



# 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 Neuroscience (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 Committees

- 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.

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## 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.

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## 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 pre-frontal 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*, selected 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*, accepted 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*, selected 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*, selected poster.  
Joana Soldado-Magraner, Valerio Mante and Maneesh Sahani

- 2015 **Linear dynamics of evidence integration in a contextual decision making task**, *NCCD*, selected poster.  
Joana Soldado-Magraner, Valerio Mante and Maneesh Sahani
- 2015 **Linear dynamics of evidence integration in a contextual decision making task**, *Cosyne*, selected 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*, invited 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	L <sup>A</sup> T <sub>E</sub> X
Version Control	Github, svn
Cluster Computing	SLURM

## Languages

Catalan	Mother tongue	
Spanish	Mother tongue	
English	Proficiency	
German	Intermediate	<i>DSH (Deutsche Sprachprüfung für den Hochschulzugang) level C1, 2010</i>
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.