



**UNIVERSITY OF
BIRMINGHAM**

Research Associate

School of Dentistry

Institute of Clinical Sciences

College of Medical and Dental Sciences

University of Birmingham

Ultrasurge - Surgery enabled by Ultrasonics EPSRC Grant No EP/R045291/1

The School of Dentistry invites applications for a full-time post of Research Associate. We are looking for a full-time Research Associate 5 years duration to work on a Nationwide grant. This post will be based at the School of Dentistry, Institute of Clinical Sciences. This prestigious grant is funded by the Engineering and Physical Sciences Research Council and provides an exciting opportunity to be involved with the research project entitled “Surgery enabled by Ultrasonics”. The post holder will be working with researchers Professor Damien Walmsley, Dr Ben Scheven, Professor Paul Cooper and Dr Shelton based in the School of Dentistry, Institute of Clinical Sciences.

This is a £6.1 million multidisciplinary grant involving 5 universities and is led by Professor Margaret Lucas (Engineering, Glasgow). The other researchers are Professor Pietro Valdastrì (Robotics & Autonomous Systems, Leeds), Professor Hamish Simpson (Orthopaedics and Trauma, Edinburgh), Professor Sandy Cochran (Ultrasound materials and systems) and Professor Fabrice Pierron (Solid Mechanics within Engineering, Southampton)

Background

The range of surgical tools for interventional procedures that dissect, or fragment tissue has not changed significantly for millennia. There is huge potential for ultrasonic devices to enable new minimal access surgeries, offering higher precision, much lower force, better preservation of delicate structures, low thermal damage and, importantly, enabling more procedures to be carried out on an out-patient or day surgery basis. To realise this potential and deliver our vision of ultrasonics being the technology of choice for minimal access interventional surgery, a completely new approach to device design is required, to achieve miniaturisation and to incorporate both a cutting and healing capability in the devices. By integrating with innovative flexible, tentacle-like surgical robots, we will bring ultrasonic devices deep into the human body, along tortuous pathways to the surgical site, to deliver unparalleled precision.

Unsurpassed precision in challenging neurological, skull-base and spinal procedures as well as in general surgery is attainable through tailoring the robotic-ultrasonic devices to deliver the exact ultrasonic energy to the exact locations required to optimise the surgery. We will achieve this by quantifying the effects of the ultrasonic excitations typical of surgical devices in tissues, at and surrounding the site of surgery, in terms of precision cutting, tissue damage

(mechanical damage, thermal necrosis, cavitation) but also the potential to aid regeneration. We will make world-leading advances in ultra-high-speed imaging measurements and biophysical analysis, complementing advances in histology and clinical assessment, to develop a combined approach to the characterisation of both damage and regeneration of tissue. Through this holistic approach to device design, we will create integrated robotic-ultrasonic surgical devices tailored for optimised surgery.

The Candidate

Candidates should possess a PhD in the area of regenerative medicine with experience of mesenchymal stem cells, cellular signalling, bone biology. Experience and/or an interest in biophysics and biomechanics would be an advantage. There will be the opportunity to receive further training in research methodology in key interdisciplinary areas.

As this is a unique interdisciplinary project and there will be travel and working at the different centres. There is a strong industrial collaboration in the project and this will include bridging these links. We are therefore looking for an individual who can not only demonstrate a strong research background but also has entrepreneurial qualities, a good networker and leadership potential. This 4-year post with the opportunity to extend provides an excellent opportunity for research development with the opportunity to excel in interdisciplinary research both in academia and industry.

For confidential, informal enquiries regarding this vacancy please contact Professor Damien Walmsley (a.d.walmsley@bham.ac.uk) or Ben Scheven (B.A.Scheven@bham.ac.uk)

Salary and other details of the post are available on jobs.ac.uk
<https://www.jobs.ac.uk/job/BNP994/research-associate-80217>

The post is full-time fixed term for 4 years in the first instance with the chance to extend the position.

Further details of the School and Institute of Clinical Sciences are at
<https://www.birmingham.ac.uk/research/activity/clinical-sciences/index.aspx>

Closing date: 1st November, 2018