

# Position description

## 1. Position identification

**Title of post :** Postdoctoral position

**Type of contract :** CDD

**Category (A,B or C) :** A

**Contract/project period :** 1 year (possibility of renewal)

**Expected date of employment :** 01/01/2025

**Proportion of work :** 100%

**Workplace :** The Engineering science, computer science and imaging laboratory – UMR 7357;  
Team: Integrative Multimodal Imaging in Healthcare

**Desired level of education :** Ph.D

**Experience required :** The candidate should have a strong background in preclinical neurosciences research and work experience with animal models (rodents), including experience in preclinical imaging and brain MRI data acquisitions/analysis

Expertise in behavioural exploration to evaluate memory, cognition, anxiety, stress and other behaviours in rodents would be strongly appreciated.

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

Dr. Laura Adela Harsan,  
Team leader: Integrative Multimodal Imaging in Healthcare  
ICube - Engineering science, computer science and imaging lab  
University of Strasbourg  
email: harsan@unistra.fr  
phone: +33 3 68 85 40 37

**Date of publication :** 07/10/2024

**Closing date for the receipt of applications :** 15/11/2024

## 2. Research project or operation

The EPI-3E research project (2024-2029) is a project funded by the JPND –Joint Programme Neurodegenerative Disease Research (EU). It aims at defining (sex and age) specific mechanisms underlying Environmental Enrichment/Exercise as non-pharmacological intervention for Alzheimer's (AD) and Huntington's disease (HD) and related potential noninvasive biomarkers. In fact, aerobic exercise or cognitive training, as well as the combination of both (referred to as environmental enrichment, EE) can enhance synaptic plasticity, improve memory function and ameliorate disease phenotypes in animal model for age-associated neurodegenerative diseases,

such as AD and HD. Similar observations have been made in humans, in both healthy individuals and patients.

As part of this project, the objective of the IMIS team - Integrative Multimodal Health Imaging research team of the ICube laboratory is to elucidate the mechanisms that underlie EE and Exercise as a non-pharmacological intervention towards age-associated dementia. Potential changes in the microstructure and functional connectivity of the brain in mouse models of AD and HD will be explored to attest the beneficial effects of such stimulation; using Nuclear Magnetic Resonance Imaging (MRI) techniques, behaviour, and histopathological analysis of brain tissue

### 3. Activities

➤ **Description of the research activities:**

The recruited post-doctoral fellow will be involved in the preclinical exploration by brain MRI of mice models of Alzheimer's disease and Huntington's disease. Functional, structural and anatomical brain images will be acquired on multiple cohorts of animals, male and female; in 2 genetic models of AD and HD.

The post-doctoral fellow will be responsible for:

- 1) the acquisition of brain MRI images in mice and data analysis, including interpretation - in collaboration with the project partners team (; which should lead to publications in international journals with a high impact factor.
- 2) the optimization and implementation of behavioural tests to assess cognition, memory, locomotor activity and anxiety in mice.
- 3) the histopathological analysis including optimization, of brain tissues to highlight underlying mechanisms of connectivity changes

➤ **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.

### 4. Skills

➤ **Qualifications/knowledge :**

- Ph.D. in Neuroscience, Medical Imaging/NeuroImaging, Biomedical Engineering or related fields.
- Track record of research and publications in scientific journals and conferences

➤ **Operational skills/expertise :**

- Experience in preclinical imaging and brain MRI data acquisitions/analysis.
- Experience in behavioural phenotyping to evaluate various behaviours such as memory, cognition, locomotor activity, anxiety, stress in rodents
- Experience in implementation/optimisation of protocols for histopathological exploration is a plus.

➤ **Personal qualities :**

- Self-driven and highly motivated to work in an interdisciplinary team
- Good oral communication and writing skills

## 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 (part of Interdisciplinary Institute for research in neuroscience) and medical research. The IMIS team focuses its research on imaging methods development, particularly MRI - to noninvasively 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. The projects of IMIS strongly developed a synergy between the preclinical research - relying on the use of animal models of brain disorders – and the clinical human research, both in methodological and application aspects.

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

➤ **Hierarchical relationship:**

The selected candidate will be part of the IMIS research Team, under direct supervision of Dr. Laura Harsan, PI of the project.

➤ **Special conditions of practice (notice attached):**

Training and accreditation on working with animal models in agreement with the EU and local rules of the University of Strasbourg are required.

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

**[harsan@unistra.fr](mailto:harsan@unistra.fr)**