Direction des ressources humaines Université de Strasbourg

Interreg Oberrhein | Rhin Supérieur

Position description

1. Position identification

Title of post : postdoctoral position in the field of Preclinical Neuroimaging MRI

Type of contract : temporary position

Category (A,B or C) : A

Contract/project period : 2 years **Expected date of employment :** 1.04.2025

Proportion of work : 100%

Workplace : Integrative Multimodal Imaging in Healthcare research group at the "Engineering science, computer science and imaging laboratory – ICube" of the University of Strasbourg

Desired level of education : PhD

Experience required : The candidate should have solid experience in preclinical neuroscience and neuroimaging research, including good experience of working with animal models (rodents). He/she should have expertise in preclinical imaging and in the acquisition/analysis of brain MRI data. Experience in setting up phenotypic evaluations using behavioural approaches testing memory, cognition, anxiety, stress and all other behaviours in rodents is appreciated.

Contact(s) for information on the position (identity, position, e-mail address, telephone) :

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Closing date for the receipt of applications : 01.03.2025

2. Research project or operation

IMAGINE-STIM is a research project supported by the European Union through the Interreg Upper Rhine programme and the Science Offensive of the trinational Upper Rhine Metropolitan Region.

The IMIS - Imagerie Multimodale Intégrative en Santé - research team at the ICube laboratory is developing a research strategy with its partners in the Upper Rhine region, aimed at using non-invasive imaging techniques to study alterations in brain networks underlying intellectual disability associated with epilepsy. The aim is to identify new relevant signatures based on quantitative multimodal MRI and behavioural or clinical features in order to reveal pathological mechanisms, predict and diagnose neurological disorders, define therapeutic targets and provide a field for testing therapeutic approaches. In preclinical models we are testing the association between DYRK1A gene expression, intellectual disability and the emergence of epilepsy.

3. Activities

- **Description of the research activities :**

The postdoctoral fellow will have the mission to develop and implement MRI methodologies dedicated to studying brain pathologies in preclinical animal models. We are particularly interested in developing personalized brain stimulation techniques guided by imaging to offer customized treatments for epilepsy and intellectual disabilities (mouse model DYRK1A combining deficiency and epilepsy). The model is being developed by partner laboratory IGBMC and Dr. Yann Hérault's team.

The post-doc will be responsible for conducting: (i) MRI brain imaging experiments, including the acquisition, pre-processing and analysis of brain MRI images in mice and the mapping of the structural and functional brain connectome. (ii) behavioural phenotyping experiments in mice, in a longitudinal protocol to monitor the evolution of the pathology over time ; this includes the optimisation and implementation of behavioural tests to assess cognition, memory and anxiety. The recruited candidate will work in close collaboration with the project's partner teams, and the study should lead to publications in high-impact international journals.

Clinical studies will be carried out in parallel by ICube and the project's partner teams (the University of Freiburg) : the Dep. The Department of Medical Physics at Freiburg University Hospital will carry out functional MRI studies on patients. This will enable a translational approach to MRI methodology to be developed, as well as parallel analysis of MRI data in humans and animal models.

Related activities : The selected candidate will have the opportunity to participate and be included in several other preclinical MRI projects (ANR/ NIH) for studying brain disorders and to work in a multi-disciplinary environment.

As part of the IMAGINE-STIM project, it is also possible to take part in activities, meetings and discussions with the clinical partners (Dr. Vera Dinkelacker and the ICube laboratory's clinical imaging platform for combined EEG-MRI studies on patients, the Epilepsie-Zentrum (Kehl-Kork Epilepsy Centre) and the Freiburg Department of Medical Physics), as well as in efforts to raise awareness and provide information about the project's results, through conferences and video-forums. These awareness raising activities will be organised in collaboration with patient associations.

4. Skills

➢ **Qualifications/knowledge** :

Ph.D. in MRI Physics, Medical Imaging/NeuroImaging, Biomedical Engineering or related fields

➢ **Operational skills/expertise :**

- Experience with sequence developments and protocols optimisations in the preclinical MRI field (Bruker systems) and/or quantitative MRI acquisition/analysis are especially valued.
- Track record of research and publications in scientific journals and conferences

➢ **Personal qualities :** Self-driven and highly motivated to work in an interdisciplinary team

5. Environment and context of work

➢ **Presentation of the laboratory/unity :** ICube lab gathers expertise in the biomedical engineering, medical imaging (MR based technologies), computer science and medical research fields (https://icube.unistra.fr/en/). It has privileged connection with the neuroscience and medical research. The IMIS team focuses its research on imaging methods development, particularly MRI - to non-invasively study brain structural and functional brain communication. The major aim is the identification of new, relevant signatures based on quantitative multi-modal MRI, brain connectome patterns and behavioural or clinical traits to unveil pathological mechanisms, predict and diagnose neurological disorders, define therapeutic targets and provide ground for testing therapeutic approaches.

➢ **Hierarchical relationship**

The selected candidate will be part of the IMIS research team, under the direct supervision of Dr Laura Harsan, head of the IMIS research team, ICube.

➢ **Special conditions of practice (notice attached) :** The team has access to ICube imaging platform including a 7T Bruker preclinical MR system with mouse head Cryoprobe, a 3T human MRI dedicated exclusively to research, multi-photon intra-vital and ex-vivo microscopy as well as the NMR metabolomics facility of the University Hospital.
The IMIS Team and the recruited post-doc will collaborate within this project with the University Hospital of Freiburg and their associated partners : IGBMC (Institute of Genetics and Molecular and Cellular Biology), the Epilepsie-Zentrum Kehl-Kork and the Precisis company.

To apply, please send your CV, cover letter and diploma to :

harsan@unistra.fr