3 Year PhD Studentship available for September 2019

**Department:** Diabetes Research Centre, Engineering & Health Sciences

**Supervisors:** Alex Rowlands (Diabetes Research Centre) alex.rowlands@le.ac.uk, Tom Yates (Diabetes Research Centre) ty20@le.ac.uk, Mateusz Bocian (Engineering) m.bocian@le.ac.uk & Simon Conroy (Health Sciences) spc3@le.ac.uk

**Eligibility:** UK/EU applicants only

**Project Title:** Identification of movement patterns indicative of frailty and pre-frailty using wearable activity monitors

**Project Description:**
The PhD student will work within the Diabetes Research Centre (DRC) and the dedicated Health Data Research UK facility. The DRC is one of the leading diabetes research centres internationally, also hosting the lifestyle theme of the NIHR Leicester Biomedical Research Centre. Our research focuses on the impact of lifestyle on preventing and/or ameliorating chronic disease.

Frailty is ‘a syndrome with multiple causes and contributors that is characterised by diminished strength, endurance, and reduced physiologic function that increases an individual's vulnerability for developing increased dependency and/or death’ (1). Frailty is associated with adverse health outcomes, e.g. disability, dependency and the need for long-term care (2). Early detection of pre-frailty is highly desirable as it may provide a window of opportunity for interventions to delay its progression. Detection methods often require supervised assessment of physical function, but daily physical activity can be assessed unsupervised using wearable sensors and has potential for the classification of frailty (3). Wearable-sensor based measurement of free-living physical activity is now commonplace in research and national surveys (4). This provides a rich resource of accelerometer data on movement patterns in nationally representative samples (e.g. NHANES), biomedical resources (e.g. UK Biobank, 4) and specific populations (e.g. Newcastle 85+, Whitehall II). The data are high-resolution (up to 100 Hz, in three axes) and collected 24 hours a day up to 7-days a week. The ability to detect pre-frailty and frailty from these data would facilitate prevalence estimates and identification of individuals at risk.

This project aims to identify metrics that can be automatically extracted from accelerometer data to identify individuals with movement patterns indicative of early physical frailty who would benefit from intervention. Pre-frailty and frailty will be classified according to the frailty phenotype (5). The project will: a) characterise accelerometer movement patterns that are associated with pre-frailty and frailty during physical function tasks and across the 24 h day; b) use the characterised movement patterns to develop potential accelerometer metrics for identifying pre-frailty and frailty;
c) determine whether these metrics can be applied to free-living accelerometer data (e.g. from UK Biobank, 4) to facilitate early identification of movement patterns linked to physical frailty.

The student will gain skills in accelerometry, signal processing, statistics, and epidemiology. The project will suit an enthusiastic student with a background in Data Science and a strong interest in health and lifestyle. The project benefits from a multi-disciplinary collaboration between researchers with expertise in lifestyle, accelerometry, engineering and frailty.

References:


Funding details:
The College of Life Sciences (CLS) HDRUK Studentship will provide a tax-free stipend at RCUK rates (£15,009 for 2019/20) and UK/EU fees for 3 years.

Entry requirements:
Applicants are required to hold/or expect to obtain a data science related UK Bachelor Degree 2:1 or better (e.g. Computer Science, Bioinformatics, Biostatistics), and preferably also a similar MSc qualification. The University of Leicester English language requirements apply where applicable.

How to apply:
You should submit your application using our online application system.

Apply for a PhD in Health Sciences Research

In the funding section of the application please indicate you wish to be considered for a CLS HDRUK Studentship
In the proposal section please provide the name of the supervisor and project you want to be considered for – please list both your first and second choices.

**Project / Funding Enquiries:** Dr Alex Rowlands alex.rowlands@le.ac.uk

Application enquiries to pgradmissions@le.ac.uk

Closing date for applications: 3rd April 2019

Interviews are likely to be week commencing 8th or 15th April 2019