Measuring motor function using low-cost, minimally invasive sensors for self-management of rehabilitation
PhD

Start Date: February 2017
Project Supervisors: Dr Mark Elliott, and Professor Theo Arvanitis
Funding: 3 years

Project aims

At the Institute of Digital Healthcare, University of Warwick, we are working to improve people’s health and wellbeing through the use of innovative digital technologies. As part of this we are developing and applying technologies that will facilitate self-management of physiotherapy and rehabilitation exercises. In particular, we are investigating ways of providing guidance and feedback to the patient and tracking exercise adherence and recovery over time.

In this project you will investigate methods of accurately measuring lower and/or upper limb movements and develop tools that can be used by both patients and clinicians to quantitatively track movement function over the short and long term. The project will involve algorithmic development and the use of signal processing and mathematical modelling methods. It could further involve development of novel hardware or alternatively, use off-the-shelf technologies, depending on the student’s background and expertise. You will be expected to exploit IDH’s close collaborations with local NHS trusts to co-design a solution and collect data from a suitable sample of patients by the end of the project.

Background and need:

Many areas of healthcare rely on physiotherapy interventions to restore range of movement or increase health and wellbeing in patients. Examples include repetitive exercises following musculoskeletal injury, rehabilitation to aid re-learning of movement in neurological degenerative diseases and general fitness exercises to improve cardiovascular and respiratory function. Movement therapies often require individuals to engage with long-term, specific exercises and activities. Successful outcomes rely on patients adhering to the prescribed exercises and the correct intensities, often in the home without the guidance of a clinician. This often leads to patients becoming demotivated, with the exercises being perceived as either unachievable or ineffective. This leads to low adherence to the prescribed activities, hence reducing chances of a successful recovery and further increasing resource demand on health services in the long term.

Entry requirements:

- Applicants should have a 1st class or 2.1 degree in a relevant subject
- A relevant Master’s level degree is desirable
- A strong background in Matlab/R or similar research programming languages and experience of analysing motion capture data is essential
- A good knowledge of vector mathematics and/or biomechanics would be beneficial
- Experience of working with clinical staff and/or working in an NHS environment is desirable

Funding:

This studentship is available to Home and EU students, according to fee status, who meet Research Council eligibility requirements based on residency. The studentship provides a tax free stipend of £14,000 per annum, and all fees paid
To apply:

This is a COMPETITIVE application process and a formal application must be completed. The information supplied will then be sent for review to assess your suitability and interviews will be conducted.

As part of your application you should provide a 1-page statement detailing your research background to date and how your expertise matches the requirements of this project.

To submit your application, please complete our online enquiry form.