



University of
Sheffield

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Research Associate in Computational Spine Biomechanics

Faculty of Engineering,
Department of Mechanical
Engineering

Overview

This highly interdisciplinary post-doctoral research associate (PDRA) position will advance the modelling of patients with vertebral metastases for the prevention of fractures in order to reliably stratify patients based on their fracture risk. The position is funded as part of the Horizon Europe Project that aims to provide a combination of models biomechanically validated and demonstrated in relevant clinical environments that will be incorporated in a clinical decision support system.

The ideal candidate will have an excellent PhD in biomechanics (or a related discipline), possess a solid knowledge of finite element modelling, and have a strong experience in developing patient-specific biomechanical computational model. Ensuring the achievement of the project objectives will advance the vision of the INSIGNEO institute to produce a transformational impact on healthcare. You will also sustain and strengthen collaboration within relevant INSIGNEO research groups and beyond; and will commit to INSIGNEO's mission to produce high quality cutting-edge research.

Person Specification

You should provide evidence in your application that you meet the following criteria. We will use a range of selection methods to measure your abilities in these areas including reviewing your online application, seeking references, inviting shortlisted candidates to interview and other forms of assessment action relevant to the post.

The University of Sheffield is proud to be a Disability Confident Employer, we commit to recruit and retain disabled applicants and support positive action. We encourage disabled people to apply for our jobs and to have the opportunity to demonstrate their skills, talent and abilities at the interview stage. We commit to offer an interview to disabled applicants who meet the minimum criteria for the job. For further information on the Disability Confident Scheme, please follow the [link](#).

Criteria		Essential	Desirable
1.	An excellent PhD in biomechanics (or a related discipline, or equivalent experience).	X	
2.	Solid knowledge of finite element modelling.	X	
3.	Good understanding of spine biomechanics.		X
4.	Expertise in using finite element software with high level of sophistication (e.g. use of user-subroutines in Abaqus, Ansys).	X	
5.	Experience in working with high-performance computing (HPC) systems.		X
6.	Proven track record in drafting and publishing papers in quality journals under supervision.	X	
7.	Experience in participating in large projects and ability in delivering research within given deadlines.		X
8.	Effective communication skills, both written and verbal, report writing skills and experience of delivering presentations.	X	
9.	Experience of working as a team member to collaborate, co-operate and participate with others to achieve common objectives and to share experience and ideas.	X	
10.	Ability to develop creative approaches to problem solving.	X	
11.	Ability to analyse and solve problems with an appreciation of longer-term implications.		X
12.	Ability to manage and prioritise own workload effectively, to	X	

	meet deadlines.		
13.	Experience of adapting own skills to new circumstances.	X	
14.	Experience of developing and maintaining a network of contacts throughout own work area.		X

About the Team

You will join the group of Prof. Damien Lacroix and Dr. Enrico Dall'Ara. Our biomechanics group within the Department as an international and interdisciplinary profile and a strong commitment to clinical and industrial translation with impact in future healthcare. We are active in biomechanics and mechanobiology of the neuromusculoskeletal systems. We have access to a fully equipped human movement analysis laboratory, a tissue testing and mechanobiology laboratory, and, through the Department of Oncology and Metabolism, to ex vivo and in vivo microCT imaging.

On appointment, you will become a research staff member of the Department of Mechanical Engineering and an associate member of the Insigneo institute at the University of Sheffield. You will also be part of the Integrative Musculoskeletal Biomechanics (IMSB) group within Insigneo, and actively engage with the activities organized by the group. The IMSB is formed by eight Principal Investigators and their teams (in total ~35 members), with expertise in multiscale experimental and computational musculoskeletal biomechanics. The Department of Mechanical Engineering is a very supportive place to work and achieved Athena SWAN silver status in 2018 in recognition of its commitment to promoting gender equality. We are ranked amongst the UK's top ten Mechanical Engineering departments for research excellence (REF2021) and our student satisfaction is consistently high - we came 1st in the Russell Group in the 2021-2022 National Student Survey with an overall satisfaction of 92%.

The Insigneo Institute for in silico Medicine is a collaboration between the University of Sheffield, Sheffield Teaching Hospitals NHS Foundation Trust and Sheffield Children's NHS Foundation Trust. The Insigneo Institute is driving innovative research at the interface of healthcare, engineering and science to transform the future of healthcare technology. Established in 2012, the institute has built a strong multidisciplinary network of over 260 academics and clinicians who bring together expertise in biomedical imaging, healthcare data, computational modelling, and digital healthcare technologies. Academic members of the Insigneo institute are all members of individual departments, where the majority of teaching and administrative responsibilities are undertaken. For more information on Insigneo please see <https://www.sheffield.ac.uk/insigneo>

Job Description

Main Duties and Responsibilities

- Effectively work with other partners of the project for the segmentation of vertebrae with metastatic lesions.
- Lead the development of subject-specific finite element models of vertebrae with lesions.
- Work collaboratively with other colleagues for the validation of the finite element models.
- Lead the development of computational models that simulate the treatment of metastatic vertebrae.
- Work collaboratively with other colleagues for the development of finite element models of the spine segment (including vertebrae and intervertebral discs).
- Follow best practices for quality assurance of research software and effective management of research data.
- Self-organise time to ensure the achievement of the objectives agreed with the line manager and

to continue to develop own knowledge in the domain of research.

- Maintain up-to-date knowledge of the relevant literature.
- Effectively collaborate with colleagues, co-workers, partners, etc. to achieve the agreed objectives.
- Proactively seek to develop further collaboration opportunities arising from own work.
- Be actively engaged and participate in all meetings and activities in the collaborative projects in which the IMSB group at Insigneo is currently participating.
- Mentor junior colleagues and PhD students and supervise MEng/MSc dissertation research.
- Interact with other researchers within the department, the Insigneo Institute, the rest of the university and the institutions of our partners in collaborative projects.
- Write papers that are published in internationally peer-reviewed journals.
- Present work at national and international conferences.
- Write technical reports both for internal monitoring and for reporting to external funding agencies.
- As a member of staff you will be encouraged to make ethical decisions in your role, embedding the University sustainability strategy into your working activities wherever possible.
- Any other duties, commensurate with the grade of the post.

Reward Package

Terms and conditions of employment: Will be those for Grade 7 staff.

Salary for this grade: £36,333 - £44,414 per annum. Potential to progress to £48,423 per annum through sustained exceptional contribution.

This post is fixed-term with a start date of 1 July 2023 and an end date of 30 June 2026 with possibility for extension.

This post is full-time:

This role has been identified as a full-time post, but we are committed to exploring flexible working opportunities with our staff which benefit both the individual and the University. Therefore, we would consider flexible delivery of the role subject to meeting the business needs of the post. If you wish to explore flexible working opportunities in relation to this post, we encourage you to call or email the departmental contact listed below.

If you join the University you will have access to a Total Reward Package that includes a competitive salary, a generous Pension Scheme and annual leave entitlement, as well as access to a range of learning and development courses to support your personal and professional development. You will have access to your own personalised portal where you can also access a comprehensive selection of benefits and offers to suit your changing lifestyle needs, for example financial wellbeing, travel options, shopping and cinema discounts.



The University is committed to tackling the global climate emergency. Our sustainability strategy forms an integral part of all we do. We strive to embed this in all areas of university life, from our

students' education, the globally impacting international research we contribute, to campus life.

We aim to empower staff to work sustainably by giving them the knowledge to make ethical decisions at work and home. Staff have the opportunity to be involved in impactful sustainability projects through the nationally recognised Green Impact scheme.



Staff have access to excellent green benefits including the cycle to work scheme with discounts and free secure bike storage, as well as many greener choices across campus.

If you have an interest in this area, the university will strive to passionately support you in these commitments. Check out www.sheffield.ac.uk/sustainability for more information.

The University of Sheffield recognises the importance of creating a positive environment, whereby all staff feel able to talk openly and with trust about wellbeing and mental health.

Our Staff Wellbeing offer, encourages and supports staff to maintain their own positive health and wellbeing through a range of accessible, inclusive and supportive services and activities.

Our leadership development has been designed to ensure that our leaders have the knowledge, skills and behaviours needed by the University.

Inclusion at Sheffield is everyone's responsibility. Our vision is to build a University community that actively attracts, engages and develops talented individuals from many different backgrounds.



We are proud of our award-winning equality, diversity and inclusion action, and we continue to work to create a fully inclusive environment where everyone can flourish.

To find out more about the benefits of working at the University, visit www.sheffield.ac.uk/jobs/benefits

Selection – Next Steps

Closing date: For details of the closing date please view this post on our web pages at www.sheffield.ac.uk/jobs

Following the closing date, we will contact you by email to let you know whether or not you have been shortlisted to participate in the next stage of the selection process. Please note that due to the large number of applications that we receive, it may take up to two working weeks following the closing date before the recruiting department will be able to contact you.

Full details about interviews and other selection action will be provided to invited candidates.

For more information on our application and recruitment processes visit www.sheffield.ac.uk/jobs/application-tips

Informal enquiries

For informal enquiries about this job and the recruiting department, contact: Professor Damien Lacroix on d.lacroix@sheffield.ac.uk

For administration queries and details on the application process, contact the lead recruiter: Mrs Lisa Gardiner on l.m.gardiner@sheffield.ac.uk .

For all online application system queries and support, visit: www.sheffield.ac.uk/jobs/faqs

Creating a remarkable place to work

We build teams of people from different heritages and lifestyles from across the world, whose talent and contributions complement each other to greatest effect. We believe diversity in all its forms delivers greater impact through research, teaching and student experience.

We are consistently ranked in the top 100 of the world's universities, but there's so much more to us than that. By joining the University, you will be joining award-winning teams and departments who are all working together to make the University of Sheffield a remarkable place to work.