2021	Visually guided aspiration of fluorescently labelled single neurons from acute midbrain slices followed by Smart-seq2 <i><b>Pavón Arocas O</b>, Olesen SF, Branco T</i>
Protocols.io   2021	Fluorescent In Situ Hybridization (FISH - RNAscope) in mouse brain sections <i>Tan YL, <b>Pavón Arocas O</b>, Duquenoy L, Branco T</i>
eLife   2020	Ca <sup>2+</sup> entry through Nav channels generates submillisecond axonal Ca <sup>2+</sup> signalling <i>Hanemaaijer NAK*, Popovic MA*, Wilders X, Grasman S, <b>Pavón Arocas O</b>, Kole MHP</i>
Neuron   2019	The neuropeptide Galanin is required for homeostatic rebound sleep following increased neuronal activity <i>Reichert S, <b>Pavón Arocas O</b>, Rebel J</i>

## Conference presentations

25. 07. 2022  
Lisbon, Portugal “Biophysical properties and gene expression profile of single Periaqueductal Gray neurons in the mouse brain”. Poster at the 14<sup>th</sup> International Congress of Neuroethology [[link to event](#)]  
*Pavón Arocas O, Olesen SF, Branco T*
11. 07. 2022  
Paris, France “Biophysical properties and gene expression profile of single Periaqueductal Gray neurons”. Poster at the 13<sup>th</sup> FENS Forum of Neuroscience [[link to event](#)]  
*Pavón Arocas O, Olesen SF, Branco T*
05. 11. 2021  
Lleida, Spain “Inhibition in a midbrain circuit controlling instinctive escape decisions”. Poster at the 19<sup>th</sup> 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  
London, UK “Topographic gene expression profiling of single Periaqueductal Gray neurons”. Poster at the 12<sup>th</sup> UCL Neuroscience Symposium, selected for a short live presentation [[link to event](#)]  
*Pavón Arocas O, Olesen SF, Branco*
30. 09. 2020  
virtual 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  
virtual 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  
Barcelona, Spain “Topographic, single-cell gene expression profiling of Periaqueductal Gray neurons”. Poster at the 18<sup>th</sup> CRG Symposium [[link to event](#)]  
*Pavón Arocas O, Olesen SF, Branco T*

## Fellowships & Awards

07. 2022 Bursary to present at the 13<sup>th</sup> FENS Forum of Neuroscience in Paris | £ 182.50  
*British Neuroscience Association (BNA)*
11. 2021 Travel Grant to present at the 19<sup>th</sup> 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*

## 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 Archærodopsin 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*

## 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

## 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 [SWC Systems Seminar](#): “Cross-Species Conversations: integrating findings across nervous systems” and 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.
- 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*

## 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](#)
- 10. 2016 – 06. 2019 Editor at [Bright Brains](#), newsletter by the British Neuroscience Association
- 06. 2017 & 06. 2018 Official blogger for the [2017](#) and [2018 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

## Courses & Certifications

- 01–02. 2023 “Docker for Windows”, “Learning Git and GitHub”, and “8 Git Commands You Should Know”, *LinkedIn Learning*
11. 2022 “Learning Bash Scripting”, *LinkedIn Learning*
09. 2022 “Agile Foundations” and “Scrum: The Basics”, *LinkedIn Learning*
03. 2017 “Home Office Licensee Training Modules PIL AB for Zebrafish and Medaka”, *Royal Society of Biology*
10. 2016 “Home Office Licensee Training Modules E1/L and PIL ABC for Rat and Mouse”, *Royal Society of Biology*
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, 1<sup>st</sup> 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*