Postdoc in Cognitive Neuroscience of PTSD

Deadline for application November 15th, 2020

- INSERM – Brain imaging center, Cyceron, Caen 14000, France
- Fixed term full-time position (2 years)

The INSERM-UNICAEN-EPHE U1077 research unit based in Caen (Normandy, France, https://nimh.unicaen.fr) invites applications for a position as a Postdoc in the field of Cognitive Neuroscience of Post-Traumatic Stress Disorder (PTSD). The position is related to the research program REMEMBER: "Resilience and modification of brain control network following November 13", led by Dr. Pierre Gagnepain (PhD). REMEMBER is part of a larger collaborative and transdisciplinary research program (http://www.memoire13novembre.fr/) aiming to understand the construction and evolution of both individual and collective memory of the November 13 Paris attack.

We are ideally looking for an experienced Postdoc with a strong expertise in fMRI imaging, excellent programming and engineering skills, and a solid mathematical background.

Research Environment at Cyceron

The Caen Cyceron Neuroimaging Platform (France) offer an exciting and friendly multi-disciplinary research environment with ample opportunities for training and collaboration, and excellent technical facilities. Cyceron is a structure devoted to multimodal imaging (pre-clinical and clinical) and provides a stimulating work environment as it groups several research units and several research instruments, such as a cyclotron for molecular marking, 2 PET-CT, 2 MRI (including a brand new GE 3T) , and a molecular and cellular imaging department.

Cyceron is a friendly environment with an excellent work-life balance. We are located 12 km away from the Normandy coast and beaches. Caen is a young and vibrant city with many venues for music and culture.

The project

This is a multiwave longitudinal neuroimaging study in a group of 120 direct survivors of November 13 Paris terrorist attacks and 72 additional non-exposed control participants.

Both structural (T1, DTI image, high-resolution T2 images for hippocampal subfield delineation) and functional (task-based and resting-state) brain imaging data have been collected at about 1 and 3 years following the attacks. In 2021, the project will evolve and include imaging sequences of the GABAergic transmission using PET scan.

This project is centered around the role of memory control mechanisms and their underlying networks to understand clinical trajectories and response variation following trauma (Mary et al., *Science*, 2020).

This project will thus provide a unique opportunity to observe the online and structural dysfunctions of the memory control network following a severe psychological trauma and how such processes may contribute to recovery and psychopathological dynamics in PTSD.

Another fascinating and parallel aspect of the November-13 research program concerns the recording of the evolution of individual narratives and memories of the attack (measured here

through filmed interviews of 1000 individuals directly, indirectly or not connected to the attacks) and their potential interactions with collective memory (e.g. Gagnepain et al., *Nature Human Behavior*, 2020).

What we expect from you

It is unlikely that an accurate prediction of the strong individual variations in the response to trauma could be successfully achieved using univariate analysis of isolated neurofunctional markers. Your task will be to contribute to the development of multivariate analysis tools and machine-learning algorithms of clinical and brain imaging data, to identify neurofunctional markers of the control network, that considered jointly, are the most relevant to predict and understand PTSD evolution.

We anticipate that this approach will help building a neurofunctional model describing the interactions between brain structures and functional dynamics of memory control and their evolution following trauma.

You will be asked to implement cutting-edge machine learning algorithm and develop predictive model of clinical symptoms and features using complex and integrated models of brain activity and structure.

Importantly, you will also be asked to standardize the preprocessing pipeline, optimize the quality control, and contribute to the training and supervision of younger PhD student in the lab.

Finally, you will be asked to participate and help to the third round of data collection starting 2021, and help with the methodological development of new projects.

Competences requested

- You have academic qualifications at PhD level, preferably within one or more of the following areas computational neuroscience, mathematics, engineering, physics/biophysics.

- Demonstrating skills in computational modelling, data analysis and programming is important.

- Proficiency with Matlab and Python is essential as well as experience with fMRI analyses.

- A high level of written and spoken English is important.

- Knowledge of French language is beneficial but is not required.

Your application

Please include the following documents in your application: motivation letter including academic goals and research interests, curriculum vitae, and at least one recommendation letter. A maximum of five publications that you believe of greatest relevance to the job may also be submitted. Applications, questions or informal enquiries about the position, should be sent to Dr. Pierre Gagnepain (gagnepain@cyceron.fr).

Terms of employment

- Gross salary is 2569,96 Euros for a fulltime postdoc position with less than 2 years of working experience after PhD graduation, and 2948,5 Euros between 2 and 4 years of working experience.