



**LIVERPOOL JOHN MOORES UNIVERSITY
Research Institute for Sport and Exercises Sciences (RISES)
School of Sport and Exercise Sciences
Faculty of Science**

Job Description

Vac Ref: 2382

Title:	Post-Doctoral Researcher
Grade:	7
Salary:	£32,548 - £38,833 per annum (maximum starting salary £32,548)
Hours:	Full Time
Contract length:	Fixed term 36 months
Location:	Tom Reilly Building
Reporting to:	Dr Thomas O'Brien

Role Summary: The Post-Doctoral Researcher will work with Dr Thomas O'Brien (LJMU) and Mr Alf Bass (Alder Hey Children's Hospital), and the collaborative team, on data collection, analysis, and dissemination for the project "An intelligent ultrasound-based diagnostic tool to decouple neural and structural contributions to reduced joint range of motion in cerebral palsy". A project summary can be found at the end of this document. The appointed person will also be expected to make broad contributions to further strengthen the collaborative research between LJMU Alder Hey Children's Hospital. The wider aspects of the role as a post-doctoral researcher include developing and conducting individual and/or collaborative research projects, acting as principal investigator where appropriate. Extend, transform and apply knowledge acquired from scholarship to research and appropriate external activities. Make presentations at conferences, or exhibit work in other appropriate events, and write up research work for publication.

Key Accountabilities or Duties:

Research

- Data collection at Alder Hey Children's Hospital associated with the above research project
- Analysis of musculoskeletal structure and function data using Artificial Neural Network analysis

- Contribute to the supervision and guidance of the post-graduate students in biomechanics and specifically the PhD students working as part of the LJMU-Alder Hey group
- Assist with the planning, coordination and implementation of research, including manage research resources and budgets and ensure effective use is made of them
- Ensure that research is conducted to appropriate ethical and governance standards as defined by the University and the NHS
- Use due diligence in the management, protection and exploitation of intellectual property owned by the University
- Analyse and interpret data, prepare and submit papers and disseminate scholarly activity in the form of peer reviewed publications in journals of international standing and internationally recognised conferences, or other high quality health research outlets.
- Aim to secure external funding to extend this area of work and to promote a dynamic research culture.
- Contribute to the development of new models, techniques and methods
- Maintain contact with (including membership of) appropriate professional bodies
- Engage with and participate in the University's PDR process
- Any other duties commensurate with the grade as deemed necessary by the Head of RISES/Director of School
- A commitment to LJMU's values and regulations, including Equal Opportunities Policy, the AUA (Association of University Administrators) Statement of Values and AUA CPD Framework.
- Liverpool John Moores University recognises and is aware of its Social, Economic and Environmental responsibilities, the post holder is required to minimise environmental impact in the performance of the role and actively contribute to the delivery of LJMU's Environment and Sustainability Policy.
- The post-holder's mandatory Health and Safety responsibilities, which have been agreed by the University's Strategic Management Team, are contained in Section 2 of the University's Safety Management Code of Practice MCP1 Organisation for the Implementation of the Health and Safety Policy.
- For some of your activity, from time to time, you may be required to contribute to externally funded projects such as research or EU projects.

Teaching and Learning

- Be involved in the assessment of student knowledge and supervision of projects as part of the LJMU-Alder Hey group
- Assist in the development of student research skills

Leadership and Management

- Coach and support more junior colleagues in developing their research techniques

- Supervise the work of others in the research teams or projects

Citizenship

- Contribute to a supportive working environment and develop productive working relationships with other team members
- Attend and contribute to staff meetings
- Contribute to wider school/university activities e.g. open days, student welcome, graduation and clearing events
- Build internal contacts and seek external contacts to assist in the delivery of research, take part in engagement activity
- Act as an ambassador for the University in all interactions with current and prospective staff and students, visitors to the University, external partners, media and general public
- Promote the University's values of an inclusive and diverse community.

Project summary

An intelligent ultrasound-based diagnostic tool to decouple neural and structural contributions to reduced joint range of motion in cerebral palsy

Funded by Sparks and Great Ormond Street Charity

In treating children with cerebral palsy (CP), the first challenge is diagnosing whether the restricted range of motion is primarily due to neural (hypertonia) or structural (contracture) factors. Since these require different treatments, correct diagnosis is essential. However, existing clinician-rated tools lack sensitivity and the alternative, assessing a child under general anaesthesia or administering a bolus baclofen dose, is risky and impracticable. Consequently, treatment planning is complex and ill-informed and patient outcomes vary. A widely applicable diagnostic tool is required. We, and others, have shown that ultrasound imaging has the potential to serve this purpose.

The aim of this project is to develop and evaluate a diagnostic ultrasound-based muscle stiffness assessment that can distinguish between structural and neural contributions to reduced joint range of motion in children with CP, and predict treatment outcomes, without anaesthetisation.

Ultrasound imaging will be integrated with motion, force and electromyography to quantify muscle-tendon properties. Measurements will be taken from children with CP and typically developing children while conscious (neural and structural contributions present), and under general anaesthesia (neural contribution removed) to differentiate the two contributing mechanisms. These unique data will 1) advance understanding of the causes and required treatments for reduced range of motion and 2) be used to train an artificial neural network, which predicts the likelihood of hypertonia and contracture from muscle-tendon properties. A user-friendly interface will visualise the intelligent model, guide decision-making, and allow individualised simulation of changing muscle-tendon parameters to predict the treatment outcome. We will then evaluate the tool in an independent group of children with CP, by testing whether it can correctly diagnose the causes of reduced range of motion, and determining if its use in diagnosis could improve treatment outcomes following botulinum toxin.

At completion, the muscle stiffness assessment will be ready for translation and an evaluation of its effectiveness as a diagnostic tool in clinical settings.

Person Specification

Introduction

The person specification describes the skills, experience, knowledge and aptitude required to perform the duties of this post effectively. The criteria order listed should not be taken to imply their relative importance.

Paid and unpaid experience may both be relevant.

ESSENTIAL

Factors	Minimum Requirements	Evidence
Doctoral level research degree in Biomechanics, human movement science, biomedical engineering or related discipline	PhD	Application/interview
Proven record of ability to conduct high quality research which is reflected in the authorship of high quality publications in high impact biomechanics and/or clinical journals or other research outputs publications		Application/interview
Expertise and experience of using integrated systems for analysis of musculoskeletal function (e.g., ultrasound, MRI, X-rays, optoelectronics etc.)		Application/interview
Experience of working or conducting research in clinical settings		Application/interview
Capacity to plan, manage and lead experimental studies, including participant recruitment		Application/interview
Ability to work independently and as part of the Biomechanics research group within RISES and integrate with the clinical team at Alder Hey Children's Hospital		Application/interview
Ability and willingness to communicate research findings to a wide range of audiences on an international scale, including the community, healthcare professionals and research peers		Application/interview
Excellent written and oral communication skills.		Application/interview

DESIRABLE

Factors	Minimum Requirements	Evidence
Previous post-doctoral experience in biomechanics and musculoskeletal health		Application/interview
Experience working with children with cerebral palsy and their families		Application/interview
Strong knowledge of research methods and advanced statistics, including Artificial Neural Networks		Application/interview
Ability to develop a network of collaborative partnerships		Application/interview



Advert

An intelligent ultrasound-based diagnostic tool to decouple neural and structural contributions to reduced joint range of motion in cerebral palsy

We are seeking an excellent post-doctoral researcher to join our research group and lead our latest exciting project in the musculoskeletal health of children with cerebral palsy. This project will integrate motion analysis and ultrasound imaging of muscle structure in an artificial neural network analysis to develop a novel diagnostic tool to distinguish between the causes of joint stiffness in children with cerebral palsy. A project summary can be found within the job description.

You will be responsible for day-to-day management and delivery of this project including research governance, data collection and analysis, dissemination in scientific and lay forums, and management of national and international collaborations. It is also expected for you to make a wider contribution to the research group by supporting ongoing projects and postgraduate research students.

Our research group brings together internationally recognised research expertise in muscle mechanics and clinical motion analysis at Liverpool John Moores University, and clinical partners from the Orthopaedics Department and Gait Laboratory at Alder Hey Children's Hospital. Alder Hey is the regional centre for movement analysis in the North-West of England and one of the largest children's hospitals in Europe. The successful candidate will be employed by LJMU, but will be required to work flexibly within this research group at both Alder Hey and LJMU.

You must have completed doctoral research in the field of musculoskeletal mechanics, and have experience with ultrasound imaging and motion analysis. An understanding of the effects and treatments of cerebral palsy is essential, and candidates must demonstrate the ability to work in the challenging environment of clinical paediatrics. Any appointment would be dependent on the applicant receiving enhanced clearance from the Disclosure and Barring Service.

Informal enquiries may be made to Dr Thomas O'Brien, email: T.D.O'Brien@ljmu.ac.uk
Telephone: 0151 904 6262

Benefits of working with us

Annual leave: allowance of 30 days (for grade 3-7 staff) and 35 days (for grades 8 and above) plus 8 public holidays.

Childcare: vouchers which are exempt from tax and national insurance (up to a value of £243 per month). You could save up to £933 per year.

Pension: access to a generous defined benefit pension scheme.

Travel: various interest free travel loans for annual season tickets, cycle to work scheme and reduced-rate city centre car parking.

Flexible working: maintain a healthy balance between work and home life with opportunities to work flexibly - including flexi time and job sharing where possible.

Health and wellbeing: we offer counselling and advice services, a voluntary dental plan option and free off-peak gym membership to help you keep fit.

Professional development: our Leadership and Development Foundation offers ILM recognised leadership and management support, mentoring, 1 to 1 coaching and a wide range of professional development courses. We take career progression seriously and encourage all staff to maintain their continuous professional development. There are opportunities to take part in accredited qualifications in Education and Training (CIEH), Leadership and Management Development (ILM), Developing Professional Practice (SEDA) and online ITQs accredited by the British Computer Society (BCS).

Community: there are plenty of opportunities to give back to the community through volunteering, supporting our Corporate Charities and getting involved in groups such as LJMU Together which recognises the contribution of our lesbian, gay, bisexual, and transgender staff and students, Disability Equality Group and Culturally Diverse Group. There is also an opportunity to give to charities through the Payroll Giving scheme.

Benefits Plus: in addition to the great benefits above, our close ties to organisations and businesses within the region and further afield means we can offer discounts for many shops, restaurants and services, free off-peak gym membership and free or discounted tickets to a range of events.

