Joao Barbosa

Junior PI @ Institut de Neuromodulation

homepage, mail, google scholar

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

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) and 2024 (1 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

Peer-reviewed

Early selection of task-relevant features through across-area population gating
Joao Barbosa, Remi Proville, Chris C. Rodgers, Srdjan Ostojic, Yves Boubenec.
Nature Communications (2023)

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)

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)

Neural signatures of reduced serial dependence in anti-NMDAR encephalitis and schizophrenia
Heike Stein, **Joao Barbosa**, Diego Lozano-Soldevilla,Mireia Rosa-Justicia, Alba Morató, Adrià Galan-Gadea, Laia Prades, Amaia Muñoz-Lopetegui, Helena Ariño, Eugenia Martinez-Hernandez, Mar Guasp, Josefina Castro-Fornieles, Josep Dalmau, Joan Santamaria, Albert Compte.
PsyArxiv (2024)

Alpha phase-coding supports feature binding during working memory maintenance
Mattia F. Pagnotta, Aniol Santo-Angles, Ainsley Temudo, **Joao Barbosa**, Albert Compte, Mark D'Esposito, Kartik K. Sreenivasan.
bioRxiv (2024)

Estimating flexible across-area communication with neurally-constrained RNN.
Joao Barbosa, Adrian Valente, , Scott Brincat, Earl Miller, Srdjan Ostojic.
Cognitive computational Neuroscience (2024)

Teaching

Co-coordinator (w/ Boris Gutkin) of "Computational Neuroscience" course (2nd semester) at Master's degree in cognitive science, Ecole Normale Superieur, Paris (2025).

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

PhD students

Supervision of PhD student Lubna Shaheen Abdul Parveen (2024-).

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

Master and undergraduate students

Co-supervision (w/ Srdjan Ostojic) of Master student Jeanne Sentenac (2023)

Mentor at Neuromatch Academy (2022)

Co-supervision (w/ Srdjan Ostojic) of Master student Celia Jonas (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.

Scientific meetings organization

Paris, Ile-de-France Neural Theory & Systems Symposium, Yearly local conference in Paris. Co-organized with Alex Cayco-Gajic, Yves Boubenec and Sophie Bagur.

Neural Networking Night, Monthly seminar delivered in the afternoon, in a bar. Co-organized with Alex Cayco-Gajic, Srdjan Ostojic and Michael Graupner.

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.

Contributed Talks

Estimating flexible across-area communication with neurally-constrained RNNs at "Bridging RNNs and data: Hypothesis-testing of network dynamics against neural recordings" workshop, Bernstein 2024

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 multi-item visual working memory that accounts for memory binding errors, `Donders Discussions 2015`

Invited Talks

Michael Cole lab, *Rutgers University, New Jersey*, 2024

Peter Rudebeck lab, *Mount Sinai, New York*, 2024

Roozebeh Kiani lab, *NYU, New York*, 2023

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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 Superieure, 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*

Outreach activities

Neural Networking Night, Monthly seminar delivered in a bar; open to all. Co-organized with Alex Cayco-Gajic, Srdjan Ostojic and Michael Graupner.

From mathematical models of single neurons to behavior (talk given together with Genis Prat), JIPI 2018, Barcelona.

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`

Last updated: September 9, 2024