Dr. Joana Soldado-Magraner

Curriculum Vitae

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

Postdoctoral research

project *Probing prefrontal cortex dynamics and computation with patterned microstimulation perturbations.*

advisors Byron Yu and Matthew Smith

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 Valerio Mante, Michael Pfeiffer and Kevan Martin

Carnegie Mellon University – Pittsburgh – USA
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Joana Soldado-Magraner

Additional research experience

Master's research

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

2012 **MSc short project II**, *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.

Undergraduate research

2009 **JAE-Intro Fellowship**, CERN-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 **Advisor and collaborator**, *Yuki Minai*, PhD Thesis, PhD program in Neural Computation and Machine Learning, CMU
'Closed-loop electrical microstimulation optimization for the control of neural activity and behavior'

2025-present **Advisor and collaborator**, *Adithya Chandrasekaran*, PhD Thesis, PhD program in Neural Computation, CMU
'PFC–M1 interactions underlying working memory robustness in the presence of distractors'

2025-present **Supervisor**, *Debasmita Kanungo*, MSc Thesis, Biomedical Engineering, CMU
'Effects of patterned microstimulation on LFP signals in PFC'

2021-2023 **Supervisor**, *Lucas Nadolskis*, MSc Thesis, Biomedical Engineering, CMU
'Exploring top-down visual pathways using microstimulation and its applications to cortical visual prosthesis'

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

2024-2026 **Guest lecturer**, *18-698 Neural Signal Processing*, Department of Electrical and Computer Engineering, CMU, graduate course.

2025 **Guest lecturer**, *42-630 Intro to Neural Engineering*, Department of Biomedical Engineering, CMU, graduate course.

2025 **Guest lecturer**, *2351 Biosignal Acquisition and Analysis*, Department of Bioengineering, University of Pittsburgh, graduate course.

2025 **Guest lecturer**, *HPS 2390 Explanation in Cognitive Science and Neuroscience*, Department of History and Philosophy of Science, University of Pittsburgh, graduate course.

2023-2026 **Teaching Coordinator**, *TReND-CaMinA course in Computational Neuroscience and Machine Learning Basics*, summer school
Teaching and Research in Natural Sciences for Development in Africa (TReND)

2023-2026 **Instructor**, *TReND-CaMinA course in Computational Neuroscience and Machine Learning Basics*
Python coding, linear algebra, dynamical systems and machine learning techniques for neural data analysis

2024-2025 **Future Faculty Program Certificate**, *Eberly Center, CMU*
A teaching training program with seminars, teaching observations with feedback (during guest lectures), a course design project and a statement of teaching philosophy project.

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

2022-2025 **Cosyne**, *Reviewer*, Computational and Systems Neuroscience conference

2018,2025 **NeurIPS**, *Reviewer*, Neural Information Processing Systems conference

2025 **Nature Neuroscience**, *Co-reviewer*, Scientific journal

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

2023 **Communications Biology**, *Co-reviewer*, Scientific journal

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

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

Conferences, workshops and schools

2023-2026 **Director**, *TReND-CaMinA summer school*
An intensive two-week course to teach African students the basics of Computational Neuroscience and Machine Learning: Two leading and cost-effective research fields that can boost scientific capacity in the continent

2026 **Organiser**, *Cosyne*, Computational and Systems Neuroscience workshop
Advances in population level perspectives for neural activity perturbations

2019 **Organiser**, *CapoCaccia*, Cognitive Neuromorphic Engineering workshop
Working group: sRNNs stability, training and dynamics analysis

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

Boards and Commitees

2025 **Consultant**, REI-RICORS, Redes de Investigación Cooperativa Orientadas a Resultados en Salud, Inflamacion y Neuroinflamacion
Data science and statistics consultant

2020–2024 **Member**, IEEE Neuroethics working group
Contributing to write guidelines for the usage of neurotechnologies and discussing their ethical, legal, social, and cultural implications.

2012–2013 **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.

Congresses, workshops and symposia attended

2025 **RCP summit**, *Raynor Cerebellum Project*, Early career discussion leader (per invitation)

2025 **10Q Workshop**, *10 Questions for NHP Systems Neuroscience (per invitation)*

2025 **Population Doctrine Workshop**, *A Population Doctrine in Neuroscience Workshop*

2024 **CPPC**, *Computational Properties of Prefrontal Cortex (per invitation)*

2014–2026 **COSYNE**, *Computational and Systems Neuroscience conference*

2016,2022,2024 **SfN**, *Society for Neuroscience meeting*

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

2019 **CapoCaccia**, *Cognitive Neuromorphic Engineering Workshop*, Alghero, Italy

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*, Innsbruck, Austria

Public engagement

2023-2026 **TReND**, *Teaching and Research in Natural Sciences for Development in Africa*, Outreach activities at local universities in Accra, Ghana; Kigali, Rwanda; Lusaka, Zambia; and Nyeri, Kenya

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

Publications

Journal Articles

2025 **Robustness of working memory to prefrontal cortex microstimulation**, *JNeuroscience*, special collection "Computational Properties of the Prefrontal Cortex", invited article.
Joana Soldado-Magraner, Yuki Minai, Matthew Smith and Byron Yu

2025 **Brain-computer interfaces as a causal probe for scientific inquiry**, *Trends in Cognitive Sciences*, invited review
Asma Motiwala*, Joana Soldado-Magraner*, Aaron Batista, Matthew Smith and Byron Yu

2024 **Inferring context-dependent computations through linear approximations of prefrontal cortex dynamics**, *Science Advances*
Joana Soldado-Magraner, Valerio Mante and Maneesh Sahani

2024 **Applying the IEEE Neuroethics Framework to Intra-cortical Brain Computer Interfaces**, *Journal of Neural Engineering*
Joana Soldado-Magraner*, Alberto Antonietti*, Jennifer French, Nathan Higgins, Michael J. Young, Denis Larrivee and Rebecca Monteleone

2024 **Examining funders' roles in responsible research and innovation of medical neurotechnology**, *Journal of Responsible Innovation*
Denis Larrivee, Jennifer French, Alberto Antonietti, Zach McKinney, Noeline W Prins, Joana Soldado-Magraner, Michael J. Young, and Laura Y. Cabrera

2018 **Brittleness in model selection analysis of single neuron firing rates**, *PNAS (under 2nd 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*
Jerry L. Chen, Stefano Carta, Joana Soldado-Magraner, Bernard L. Schneider and Fritjof Helmchen

Conference Proceedings

2025 **OMiSO: Adaptive optimization of state-dependent brain stimulation to shape neural population states**, *NeurIPS*
Yuki Minai, Joana Soldado-Magraner, Matthew Smith and Byron Yu

2024 **MiSO: Optimizing brain stimulation to create neural activity states**, *NeurIPS*
Yuki Minai, Joana Soldado-Magraner, Matthew Smith and Byron Yu

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 Y. Cabrera.

Presentations

Talks

2025 **Population-level perspectives for interpreting and designing neural activity perturbations**, *Instituto de Neurociencias Christmas meeting, Alicante, Spain*
Joana Soldado-Magraner

2025 **Robustness of prefrontal cortex networks under patterned microstimulation perturbations**, *SfN webinar*, "Computational Properties of Prefrontal Cortex", short talks and panel discussion
Joana Soldado-Magraner, per invitation

2024 **Robustness of prefrontal cortex networks under patterned microstimulation perturbations**, *SfN nanosymposium*, "Mechanisms of Working Memory and Cognitive Control in Prefrontal Circuits"
Joana Soldado-Magraner

2024 **Robustness of prefrontal cortex networks under patterned microstimulation perturbations**, *8th Computational Properties of Prefrontal Cortex Workshop*, Session "What can neural dynamics teach us about prefrontal cortex function?"
Joana Soldado-Magraner, per invitation

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, per invitation

2022 **High-order computations by neural population dynamics in the prefrontal cortex**, *BARCCSYN*
Joana Soldado-Magraner, per invitation

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

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

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, workshop organiser and speaker

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

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

2025 **Population-level perspectives for interpreting and designing neural activity perturbations**, *Cajal Xmas meeting, Madrid, Spain*
Joana Soldado-Magraner

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*, per invitation
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

Patents

2025 **U.S. patent**, *Closed-Loop Brain Stimulation Framework to Modulate Neural Population Activity*, Pending International Patent Application No. PCT/US25/47445
Yuki Minai, Joana Soldado-Magraner, Matthew Smith and Byron Yu

Online resources

Datasets

2025 **uStim NWB data**, Microstimulation data package converted into the Neuroscience Withouth Borders open data format (to be released in 2026)

2025 **PFC-uStim-data**, Data package from Soldado-Magraner et al. 2025, Zenodo repository

Open-source data analysis code

2025 **PFC-uStim**, Matlab code package to fit dimensionality reduction methods (FA and dPCA) to analyse robustness properties of PFC populations during working memory, Github repository

2024 **LDS-TFR-Approx**, Python code package to fit context-dependent linear dynamical systems models and tensor factor regression models to neural population data, Github repository

Open-source teaching materials

2023-2025 **TReND-CaMinA course in computational neuroscience and machine learning basics**, Python notebooks, lecture slides and datasets, TReND course Github repository
TReND-CaMinA 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, online report

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	
Portuguese	Advanced	
German	Intermediate	*DSH (Deutsche Sprachprüfung für den Hochschulzugang) level C1, 2010*