

Job Title:	Research Assistant/Associate- Mechanisms of mechanotransduction in cartilage and bone formation
Department/Division/Faculty:	Bioengineering
Campus location:	Engineering
Job Family/Level:	Academic and Research, Level A/B
Responsible to:	Dr Niamh Nowlan
Key Working Relationships (internal):	Members of the Nowlan Group, project students
Key Working Relationships (external):	Prof David Hoey, Trinity College Dublin, Ireland
Contract type:	Fixed term, Full time for 12 months

Purpose of the Post

This project forms a part of European Research Council project, in which the aim is to understand how the joints of the skeleton acquire their shape over prenatal development, and how the emergence of shape depends on the mechanical environment due to fetal movements. The post holder will investigate mechanotransduction pathways involved in prenatal bone and cartilage development using a mechanostimulation bioreactor for in vitro culture of mouse limb explants.

Project details:

Recent work from the Nowlan group has shown that calcium channels are involved in mechanically-mediated cartilage growth and morphogenesis (see Parisi et al., 2018), and it is likely that these channels are also involved in bone development. This project will investigate which specific calcium channels are most important (including TRPV4, Piezo 1 and 2, Polycystin 2) for cartilage and bone development using a mechanostimulation bioreactor (see Parisi et al., 2018 and Chandaria et al., 2017). Agonists and antagonists of a range of channels will be used to identify the action of each of these channels in mechanotransduction in developing bone and cartilage. Morphological and cellular dynamics analyses will be performed. The eventual aim of the work is that it would open avenues towards mechanotherapeutics for bone and cartilage development, healing and regeneration. For example, this project may reveal specific drugs that could be used systemically to promote cartilage or bone formation as a replacement for mechanical stimulation. This project will be a collaboration between the Nowlan group at Imperial College London (<https://developmental-biomechanics.org/>) and the Hoey group at Trinity College Dublin, Ireland (<https://www.tcd.ie/mecheng/staff/dahoey/>).

Key Responsibilities

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- To work on technology developed in the group to apply mechanical stimulation to prenatal limb explants using an *in vitro* culture bioreactor system
- To research, design and effectuate experiments in which multiple specific mechanosensitive channels are blocked, or their activity downregulated or upregulated
- To characterise and quantify shape changes in the cultured joint explants using 3D imaging and analysis, and to characterise cell and tissue level events using histology and immunohistochemistry
- To publish in high quality journals and to present data at relevant conferences.
- To maintain a highly organised and accurate record of all findings and to ensure the validity and reliability of data at all times
- To conduct literature searches and reviews.
- To write reports for submission to research sponsors and to contribute to bids for research grants
- To assist in the supervision of undergraduate and postgraduate research students and research

assistants as required.

- To develop contacts and research collaborations within the Department and wider academic community in order to further the project aims.
- To actively participate in the research programme of the Group and to participate in Group research meetings and internal seminars
- To actively engage with collaborator on the project Prof David Hoey and his group
- To contribute to the smooth running of the Group's laboratories and facilities
- To comply with the College, Division, and Unit safety practices and to attend courses on safety when appropriate.
- To complete timesheets for your work on projects in a timely manner
- To observe and comply with all College policies and regulations, including the key policies and procedures on Confidentiality, Conflict of Interest, Business Continuity, Data Protection, Equal Opportunities, Ethics related, External Interests, Financial Regulations, Health and Safety, Imperial Expectations (for new leaders, managers and supervisors), Information Technology, and Smoking.
- To undertake specific safety responsibilities relevant to individual roles, as set out on the College Health and Safety Structure and Responsibilities web page: www.imperial.ac.uk/safety/policies/organisationandarrangements.
- To undertake [Business Continuity responsibilities](#) relevant to individual roles
- Any other duties commensurate with the grade of the post as directed by the line manager.

Where Imperial or funder conditions necessitate, you will be required to complete timesheets for your work on projects in a timely manner

Job descriptions cannot be exhaustive and the postholder may be required to undertake other duties, which are broadly in line with the above key responsibilities.

Imperial College London is committed to equality and valuing diversity

Person Specification

Requirements	Essential (E)/ Desirable (D)
Candidates/post holders will be expected to demonstrate the following	
Education	
• An MEng or MSc or equivalent qualification in a relevant Bioengineering or Mechanical Engineering subject	E
• A PhD (or equivalent) in the Biomechanics or Bioengineering field, or equivalent research, industrial or commercial experience	E (for Associate level)
Experience	
• Practical, in-depth experience of using a bioreactor for in vitro culture of cells or tissues	E
• Track record of high-quality academic publications as main author in the Biomechanics or Biomedical Engineering field in international journals	E (for Associate level)
• Demonstrated experience with the murine experimental model system	D
• Demonstrated proficiency with sectioning, histological and immunohistological techniques	D
• Experience working with developmental model systems	D
• Expertise with 3D imaging and 3D image processing and analysis	D
• Experience with supervision of student projects	D
Knowledge	

• In-depth knowledge of mechanoregulation and mechanotransduction	E
• Knowledge of research methods, statistical procedures and imaging packages	E
• A current or recent Home Office Personal License (PIL)	D
• Proficiency with Matlab	D
Skills & Abilities	
• Self-motivation and an ability to exercise initiative and judgment in carrying out research tasks	E
• Ability to work both independently and as part of a team	E
• Willingness to travel within the UK, to the project collaborator in Ireland, and otherwise abroad to conduct research and attend conferences	E
• Willingness to work out of normal working hours (including weekends) if the requirements of the project demand.	E
• Ability to prioritise jobs and organise work effectively to meet deadlines	E
• Competence at writing and presenting in scientific English at a level suitable for conference presentations and peer reviewed journal publications	E
• Excellent verbal communication skills and the ability to deal with a wide range of people	E
• Ability to contribute to a complex research programme	E
• Willingness to work as part of a team and to be open-minded and cooperative	E
• Flexible attitude towards work	E
• Willingness to undertake any necessary training for the role	E
• A willingness to learn and operate good research practice, Health and Safety and Ethics Policies	E

Imperial College is committed to equality of opportunity and to eliminating discrimination. All employees are expected to follow the [7 Imperial Expectations](#) detailed below:

- 1) Champion a positive approach to change and opportunity
- 2) Encourage inclusive participation and eliminate discrimination
- 3) Communicate regularly and effectively within and across teams
- 4) Consider the thoughts and expectations of others
- 5) Deliver positive outcomes
- 6) Develop and grow skills and expertise
- 7) Work in a planned and managed way

Employees are also required to comply with all College policies and regulations paying special attention to:

- Confidentiality
- Conflict of Interest
- Data Protection
- Equal Opportunities
- Financial Regulations
- Health and Safety
- Information Technology
- Smoking
- Private Engagements and Register of Interests

They must also undertake specific training and assume responsibility for safety relevant to specific roles, as set out on the [College Website Health and Safety Structure and Responsibilities](#) page.

The College is a proud signatory to the San-Francisco Declaration on Research Assessment (DORA), which means that in hiring and promotion decisions, we evaluate applicants on the quality of their work, not the journal impact factor where it is published. For more information,

see <https://www.imperial.ac.uk/research-and-innovation/about-imperial-research/research-evaluation/>

The College believes that the use of animals in research is vital to improve human and animal health and welfare. Animals may only be used in research programmes where their use is shown to be necessary for developing new treatments and making medical advances. Imperial is committed to ensuring that, in cases where this research is deemed essential, all animals in the College's care are treated with full respect, and that all staff involved with this work show due consideration at every level.

<http://www.imperial.ac.uk/research-and-innovation/about-imperial-research/research-integrity/animal-research/>

Committed to equality and valuing diversity, we are an Athena SWAN Silver Award winner, a Stonewall Diversity Champion, a Disability Confident Employer and work in partnership with GIRES to promote respect for trans people.