GSK funded PhD Studentship

Improving Quantification of Dynamic PET/CT Biomarkers in the Fibrotic Lung for the Evaluation of Disease Progression and Treatment Effectiveness

Using patient data, this project will create new and develop pre-existing techniques to account for respiratory motion and the low spatial resolution of PET/CT imaging in order to improve kinetic parameter estimates and determine a suitable biomarker to track disease progression in patients with idiopathic pulmonary fibrosis (IPF).

The Institute of Nuclear Medicine at UCL has a close collaboration with GlaxoSmithKline (GSK). As part of this collaboration, GSK is funding a PhD studentship at UCL. The funding covers an annual stipend (£18,600) and tuition fees at the rate for UK/EU nationals for 3.5 years. Expected starting date: October 2016 but there is some flexibility.

Project

Positron Emission Tomography / Computerised Tomography (PET/CT) is a widely used molecular imaging technique. Although the methodology has limited spatial resolution, it has been found to be invaluable in cancer detection and staging. Recently, PET/CT has been used to image diffuse lung diseases such as idiopathic pulmonary fibrosis (IPF), a degenerative disease with very limited treatments and an average survival of 3 years. Use of PET/CT in this patient group may allow faster evaluation of new treatments which aim to halt the progression of the disease, extending patient lifespan. However, to investigate early response to therapy it is vital to improve the quantitative dynamic analysis methodology in order to determine PET/CT-based biomarkers that may be particularly sensitive to treatment. Our hypothesis is that improved quantitative analysis will facilitate early evaluation of treatment response.

The primary aim of this project is to improve the methods of dynamic PET/CT analysis so as to optimize the sensitivity to treatment effects or disease progression and to apply this work across a range of available tracers. This will focus on three specific areas:

a) Determination and validation of the fractional blood volume in the fibrotic lung
b) Application of motion correction techniques to the dynamic PET data
c) Correction for partial volume effects in the blood and lung regions.

The student will be located within the Institute of Nuclear Medicine (INM) at the University College London Hospital (UCL Division of Medicine). The supervisory team will include Dr Kris Thielemans and Professor Brian Hutton.
**Requirements**
Candidates must meet the UCL graduate entry requirements which include holding at least an upper second class degree or equivalent qualifications, in a relevant subject area such as physics, biomedical engineering or applied mathematics. A Master's degree in a relevant discipline and additional research experience would be an advantage.

**Eligibility**
The funding covers an increased annual stipend (£18,600) and tuition fees at the rate for UK/EU nationals only. Non-UK/EU nationals will have to find funding to cover the extra fees given on http://www.ucl.ac.uk/current-students/money/2016-2017_fees/2016-17_postgrad_research (code RRDMDNSING01).

**Application**
Informal enquiries can be addressed to Beverley Holman (Beverley.holman.12@ucl.ac.uk) and Kris Thielemans (k.thielemans@ucl.ac.uk). To make a formal application, please e-mail k.thielemans@ucl.ac.uk your CV and covering letter outlining your motivation for the position and suggested referees.

**Application closing date:** Friday 1st of July noon (UK time), 2016.

**Further information**
UCL Institute of Nuclear Medicine: https://www.ucl.ac.uk/nuclear-medicine
UCL Graduate Prospectus: http://www.ucl.ac.uk/prospective-students/graduate/