3 PhD Student Positions
GIGA - Cyclotron Research Centre / In Vivo Imaging

PhD # 1: Human sleep-wake regulation, cognition, Alzheimer’s disease, electrophysiology, neuroimaging

Background. Amyloid beta plaque brain accumulation is a central feature of the pathophysiology of Alzheimer’s disease. Amyloid plaque formation starts years prior to cognitive symptom onset and may be associated with more prominent age-related degradation of sleep-wake regulation. We want to isolate features of sleep-wake brain regulation that are associated with Amyloid beta deposits assessed via PET scans.

The candidate will participate to acquisitions and analyses of data obtained in strictly controlled chronobiology protocols. He will use a wide variety of approaches including neuropsychological testing, EEG, TMS, MRI, and PET (analyses only for the latter).

Qualifications and requirements. Candidates can have a MSc in any disciplines related to the topics of the call: biomedical sciences, (neuro)psychology, biology, (bio)chemistry, biostatistics. They should be interested in the brain mechanisms of cognition and sleep and wakefulness regulation in aging.

Candidates could have skills and experience in one or more of the following topics: acquisition/analysis of MRI, DWI, EEG data; TMS; neuropsychological assessments; running constant routine protocols.

Speaking French is considered as a strength (for interactions with study participants) but candidates willing to learn French during the PhD training are also strongly encourage to apply.

Supervisor. The PhD bursary will be mainly supervised by Dr. Gilles Vandewalle and Dr. Fabienne Collette at the GIGA - Cyclotron Research Centre / In Vivo Imaging.

PhD # 2: Brain microstructure, Alzheimer’s disease, neuroimaging

Background. Amyloid beta plaque brain accumulation is a central feature of the pathophysiology of Alzheimer’s disease. Amyloid plaque formation starts years prior to cognitive symptom onset and may be associated with change in brain microstructure which are not detected via traditional MRI techniques. We want to identify quantitative MRI and diffusion based imaging measures of brain structure associated with Amyloid beta brain deposits assessed via PET scans.

The candidate will participate to MRI data acquisition and analyses as well as to PET data analyses. She/he will also contribute to acquisitions and analyses of data obtained in strictly controlled chronobiology protocols (EEG, TMS, neuropsychological testing)

Qualifications and requirements. Candidates should have a MSc in (Biomedical) Engineering, (Medical) Physics, Computational Sciences, Biostatistics (or akin). They should be interested in the brain mechanisms associated with Alzheimer’s disease pathophysiology.
Candidates could have skills and experience in one or more of the following topics: MRI, DTI, PET; neuropsychological assessments; Matlab or R programming. Candidates are encouraged to learn French during the PhD training period (to improve interaction with the team and participants).

**Supervisors.** The PhD bursary will be mainly supervised by Dr. Christine Bastin and Dr. Christophe Phillips at the GIGA - Cyclotron Research Centre - In Vivo Imaging and GIGA - In Silico Medicine.

**PhD # 3: Brain microstructure, high field MRI**

**Background.** MRI typically provides relative measures of brain function and structure. Novel quantitative MR markers are however being developed to assess brain microstructure (e.g. myelin water fraction, iron content). Resolution remains however at the mm level. The development of higher field (7T) MR scanner makes it possible to obtain such quantitative measure with a resolution < 0.5mm. **We want to developed MR sequences for qMRI applied to a 7T MR scanner.**

**Qualifications and requirements.** Candidates should have a MSc in (Biomedical) Engineering, Computational Sciences, (Medical) Physics (or akin). They should be interested MR tools for high field scanners to detect features of brain microstructure. Candidates could have skills and experience in one or more of the following topics: MRI, DWI, MR spectroscopy, CEST, development of MRI sequence. Candidates are encouraged to learn French during the PhD training period (to improve interaction with the team and experiment participants).

**Supervisors.** The PhD bursary will be mainly supervised by Dr. Evelyne Balteau and Dr. Christophe Phillips at the GIGA Cyclotron Research Centre - In Vivo Imaging and GIGA-In Silico Medicine.

**Work environment**

Our team has direct access to research-dedicated neuroimaging and electrophysiology equipment including a 3T MRI scanner (and a 7T MR scanner from 2018), a PET scanner, five bedrooms for full polysomnography recordings and neuropsychological testing, a neuro-navigated TMS-EEG apparatus, and a growing database of participants included in chronobiology protocols.

Within the GIGA Graduate school, PhD bursaries will have the opportunity to follow specific training and improve their skills in relation to the project topics.

**Contract duration**

The PhD bursaries are advertised for 2 years, extendable to 2 more years, and start on October 1st 2017. Monthly salary of bursary will be provided upon request and follows Belgian regulations.

**Applications**

Applicants are invited to respond as soon as possible and **no later than July 7th**, 2017, by submitting a curriculum vitae (including publication list if applicable), a one-page summary of research interests and expertise, and names and contact details of two referees to rh.giga@ulg.ac.be