Dr. Joana Soldado Magraner

Curriculum Vitae

"Be ashamed to die until you have won some victory for humanity" Horace Mann

Education

2013–2018 **PhD**, The Gatsby Computational Neuroscience Unit, University College London (UCL), London, UK.
PhD program in Theoretical Neuroscience and Machine Learning

2011–2013 **MSc**, Institute of Neuroinformatics, ETH-UZH, Zürich, Switzerland.
Master's program in Neural Systems and Computation

2009–2010 **BSc&MSc**, RWTH-Aachen, Aachen, Germany.
Erasmus programme exchange year, BSc+MSc in Physics.

2006–2011 **BSc&MSc**, Universitat de València, València, Spain.
Licenciatura (BSc+MSc) in Physics.

Academic Employment History

2019-present **Postdoctoral Research Associate**, Carnegie Mellon University, Pittsburgh, US.

2018-2019 **Postdoctoral Research Associate**, The Gatsby Computational Neuroscience Unit, UCL, London, UK.

2012–2013 **Research Assistant**.
HIFO, Brain Research Institute, University of Zürich

Postdoc project

project *Patterned microstimulation neurotechnologies for the control of prefrontal cortex dynamics and computation.*

advisors Matthew Smith and Byron Yu

PhD thesis

thesis *Linear dynamics of evidence integration in contextual decision making.*

supervisor Maneesh Sahani

minor *First-order approximation of cross-validation for automatic regularization of estimators*

supervisor Aapo Hyvarinen

Master thesis

thesis *Integration of evidence in Recurrent Neural Networks with synaptic normalization.*

supervisors Michael Pfeiffer, Valerio Mante and Kevan Martin

Additional research experience

Research projects

2013 **Msc short project**, *Learning Reward States in a Probabilistic Categorisation Task*.
Institute of Neuroinformatics, ETH-UZH Zürich.
Supervisor: Michael Pfeiffer.

2012 **Msc short project**, *Analysing two photon microscopy data from recordings of long-range projection neurons in somatosensory cortex of awake behaving mice*.
HIFO, Brain Research Institute, University of Zürich.
Supervisors: Jerry Chen and Fritjof Helmchen.

Research fellowships

2009 **JAE-Intro (CSIC Research Introduction Scholarship)**, ATLAS Silicon Forward Tracker Group and GRID Computing Group, IFIC, CSIC-UV Particle Physics Institute, València, Spain.

2008 **Research internship**, Environmental Radioactivity Laboratory, UV, Universitat de València, Spain.

Academic experience

Mentoring

2021-present **Supervisor**, *Yuki Minai*, PhD Thesis, PhD program in Neural Computation and Machine Learning, CMU.
'A closed-loop BCI system to control neural activity and behavior'

2021-2023 **Supervisor**, *Lucas Nadolskis*, MSc Thesis, Biomedical Engineering, CMU.
'Exploring top-down visual pathways using micro-stimulation and its applications to cortical visual prosthesis'
Blind student who successfully completed a master research program adapted to his disability.

2021 summer **Mentor**, Neuromatch Academy.

2020-2021 **Supervisor**, *Mathew Hall*, MSc Thesis, Biomedical Engineering, CMU.
'A convolutional neural network for generalized and efficient spike classification'

2017-2018 **Supervisor**, *Eugenie Ordonneau*, BSc Natural Sciences Literature Review module, UCL.
'Decision-making cortical circuits for motion perception in the saccadic system of primates'

Teaching

2023,2024 **Teaching Coordinator**, *Teaching and Research in Natural Sciences for Development in Africa (TReND)*, summer school.
Computational Neuroscience and Machine Learning Basics

2023,2024 **Instructor**, *TReND course in Computational Neuroscience and Machine Learning Basics*, summer school.
Machine Learning module: Dimensionality reduction techniques for neural data analysis

2016 **Teaching Assistant**, *Society for Neuronscience (SfN)*, short course.
Data Science and Data Skills for Neuroscientists

2014 **Teaching Assistant**, Theoretical Neuroscience, The Gatsby Unit, UCL.
PhD programme in Theoretical Neuroscience and Machine Learning

Reviewing

2022,2023 **Cosyne**, *Reviewer*, Computational and Systems Neuroscience conference.

2023 **Cell**, *Co-reviewer*, Scientific journal.

2021 **Nature**, *Co-reviewer*, Scientific journal.

2020 **Neuron**, *Co-reviewer*, Scientific journal.

2018 **NEURIPS**, *Reviewer*, Neural Information Processing Systems conference.

Conferences, workshops and schools

2023,2024 **Co-organiser**, *TReND*, School in Computational Neuroscience Basics.
An intensive two-week course to teach African students the basics of Computational Neuroscience: a thriving and cost-effective research field to boost scientific capacity in the continent

2019 **Co-organiser**, *CapoCaccia*, Cognitive Neuromorphic Engineering Workshop.
Working group: sRNNs stability, training and dynamics analysis

2019 **Co-organiser**, *Cosyne*, Computational and Systems Neuroscience workshop.
Data, dynamics and computation: using data-driven methods to ground mechanistic theory

Boards and Commitees

2020–present **Member**, IEEE Neuroethics working group.
Contributing to write guidelines for the use of neurotechnologies and discussing their ethical, legal, social, and cultural implications.

2012–2013 **Board Member**, Frei Denken Zürich.
Founded by an interdisciplinary group of students from Neuroscience, Medicine, Engineering, Philosophy and Ethics to promote 'Free Thinking' and rationality among students and the public.

2008–2009 **Student representative**, Physics Faculty Committee, Universitat de València.

2008–2009 **Board member**, Physics Student Association, Universitat de València.

Competitions and awards

2019 **NEUROTECH fellowship**, *CapoCaccia*, Cognitive Neuromorphic Engineering Workshop.

2015 **Honourable mention**, *IWSP7 poster prizes*.
The international workshop on seizure prediction.
Performance of synchrony and spectral-based features in early seizure detection: exploring feature combinations and effect of latency.

2014 **Top ten ranking**, *UPenn-Mayo Clinic Seizure Detection Challenge*.
Kaggle Data Science contest for early seizure detection in epilepsy.
A method employing synchrony and spectral-based features with a random forest classifier for early seizure detection. Ranked 9th out of 205 participants.

2008 **First award**, *ESPOU, Experimental Science Congress*, Pablo de Olavide University, Sevilla, Spain.
Study of Radon-222 indoor concentration depending on environmental conditions.
Research project conducted at the Environmental Radioactivity Laboratory, Universitat de València.

Congresses, workshops and symposia attended

2014–2023 **COSYNE**, *Computational and Systems Neuroscience conference*.

2016,2022 **SfN**, *Society for Neuroscience meeting*, San Diego, USA.

2022 **Bernstein Conference**, *Bernstein Network in Computational Neuroscience*, Berlin, Germany.

2019 **CapoCaccia**, *Cognitive Neuromorphic Engineering Workshop*.

2015,2017 **NCCD**, *Neural Coding, Computation and Dynamics workshop*.

2017 **TENSS**, *Transylvanian Experimental Neuroscience Summer School*, Cluj-Napoca, Romania.

2015 **IWSP7**, *The international workshop on seizure prediction*, Melbourne, Australia.

2012 **FENS-IBRO-Hertie Winter School: Brain Dynamics and Dynamics of Brain Diseases**, Austria.

2012–2013 **Swiss Computational Neuroscience Seminar Series**, ETH-UZH, EPFL, Uni Bern, Switzerland.

2011 **Computational Astrophysics and Cosmology**, Universitat de Valencia, Valencia, Spain.

2008 **ESPOU**, *Experimental Science Congress*, Pablo de Olavide University, Sevilla, Spain.

Public engagement

2023 **TReND**, *Teaching and Research in Natural Sciences for Development in Africa*, Outreach activities at local universities in Accra, Ghana.

2022 **SEMF Summer School**, *Society for Multidisciplinary and Fundamental Research*, Multidisciplinary talks and courses for young researchers and the general public, Universitat Politecnica de Valencia.
Invited talk

2019 **William Perkin High School STEM enrichment day**, *Science workshop*, Sainsbury Wellcome Center Public Engagement Network, London.

2015-2017 **Science week**, Physics and Neuroscience talks, Spanish high school Cañada Blanch, London.

2013 **Robots on Tour**, ETH exhibitor assistant, Artificial Intelligence Lab, Zürich.

Selected publications

Journal Articles

2023 **Inferring context-dependent computations through linear approximations of prefrontal cortex dynamics**, submitted to *Nature Neuroscience*, preprint in *bioRxiv*.
Joana Soldado-Magraner, Valerio Mante and Maneesh Sahani

2023 **Applying a novel neuroethics framework to analyze and compare ELSCI considerations for Brain Computer Interfaces**, *IEEE Transactions on Neural Systems and Rehabilitation Engineering (under second revisions)*.
Joana Soldado-Magraner, Alberto Antonietti, Jennifer French, Nathan Higgins, Michael J. Young, Denis Larrivee and Rebecca Monteleone

2018 **Brittleness in model selection analysis of single neuron firing rates**, *PNAS* (under second revisions), preprint in *bioRxiv*.
Chandramouli Chandrasekaran, Joana Soldado-Magraner, Diogo Peixoto, William T Newsome, Maneesh Sahani and Krishna V Shenoy

2013 **Behaviour-dependent recruitment of long-range projection neurons in somatosensory cortex**, *Nature*, 499, 336-340.
Jerry L. Chen, Stefano Carta, Joana Soldado-Magraner, Bernard L. Schneider and Fritjof Helmchen

Conference Papers

2022 **Reexamining the ethical, legal, social, and cultural implications for cochlear implants through a novel neuroethics framework**, *IEEE ISTAS 2022 proceedings*.
Noeline Prins*, Rebecca Monteleone*, Joana Soldado-Magraner, Joanne Nash, Michael J. Young and Laura Cabrera.

Presentations

Invited talks

2024 **Dynamical models of PFC computation**, *8th Computational Properties of Prefrontal Cortex Workshop*, Session "What can neural dynamics teach us about prefrontal function?".
Joana Soldado-Magraner

2022 **Inter-areal patterned microstimulation selectively drives PFC activity and behavior in a memory task**, *Bernstein conference*, Workshop "Distributed computations across brain regions".
Joana Soldado-Magraner

2021 **Context-dependent computations through linear dynamics in prefrontal cortex circuits.**, *Janelia Farm Research Campus*, Computation and Theory Lecture series.
Joana Soldado-Magraner

2019 **Linear dynamics of contextual decision-making**, *CapoCaccia*, Session "Biological foundations of signal integration".
Joana Soldado-Magraner

2019 **Inferring and interpreting neural dynamics during contextual decision making**, *Cosyne*, Workshop "Data, dynamics and computation: using data-driven methods to ground mechanistic theory".
Joana Soldado-Magraner

2018 **Linear dynamics of evidence integration in contextual decision making**, *Oxford*, Neurotheory Forum (ONTF).
Joana Soldado-Magraner

2016 **Do decision-related firing rates of dorsal premotor cortex neurons ramp or step on single trials?**, *SfN*, Nanosymposium "Visual Decision Making".
Chandramouli Chandrasekaran, Joana Soldado-Magraner, Diogo Peixoto, Maneesh Sahani and Krishna V. Shenoy

Poster presentations

2023 **Robustness of PFC networks under inter- and intra-hemispheric patterned microstimulation perturbations**, *Cosyne*, poster.
Joana Soldado-Magraner, Yuki Minai, Matthew Smith and Byron Yu.

2022 **Inter-areal patterned microstimulation selectively drives PFC population activity across behavioral tasks**, *SfN*, poster.
Joana Soldado-Magraner, Yuki Minai, William Bishop, Matthew Smith and Byron Yu.

2022 **Inter-areal patterned microstimulation selectively drives PFC activity and behavior in a memory task**, *Cosyne*, poster.
Joana Soldado-Magraner, Yuki Minai, William Bishop, Matthew Smith and Byron Yu.

2017 **Dynamically constrained vs unconstrained linear models of evidence integration in a contextual DM task**, *NCCD*, poster.
Joana Soldado-Magraner, Valerio Mante and Maneesh Sahani

2015 **Linear dynamics of evidence integration in a contextual decision making task**, *NCCD*, poster.
Joana Soldado-Magraner, Valerio Mante and Maneesh Sahani

2015 **Linear dynamics of evidence integration in a contextual decision making task**, *Cosyne*, poster.
Joana Soldado-Magraner, Valerio Mante and Maneesh Sahani

2015 **Performance of synchrony and spectral-based features in early seizure detection: exploring feature combinations and effect of latency**, *IWSP7*, poster.
Vincent Adam, Joana Soldado-Magraner, Wittawat Jitkrittum, Heiko Strathmann, Balaji Lakshminarayanan, Alessandro Davide Ialongo, Gergo Bohner, Ben Dongsung Huh, Lea Goetz, Shaun Dowling, Iulian Vlad Serban and Matthieu Louis

Online resources

Open-source code and teaching materials

2023 **TReND course in computational neuroscience and machine learning basics**, Python notebooks, lecture slides and datasets, freely available at the TReND course Github repository.
2023 TReND course teaching team (Coordinator: Joana Soldado-Magraner).

Methods reports

2015 **Seizure Detection Challenge The Fitzgerald team solution**.
Vincent Adam, Joana Soldado-Magraner, Wittawat Jitkrittum, Heiko Strathmann, Balaji Lakshminarayanan, Alessandro Davide Ialongo, Gergo Bohner, Ben Dongsung Huh, Lea Goetz, Shaun Dowling, Iulian Vlad Serban and Matthieu Louis

Computer skills

Coding	MATLAB (advanced), Python (advanced), C++, R, Labview, NEST, Mathematica, Root
OS	Linux (Ubuntu), Mac OS X, Microsoft Windows
Typesetting	LaTeX
Version Control	Github, svn
Cluster Computing	SLURM

Languages

Catalan	Mother tongue	
Spanish	Mother tongue	
English	Proficiency	
German	Intermediate	*DSH (Deutsche Sprachprüfung für den Hochschulzugang) level C1, 2010*
Portuguese	Conversational	

Non-academic work experience

2012 **Cook**, Bar Milchbar.
Zürich, Switzerland

2011–2012 **Waitress, cook**, Cafe Be&So.
Zürich, Switzerland

2008–2009 **Waitress**, Celtic Pub Max Max.
València, Spain

2003–2011 **Meat preparations and delivery, office work**, Disricaem S.L. meat industry.
València, Spain

Additional interests and skills

Effective Altruism London board member, 2013-2016

Giving What We Can Switzerland board member, 2012-2013

Eager to work in groups and in highly multidisciplinary environments.

With a huge innate curiosity and always willing to learn.