

THE UNIVERSITY OF MANCHESTER
PARTICULARS OF APPOINTMENT
FACULTY OF SCIENCE & ENGINEERING
SCHOOL OF MATHEMATICS
RESEARCH ASSOCIATE IN MATHEMATICAL BIOLOGY
VACANCY REF: S&E-14765

Salary:	Grade 6 £32,816 per annum
Hours:	Full time
Duration:	Up to 60 Months from 01 January 2020
Location:	Oxford Road, Manchester

Enquiries about the vacancy, shortlisting and interviews:

Name: Prof. Karl Kadler

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Overview and Application process

UKRI-BBSRC has awarded The University of Manchester and The University of Bristol a major 5-year £4.6M Strategic Longer and Larger (sLoLa) research grant entitled '*Opportunities to modulate extracellular matrix secretion and assembly for long-term health*'. This job advertisement is for two postdoctoral research associates (PDRAs) to be based in Manchester. Post one is based in The School of Natural Sciences, post two in The School of Biological Sciences. The start date is 01 January 2020.

Introduction to the research project

Professor Karl Kadler (Lead Applicant) together with colleagues from the University of Manchester and the University of Bristol (lead contact, Professor David Stephens) has been awarded a strategic longer and larger (sLoLa) frontier bioscience research grant by UKRI-BBSRC (Biotechnology and Biological Sciences Research Council) to study '*Opportunities to modulate extracellular matrix secretion and assembly for long-term health*'. This 5-year project is joint between The University of Manchester and the University of Bristol and funds five PDRAs, a Senior Experimental Officer and three technicians. Two PDRAs and the SEO and technicians are already appointed. Of the five PDRAs in total, three will be based in Manchester

and two will be based in Bristol; however, secondments between laboratories during the 5-year period of award are necessary to achieve the aims of the research, to maximise research output, increase collaboration, and help build and shape the careers of the PDRAs. Funds are available within the award to facilitate the secondments.

The research project:

This sLoLa programme of research aims to elucidate the fundamental mechanisms of how cells build and repair collagen-rich tissues. Dysregulation of collagen is the hallmark of some of the most debilitating features of normal ageing and life-threatening diseases; insufficient collagen is associated with poor wound repair, osteoarthritis, and tendinopathy for which there are no effective treatments. Conversely, fibrosis – the dysregulated accumulation of collagen in place of functional tissue – is associated with 45% of all deaths including cardiovascular disease and cancer. Progress in treating these conditions has been hindered by a poor understanding of the fundamental mechanisms of how cells synthesise, maintain, and repair collagen-rich tissues.

This project builds on our major conceptual advances in: identifying circadian clock control of collagen synthesis and homeostasis, understanding the role of the Golgi apparatus in controlling extracellular matrix (ECM) regulation, obtaining new insights into how immune cells orchestrate wound healing, building predictive mathematical models of cell behaviour, and in designing and manufacturing mechanically- and chemically-tuneable scaffolds that control cell behaviour and tissue assembly.

This is a Frontier Bioscience project that will investigate a core topic in biology with far-reaching implications on our understanding of how tissues develop, are maintained, and age. This work underpins research into long-term human and animal health, as well as the development and use of synthetic scaffolds for regenerative medicine. At its core it develops our fundamental understanding of the cell and molecular biology of ECM function. The project focuses on the secretory machinery of cells, which addresses directly the strategic priority of Healthy Ageing, and has significance not only to human health but also to animal welfare.

The team and the research projects:

The **sLoLa team** comprises laboratories at the **University of Manchester**:

Professor Karl Kadler (extracellular matrix and collagen),
Professor Martin Lowe (Golgi protein trafficking),
Professor Qing-Jun Meng (circadian clock),
Dr. Joe Swift (biomechanics, proteomics and informatics) and
Professor Oliver Jensen (mathematics),

and laboratories at the **University of Bristol**:

Professor David Stephens (cell biology of protein trafficking),
Professor Paul Martin (wound healing) and
Dr. Chrissy Hammond (cartilage and bone diseases).

The new PDRAs will work alongside Dr. Nicola Stevenson (Research Co-Investigator based in the Stephens' laboratory), Dr. Adam Pickard (who will initially be based in Karl Kadler's laboratory), Dr. Anthony Adamson (Senior Experimental Officer in Genome Editing, based at the University of Manchester), and three technicians who will be based at the University of Bristol.

We are keen to attract applicants who are enthusiastic about learning new skills in our multi-lab team and applying their skills to a range of related research questions. Therefore, postdoctoral research associates will have a home in one laboratory but will move between laboratories during the 5-year period of the grant.

Introduction to the University of Manchester

The University of Manchester is the largest single-site university in the UK with over 40,000 students and more than 12,000 staff.

We aim to become one of the top 25 research universities in the world by 2020 and are committed to: delivering an outstanding teaching and learning experience for our students; contributing to the social and economic success of local, national and international communities; producing the highest calibre graduates; and developing our staff to be amongst the very best of their peers.

To achieve our ambitious goals we aim to attract and retain the very best people to work across a range of academic disciplines and professional services.

The Wellcome Centre for Cell-Matrix Research (WCCMR, <https://www.wellcome-matrix.org/>)

The successful PDRAs will become members of the WCCMR, which is one of 15 centres of excellence currently funded by Wellcome (<https://wellcome.ac.uk/what-we-do/our-work/research-centres-and-institutes>). The WCCMR comprises 22 laboratories at the University of Manchester focused around ChronoMatrix, ImmunoMatrix and MechanoMatrix themes to investigate the principles that govern cell and matrix interactions. The Centre has a strong focus on fibrosis, which aims to identify the principle features of matrix homeostasis and how this goes awry in fibrotic diseases. The WCCMR funds state-of-the-art infrastructure in imaging (light and EM), genomics, genome editing, proteomics, biomolecular analysis, and bioinformatics, managed by dedicated Senior Experimental Officers and technicians. The Centre has 150 staff (fellows, postdocs, technicians and postgraduate students). The Centre has teamed up with the Lydia Becker Institute at the University of Manchester to host a Wellcome Trust 4-Year PhD ImmunoMatrix; PDRAs on the sLoLa project could be expected to co-supervise PhD students from this new programme as well as Masters and Undergraduate students who perform research in the Wellcome Cell-Matrix Centre. Professor Karl Kadler is the Centre Director.

Our strategic partnerships

The Faculty has developed key strategic partnerships that underpin its ambitions to deliver ground-breaking research.

It plays a leading role in Health Innovation Manchester (HInM), which was launched in September 2015, as part of the UK Government's decision to devolve health and social care responsibilities to Greater Manchester. HInM offers a unique opportunity to bring together health and social care, academic and related business resources to deliver an innovative health ecosystem that significantly enhances our scientific standing and acts as a magnet for inward investment.

As part of this, the Faculty works collaboratively with six local NHS Trusts in a strategic partnership that unites healthcare providers with academics and researchers to deliver leadership for our regional health system - at the same time creating an internationally recognised centre for applied health research and education.

Key partnerships in the charitable sector include Cancer Research UK; Diabetes UK; and the Wellcome Trust; and the Faculty will also have research and funding links to a number of

commercial organisations including Unilever, AstraZeneca, GlaxoSmithKline and Boots, who will help us to bring new drugs and products to the market.

Working for the University of Manchester

The University of Manchester strives to make our community a welcoming, caring and enthusiastic one, fuelling ambition with opportunities and support to help us all achieve our personal and professional goals.

Our diverse job opportunities include an attractive benefits package with family-friendly policies that provide for flexible working. We care deeply about career and personal development, offering a structured induction programme for new staff, an annual performance and development review, staff training for all career stages and mentoring opportunities to support your career ambitions.

We have a genuine commitment to equality of opportunity for our staff and students, and are proud to employ a workforce that reflects the diverse community we serve.

As a global institution, situated at the heart of a lively, culturally diverse city, we welcome applicants of all nationalities. To help international job applicants plan for life in the UK, we have put together some useful information on passports and visas, travel to the UK, accommodation and a number of other practical considerations.

Overall Purpose of the Job:

Postdoctoral Research Associate in Tissue Bio-physics:

You will utilise a combination of imaging, -omics, biochemical and biomechanical assays to characterise the cellular microenvironment in collagen-rich tissues such as skin. These characterisations will consider responses to mechanical and circadian regulation, in healthy tissues and those affected by impaired repair / secretory systems (e.g. mutant model systems; diseased and ageing tissue). Resulting parameters will be used to inform development of physiologically-matched, three-dimensional (3D) culture systems that can be populated with cells and interrogated with imaging and -omics methods. 3D bioprinting technology will enable construction of tissues with complex geometries and multiple cell types, providing a tuneable platform to test findings from other areas of the project.

You will work closely with other sLola investigators and PDRAs to develop model systems to complement animal models, investigations into intracellular biology, cell secretion and to test predictions from mathematical modelling. The technology you develop will enable us to address fundamental questions in cell biology, such as how wound healing is affected by ageing. You will be based in the laboratories of Drs. Joe Swift and Qing Jun Meng (Wellcome Centre for Cell-Matrix Research, University of Manchester) with secondment to the Stephens, Martin and Hammond laboratories (3 months) at the University of Bristol during the course of the grant.

Key Responsibilities, Accountabilities or Duties:

- To take initiatives in the planning of research.
- To identify and develop suitable techniques, and apparatus, for the collection and analysis of data.
- To conduct data analysis.
- To ensure the validity and reliability of data at all times.
- To maintain accurate and complete records of all findings.
- To write regular internal reports (as agreed).
- To write reports for submission to research sponsors.
- To prepare material for presentation in oral and poster formats.
- To present findings to colleagues and at conferences.
- To draft publications and prepare them for submission to refereed journals.
- To submit publications to refereed journals.
- To contribute to writing bids for research grants.
- To provide guidance to staff and students.
- To undertake instruction of PhD students as agreed.
- To supervise practical work and advise students on techniques.
- To take responsibility for organising resources and effective decision making in support of research.
- To attend relevant workshops and conferences as necessary.
- To be an active team-member and set positive examples by showing a commitment to achieving results, encouraging and supporting junior members of the team and raising suggestions for continuous improvement.
- To work alongside the PI and other colleagues in a collegiate manner and build rapport within the team and the wider Faculty.
- To develop contacts and research collaborations within the Faculty and the wider community.
- To promote the reputation of the laboratory, Faculty and wider University.

Other Duties

- To undertake appropriate administration tasks.
- To attend relevant meetings.
- To undertake any necessary training and/or development.
- Actively read the scientific literature relating to (and around) the project.
- To maintain safe workplace practice and procedures in accordance with the requirements of Health and Safety legislation.
- To maintain an up-to-date knowledge of relevant statutory Health and Safety legislation and recommendations and attend safety training as required.
- Any other duties commensurate with the grade of the post as directed by PI / supervisor.

Facilities for animal research are first rate and are validated by all the appropriate Home Office licences. However, if you have any medical, social or ethical reasons for avoiding work on experimental animals, then do not apply for this post.

PERSON SPECIFICATION

Essential Knowledge, Skills and Experience:

- hold (or expect to hold shortly) a PhD (or equivalent) in applied mathematics (with experience in modelling practical applications in physics, engineering or biology), theoretical biophysics or a closely related subject
- have technical skills in mathematical modelling, computational simulation, and analysis of data (in images or otherwise)
- competent in statistical analysis.
- Have a publication track record of high quality outputs commensurate with the duration of postgraduate or postdoctoral work.
- Demonstrable ability to author research papers and present data at scientific meetings
- Proven ability to use initiative to efficiently plan, optimise and progress project and communicate findings. The ability to manage your own research independently on a day-to-day basis.
- Exhibit excellent interpersonal and communication skills and ability to work with colleagues at all levels.
- Demonstrate a willingness to contribute to the work of others by offering practical and intellectual help.
- Be able to work collaboratively as part of a larger team.
- Have good written and spoken English skills