

PhD student - Early Stage Researcher (ESR) (f/m)

INSPIRE-MED (INtegrating magnetic resonance SPectroscopy and multimodal Imaging for Research and Education in MEDicine)

<http://inspire-med.eu/>

ESR 9: Development of combined PET-MR imaging biomarkers in brain tumours and neuropsychiatric diseases

Location: University of Manchester, Manchester, United Kingdom

Gross salary (pre-employer/employee and income tax): 3270 €/month

Mobility allowance (pre-employer/employee and income tax): 600 €/month

Family allowance (pre-employer/employee and income tax): 500 €/month (if applicable)

Start date: 2nd January 2020

Duration: 36 Months

Project description: This position is one of the 15 ESR positions of the INSPIRE-MED European Training Network, which focuses on the development of Magnetic Resonance Spectroscopy (MRS) and Magnetic Resonance Spectroscopic Imaging (MRSI) combined with Positron Emission Tomography (PET), enhanced by machine learning techniques.

PET tracers have been developed to bind to specific targets in the brain, providing information on specific pathological changes, such as neuroreceptor function or loss of synapses. Magnetic resonance (MR) imaging and MRS generally lack the specificity of PET but can measure multiple microstructural, physiological and metabolic tissue properties in a single scan. Simultaneously combining PET and MR therefore offers the opportunity to collect complementary information, allowing improved insight into disease mechanisms. The project of ESR9 aims to develop *in-vivo* imaging biomarkers of synaptic function by combining measurements of neuronal density from MRSI and of synaptic density using the fluorinated PET tracer [¹⁸F]UCB-H. The method will be tested in healthy volunteers and first validated in glioma patients where the neuronal and synaptic densities vary with distance from the tumour. The project will involve optimisation of MRSI sequences on the simultaneous PET/MR scanner, software implementation for the

quantitative analysis of MRSI data, pharmacokinetic analysis of dynamic PET data for the derivation and assessment of imaging biomarkers of synaptic function in order to determine the repeatability, normal variability and sensitivity of the novel measurements.

Research environment:

This project is hosted by the Division of Informatics, Imaging and Data Sciences in the Faculty of Biology, Medicine and Health at The University of Manchester (<https://www.bmh.manchester.ac.uk/>). The University of Manchester is part of the elite Russell group of UK universities and was ranked 27th in the world in the last QS World University Rankings. The University infrastructure for human imaging includes two 3T and one 1.5T research MR scanners, a 3T GE-Signa MR-PET scanner (installed in 2017), two human PET scanners (the high resolution research brain tomograph and a PET/CT scanner) at the Wolfson Molecular Imaging Centre (WMIC) where the GMP radiochemistry facility is also located. Supervision will be by experienced researchers specialising in neuroimaging using both MR and PET. Collaboration with clinical colleagues in neurosurgery will form an essential part of the project. The university runs an MSc in Medical Imaging Science (<https://www.manchester.ac.uk/study/masters/courses/list/10263/msc-pgdip-medical-imaging-science/>) and the candidate will be encouraged to attend relevant course units and lectures given by imaging experts.

The selected candidate will be able to take advantage of the unique set-up of the INSPIRE-MED network, encompassing 12 academic and 9 industrial partners providing the researchers with transferable and generic skills as well as a comprehensive, wide-ranging education on the basic principles of medical imaging and image analysis. This multi-disciplinary environment encompasses physics, mathematics and computer sciences, with applications in medicine and biological sciences.

Your profile: You should have a bachelor degree with at least 2.1 UK equivalent or Master's degree in physics, applied mathematics, electrical or biomedical engineering, or a similar degree with an equivalent academic level. A genuine interest in biomedical imaging and research should motivate your application. Ideal candidates should have good programming skills, preferably with experience in Matlab, Python or Java. Experience or qualification in medical imaging will be an advantage. Candidates are expected to be proficient in written and spoken English.

The candidate should have strong social abilities allowing an active participation to the European network, fruitful exchanges with other students and researchers, and an excellent integration in the team of your research group. You should be ready and able to

travel in Europe for the network meetings as well as for sharing the experience of the your secondment team.

Eligibility and Mobility Rule: Early-Stage Researchers shall, at the time of recruitment by the host organisation, be in the first four years (full-time equivalent research experience) of their research careers and have not been awarded a doctoral degree. At the time of recruitment by the host organisation, researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation for more than 12 months in the 3 years immediately prior to the reference date.

To apply: Please send your CV, motivation letter and other supporting documents via our on-line application system at

<https://www.manchester.ac.uk/connect/jobs/>

Should you require further information, please contact Dr Marie-Claude Asselin at

marie-claude.asselin@manchester.ac.uk.