INÊS C. GUERREIRO

Research Fellow | Computational Neuroscience

ABOUT ME: Computational neuroscientist with 10 years of experience modeling neural networks at different scales. Interested in memory research and neuro-inspired computing.

KEY SKILLS: Python, Git/GitHub, neural data (EEG) analysis, mathematical modeling of biological systems

WORK EXPERIENCE

2024 - **Research Fellow** at University College London (London, UK)
Project: Post-natal development of neural networks for memory
- Building of a new pipeline for processing of ephys data to identify grid cell modules.
- Development of algorithm to identify recorded cell types and characterize their spiking dynamics during neural oscillations.

2022 - 2024 **Research Fellow** at Imperial College London (London, UK)
Project: Role of PFC in memory encoding
- Development of network model that simulates PFC-HPC interactions during the encoding and consolidation of a memory.
- Analysis of neural recordings from the amygdala, PFC and CA1 regions during fear memory task.

2017 - 2021 **PhD trainee** in Computational Neuroscience at École Normale Supérieure (Paris, France)
Project: Oscillatory dynamics in the hippocampal formation
- Development of a mean-field reduction method for networks of 2D spiking neurons
- Modeling the mechanisms of theta generation in an entorhinal-CA1 circuit.

2016 - 2017 **Research assistant** at École Normale Supérieure (Paris, France)
Project: Neuromodulatory circuits in the hippocampus
- Modeling the cholinergic mechanisms of hippocampal plasticity

2015 - 2016 **Research assistant** at Champalimaud Foundation (Lisbon, Portugal)
Project: Predictive coding in balanced spiking networks
- Optimization of the learning of feedforward weights in a network of spiking neurons

EDUCATION

2017 - 2021 **PhD in Computational Neuroscience** at École Normale Supérieure (Paris, France)
Thesis: "Computational modelling of circuit and cholinergic mechanisms of the hippocampal theta rhythm induction and expression"

2010 - 2015 **MsC in Engineering Physics** at Instituto Superior Técnico (Lisbon, Portugal)
Thesis: "Modeling the non-linear dynamics of calcium in chromaffin cells"

OTHER RESEARCH EXPERIENCES

2018 **Visiting researcher** at NIEHS (NC, USA)
2014-2015 **Visiting intern** at Université Libre de Bruxelles (Brussels, Belgium)

TEACHING AND SUPERVISION

2023 **Lecturer** at the Janelia Junior Scientist Workshop on Theoretical Neuroscience
2023 **Tutor** at the OIST Computational Neuroscience Course summer school
2022, 2023 **Grader** at Imperial College London
2021 **Teaching assistant** at the ENS Cogmaster program (Intro. to Computational Neuroscience)
2020, 2O21 **Co-advisor** of master students (2) at the ENS Cogmaster program

GRANTS AND AWARDS

2023 HHMI Janelia travel grant to attend Junior Scientist Workshop on Theoretical Neuroscience
2018 Scholarship for summer school Okinawa Computational Neuroscience Course (OCNC)
2019 Travel grant to attend the Neuromodulation of Neural Microcircuits conference
2017 - 2020 *PhD scholarship* from the Fondation pour la Recherche sur Alzheimer
2014-2015 ERASMUS scholarship (research exchange)
2012, 2013 High academic performance distinction

INVITED TALKS

2023 Janelia Junior Scientists Workshop on Theoretical Neurosceince (WA, USA)
2021 NeuRise seminar (online)
2021 AccelNet seminar (online)
2019 Neuromodulation of Neural Microcircuits conference (Champéry, Switzerland)
2019 Laure Buhry's lab at LORIA (Nancy, France)

OTHER CONFERENCE PRESENTATIONS

2019, 2021, 2025 CNS
2020, 2022, 2023 Bernstein
2022 Dendrites
2019 Neuromodulation of Neural Microcircutis, Blue Brain project
2019 Neural Coding, Computation and Dynamics
2018, 2019, 2021 SfN

MAIN PUBLICATIONS

I. C. Guerreiro, Claudia Clopath (2024). Memory's gatekeeper: the role of PFC in encoding of familiar events. PNAS, 121(30)

I. C. Guerreiro, M. Di Volo, B.S. Gutkin. Neural mass reduction for networks of neurons with complex regular-firing and bursting dynamic phenotypes (in preparation).

I. Guerreiro, Z. Gu, J.L. Yakel, B.S. Gutkin (2022). Recurring cholinergic inputs induce local hippocampal plasticity through feedforward inhibition. Eneuro; 9(5)

I. Guerreiro, Z. Gu, J.L. Yakel, B.S. Gutkin (2021). Network model provides insights into entorhinal cortex mechanisms of theta generation. Journal of Computational Neuroscience, 49(Suppl 1), S83-S83