

Joao Barbosa

homepage, mail, google scholar, twitter

Postdoc @ Group for Neural Theory, ENS, Paris

Education

2013 - 2019: PhD in Computational Neuroscience, University of Barcelona, Spain.

Advisor: Albert Compte

2009 - 2011: MSc in Bioinformatics, University of Bologna and University of Pompeu Fabra.

2006 - 2009: BSc in Informatics Engineering, Universidade do Minho, Portugal

Exchange Studies: MSc. in Computer Science, Universiteit van Amsterdam, 2009.

Courses: Computer Vision, Artificial Intelligence, Distributed Computing

Intensive Courses (E Experimental, ML Machine Learning, C Comp. Neuroscience)

E Neural Systems and Behavior, Marine Biological Laboratory, USA (June - August 2014)

ML, C Information Processing in Neural Systems, Osnabrück University, Germany. (2 May - 13 May 2015)

C, E The Barcelona Cognition, Brain and Technology summer school, University of Pompeu Fabra, Spain. (31 August - 11 September 2015)

C, ML The Computational and Cognitive Neuroscience Summer School, NYU-Shanghai, China. (9 July - 28 July 2016)

C, ML The Summer Workshop on the Dynamic Brain, Allen Institute for Brain Science (Aug 21, 2022 – Sun, Sep 5, 2022)

Research Experience

2016 (3 mo): Visiting Researcher at Buschman Lab, Princeton University

2019-2020: Postdoctoral Researcher at Compte Lab, Brain Circuits and Behavior, Barcelona

2020-2024: Postdoctoral Researcher at Ostojic Lab, Group For Neural Theory, ENS, Paris

2023 (3 mo): Visiting Researcher at Williams Lab, New York University and Flatiron Institute

Awards

Postdoctoral grant, Fyssen Foundation, "Multi-area mechanisms underlying flexible, context-dependent behavior" (2020/2022)

Bial Foundation Grant Programme (Ref: 356/18), "Neural mechanisms underlying subliminal working memory." (50K euros)

PhD grant, Training Program for Research Staff, Dec 2013 - Dec 2017, BES-2013-062654

EMBO Travel Award for short stay at Princeton University, EMBO ASTF 340-2016

Cosyne 2017 high reviewer (95% percentile) ranking abstract (Travel Grant)

Best Project at The Barcelona Cognition, Brain and Technology summer school

Publications

Preprints

NeuroGym: An open resource for developing and sharing neuroscience tasks

Manuel Molano-Mazón, **Joao Barbosa**, Jordi Pastor-Ciurana, Marta Fradera, Ru-Yuan Zhang, Jeremy Forest, Jorge del Pozo, Li Ji-An, Christopher J Cueva, Jaime de la Rocha, Devika Narain, Guangyu Robert Yang.

PsyArxiv (2022)

Peer-reviewed

Flexible selection of task-relevant features through across-area population gating

Joao Barbosa, Remi Proville, Chris C. Rodgers, Srdjan Ostojic, Yves Boubenec.

Nature Communications (in press)

Pinging the brain with visual impulses reveals electrically active, not activity-silent working memories

Joao Barbosa, Diego Lozano-Soldevilla, Albert Compte

Plos Biology (2021)

Across-area synchronization supports feature integration in a biophysical network model of working memory.

Joao Barbosa, Vahan Babushkin, Ainsley Temudo Kartik Sreenivasan, Albert Compte.

Frontiers in Neural circuits (2021)

Disrupted serial dependence suggests deficits in synaptic potentiation in anti-NMDAR encephalitis and schizophrenia.

Heike Stein*, **Joao Barbosa***, Albert Compte et al.

Nature Communications (2020) * equal contribution

Interplay between persistent activity and activity-silent dynamics in prefrontal cortex underlies serial biases in working memory.

Joao Barbosa, Heike Stein, Albert Compte et al.

Nature Neuroscience (2020)

Build-up of serial dependence in color working memory.

Joao Barbosa, Albert Compte.

Scientific Reports (2020)

Neural circuit basis of visuo-spatial working memory precision.

Rita Almeida, **Joao Barbosa**, Albert Compte.

Journal of Neurophysiology (2015)

Reviews

Working Memories Are Maintained in a Stable Code.

Joao Barbosa.

Journal of Neuroscience (2017)

A practical guide for studying human behavior in the lab.

Joao Barbosa, Heike Stein, Christopher Summerfield, Salvador Soto-Faraco, Alexandre Hyafil

Behavior Research Methods 2022

Towards biologically constrained attractor models of schizophrenia.

Heike Stein*, **Joao Barbosa***, Albert Compte

Current Opinion in Neurobiology (2021)

Teaching

2-day tutorial on Learning and low dimensional dynamics at PSL-QLife Winter School "Learning and Plasticity in Neuronal Networks" (2024)

(TA) Machine learning for neuroscience summer school, Champalimaud Centre for the Unknown, Lisbon, Portugal (2023)

(TA) The 9th Computational and Cognitive Neuroscience (CCN) Summer School Suzhou, China (2019)

Introduction to MATLAB, Master in Brain and Cognition Universitat Pompeu Fabra, Spain (2016/2017)

(TA) Data Analysis for Cognitive Neuroscience, Master in Brain and Cognition, Universitat Pompeu Fabra, Spain (2015/2016)

Mentoring

Mentor at Neuromatch Academy 2022

Co-supervision (with Srdjan Ostojic) of Master student Celia Jonas (2022)

Co-supervision (with Albert Compte) of PhD student Melanie Tschiersch (2020-), poster at COSYNE 2022

Supervision of undergraduate student Maria Alejandra Tangarife (2019-2020)

Supervision of undergraduate student Rebecca Martinez (2018), poster at BARCCSYN '18, paper in Nature Neuroscience 2020

Supervision of undergraduate student Adria Galan (2017), poster at SFN '17, BARCCSYN '17 and '18, FENS '18, paper in Nature Neuroscience

Supervision of undergraduate student David Bestue (2016), poster at ECVP '16 and BARCCSYN '16, FENS '18. Paper in preparation.

Contributed Talks

Early selection of task-relevant features through population gating at "Behavioral flexibility and its neural correlates" workshop, Bernstein 2023

Early selection of task-relevant features through population gating, WWNeuRise 2022 ([video](#))

Interplay between persistent activity and activity-silent in working memory, Neuromatch 2020 ([video](#))

Serial dependence decreases with structural connectivity decline during healthy aging, Virtual Working Memory Symposium 2020 ([video](#))

Synaptically imprinted memories reignite bump-attractor dynamics prior to stimulus in a vsWM task, COSYNE 2017*

* *high reviewer ranking (95% percentile) abstract*

The neural circuit basis of feature-binding in working memory, BARCCSYN 2018

Synaptically imprinted memories reignite bump-attractor dynamics prior to stimulus in a vsWM task, Symposia on Memory 2017

The neural basis of serial behavioral biases in spatial working memory, BARCCSYN 2016

A biophysical neural network model for multiitem visual working memory that accounts for memory binding errors, Donders Discussions 2015

Invited Talks

Roozbeh Kiani lab, *NYU, New York*, 2023
 Xiao Jing Xang lab, *NYU, New York*, 2023
 Adam Kohn lab, *Einstein College, Bronx*, 2023
 Earl Miller lab, *MIT, Boston*, 2023
 Kohn, Machens and Yu lab, *Inter-areal communication lab meeting*, 2022 (online)
 Zachary Mainen Lab, *Champalimaud Centre for the Unknown*, 2020 (online)
 UCL Max Planck Computational Psychiatry UCL, 2020 (online)
 Claudia Clopath lab *Imperial College*, 2020 (online)
 Group for Neural Theory, *Ecole Normale Supérieure, Paris* 2020
 John-Dylan Haynes lab, *Bernstein Center for Computational Neuroscience, Germany* 2018
 Stefano Fusi lab, *Columbia University, USA* 2017
 Tatiana Engel lab, *Cold Spring Harbor Lab, USA* 2017
 Christian Machens Lab, *Champalimaud Centre for the Unknown, Portugal* 2017
 Cheng-Yu Li Lab, *Institute of Neuroscience, China* 2016
 Mingsha Zhang Lab, *Beijing Normal, China* 2016
 John Murray Lab, *Yale University, USA* 2016
 Clayton Curtis Lab, *New York University, USA* 2016
 Tim Buschman Lab, *Princeton University, USA* 2016

Scientific meetings organization

Bernstein 2022 Workshop, "Distributed computations across brain regions", with Heike Stein
 Bernstein 2021 Workshop, "The geometry of neural activity: low-dimensional dynamics and high-dimensional representations", with Adrian Valente, Yuxiu Shao and Ljubica Cimesa
 Cosyne 2018 workshop "Circuit dynamics in working memory", with Albert Compte and Klaus Wimmer
 BARCCSYN Webinars, main creator and organizer. Online webinars series for the BARCCSYN community.
 Neurochats, main creator and organizer. Meeting for students and early postdocs to present their recently or ready to be published results to the whole Barcelona neuroscience community.

Outreach activities

From mathematical models of single neurons to behavior (talk given together with Genis Prat), JIPI 2018, Barcelona ([video](#))
 How do neurons do to perceive and remember the environment? (two-day workshop with short talks and demos given in Spanish for 6+) Festival de la Ciencia, Barcelona 2018

Ad hoc Reviewer

Nature Reviews Neuroscience

Neural Computation

Science Advances

Nature Neuroscience

eLife

Plos Biology

Plos Computational Biology

NeuroImage

COSYNE

Last updated: September 25, 2023