



Postdoc / engineer positions in neurophysiology integrative and epilepsy

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Project Title: Spatio-temporal dynamics of neuromodulators during physiological and epileptic brain states.

Project summary:

The postdoc/engineer positions are integrated within the framework of the Wellcome research programme Neurolight.

Despite decades of effort, we still cannot predict seizures with good accuracy. Patients' propensity to experiencing seizures changes throughout the day and is influenced by brain states. Therefore, seizure susceptibility not only depends on predictable circadian rhythms, but also on stochastic brain states. Key regulators of neuronal excitability, namely neurotransmitters (NTs) and neuromodulators (NMs), are also strongly modulated by circadian rhythms and brain states and so by tracking their fluctuations we should be able to better understand and predict seizure occurrences.

In this context, we have several projects on the neurochemical environment (neuropeptides and neuromodulators) associated to sleep-wake cycle, circadian rhythms as well as stress in relation to seizure generation. The project will be conducted in rodent models of temporal lobe epilepsy using advanced imaging methods (e.g. multi-site photometry) in combination with polysomnography (EEG, EMG) and video monitoring. We will take advantage of newly developed genetically-encoded neurotransmitter indicators and genetically encoded calcium sensors to monitor both the extracellular fluctuations of selected NTs/NMs and neuronal activity in different brain structures throughout the day in control and epileptic animals.

The project will also involve the manipulation of large data sets and potentially the development of mechanistic neural models in collaboration with computational neuroscientists. The candidate will also have the possibility to go to international meetings as well as do short stays abroad in particular at UCL, London where we have ongoing collaborations with the department of Clinical and Experimental Epilepsy (<https://www.ucl.ac.uk/ion/research/research-departments/departement-clinical-and-experimental-epilepsy>).

Research environment:

Our research group is located at the Institute of Epilepsies and the Neuroscience research centre in Lyon, France (Research group: <https://www.ibexlaboratory.com/>; <https://www.crnl.fr/fr/equipe/tiger/>). We are embedded in a very dynamic and collaborative environment with more 450 members with a breath of expertise in imaging, electrophysiology, molecular biology and behaviour spanning from the subcellular level to cognition and the clinic (CRNL: <https://www.crnl.fr>). We have regular journal clubs and lab meetings as well as seminars on a broad range of neuroscience topics.

More generally, Lyon is vibrant and dynamic international city with 3 universities located only few hours away from major cities like Paris (2h), Geneva (~1.5h) and Marseille (~1h) as well as the Alps and Mediterranean Sea.

Administrative organisation:

Employer: INSERM

“From Science to health, INSERM stands for « Institut national de la santé et de la recherche médicale » (National Institute of Health and Medical Research). We are the only French public research organization entirely dedicated to human health. Our goal: improving health for everyone, through a better knowledge of living organisms and diseases, innovating treatments and conducting public health research.”

Duration: Initially for 2 years (with possibility of extension)

Gross salary: from 2900 to 3300 euros/month brut, depending on experience.

Starting date: June-July 2025 (preferentially)

Applicant's profile:

Essential criteria:

- PhD in Neuroscience, computational biology (willing to learn and conduct experiment on animals), engineering, pharmacy, biochemistry or related. Engineering background is of particular interest.
- Strong experience in *in vivo* electrophysiology and imaging methods in animals
- Programming skills (Python, Matlab)
- Animal license
- Good analytic skills
- Good communication and writing skills
- Proficiency in English

Desirable criteria:

- *Ex vivo* and / or *in vivo* animal models of epilepsy
- Sleep, circadian and / or stress neurophysiology
- Immunostaining
- Experience in behavioural tests
- Modelling of neural network dynamics

In addition, to conducting research, analysing data and writing articles, the candidate will be asked to participate to the divers scientific meetings (JC, lab meetings, seminars) and to the supervision of Master and PhD students.

For more information, please contact Vincent Magloire (Vincent.magloire@inserm.fr).

To apply, you will need to provide a CV, the details of 2 references and a letter (1 page maximum) explaining your interest to the position and why you think that you are suited to our research group.

