Postdoctoral Position in Human Brain–Computer Interfaces

The Neuromodulation Institute (Paris) invites applications for a Postdoctoral Researcher position (full-time, 2-year contract with the possibility of extension) to join a human brain–computer interface project led by **Philippe Domenech** (Neuromodulation Institute, Paris) in direct collaboration with **João Barbosa** (Neuromodulation Institute, Paris) and **Guillaume Bellec** (Technical University of Vienna).

The work will be carried out in the center of Paris and the newly created Neuromodulation Institute. The position is available immediately and will remain open until filled.

About the Project

This position is part of an interdisciplinary collaboration involving computational neuroscientists, clinicians, and engineers. The goal is to establish model-driven, multi-site stimulation experiments in human patients and move towards novel therapies for psychiatric disorders through the control of human brain dynamics via closed-loop stimulation.

As an initial step toward these broader goals, the postdoctoral researcher will work with electrophysiological data collected from epilepsy patients implanted with ~124 intracranial LFP electrodes, enabling simultaneous recording and multi-site stimulation. We already collected several datasets (open-loop) and up to 4 subjects are collected per month through a national network of clinicians. The work carried out by the successful applicant will sit at the intersection of machine learning, computational neuroscience and data analyses of human intracranial electrophysiology.

The medium-term ambition is to expand this work to additional patient populations, including individuals with treatment-resistant major depression and obsessive-compulsive disorder, and to incorporate recording techniques such as large-scale multi-unit activity and sub-second neuromodulation (e.g. dopamine, serotonin, noradrenaline, etc) detection using ML-augmented voltammetry.

Key responsibilities include developing data-driven state-space models of neural dynamics for optimal control policies for stimulation as well as inference pipelines for predicting network responses of intracranial recordings. The position emphasizes computational modeling, theory, and algorithmic development, rather than hands-on experimental data collection.

Candidate Profile

We are seeking a highly motivated candidate with strong quantitative and computational skills, and demonstrated research experience in at least one of the following areas: machine learning, simulation-based inference, reinforcement learning, generative/diffusion models and dynamical systems.

Required Skills and Experience

- Strong scientific programming skills in Python, in particular proficiency in PyTorch, Jax or related
- Demonstrated experience in machine learning
- Excellent written and spoken English.
- **Direct experimental experience is not required.** However, the successful candidate should be enthusiastic about interacting with clinicians, neurosurgeons, and patients during experimental planning and execution.

Preferred but not required

- Experience working with time series data, in particular intracranial recordings (LFP, ECoG, depth electrodes) in humans or other animals.

We strongly encourage applications from individuals that are underrepresented in academia.

What We Offer

- Opportunity to contribute to multiple ongoing projects at the forefront of human intracranial research
- A highly interdisciplinary research environment spanning computational neuroscience, machine learning and cognitive neuroscience
- A collaborative lab culture with close mentorship from senior investigators.
- Support for career development, including opportunities to co-supervise students, present at conferences and workshops
- Paris has an increasingly tight network of systems and computational neuroscience and offers many possibilities for collaborations

How to apply

Please send a statement of your past work and future research interests (one page each), CV and at least one manuscript demonstrating required experience to palerma@gmail.com with the subject “Postdoctoral Position in Human Brain–Computer Interfaces”.