THE UNIVERSITY OF MANCHESTER

PARTICULARS OF APPOINTMENT

FACULTY OF BIOLOGY, MEDICINE & HEALTH

SCHOOL OF BIOLOGICAL SCIENCES

DIVISION OF MOLECULAR AND CELLULAR FUNCTION

RESEARCH ASSOCIATE IN COMPUTATIONAL BIOPHYSICS

VACANCY REF: BM&H-017047

Salary:	Grade 6 £32,816 per annum
Hours:	Full Time
Duration:	Fixed term from 01 August 2021 until 31 July 2024
Location:	Oxford Road, Manchester

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Enquiries about the vacancy, shortlisting and interviews:
Manager: Dr Jim Warwicker
Email: jim.warwicker@manchester.ac.uk.
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Faculty of Biology, Medicine and Health

Introduction to the University of Manchester and the Faculty of Biology, Medicine and Health

The University of Manchester is the largest single-site university in the UK with around 38,000 students and more than 11,000 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; 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 support functions.

The Faculty of Biology, Medicine and Health (FBMH)
The Faculty of Biology, Medicine and Health was created on 1 August 2016 when the Faculty of Life Sciences and the Faculty of Medical and Human Sciences will be brought together in a new, integrated structure to deliver a truly translational approach to the life sciences, ensuring smooth research pathways - from pure discovery science through to clinical application and patient care.

With a total annual income of over £300 million, and over 3,000 members of staff, the new Faculty is comparable in size to a medium-sized UK university. Thirty undergraduate and 90 postgraduate programmes offer our 11,000 students opportunities to develop the skills and knowledge they need for a successful career.

The Faculty's matrix structure facilitates interdisciplinary working and enables us to learn from each other and share best practice; and our eight, strategic Research Domains help to articulate our research strengths, drive large-scale, collaborative research activities and strengthen relationships with our research and healthcare partners.

The integration of discovery biology, clinical application and patient care within a single Faculty, particularly in a region with notable health inequality, provides us with a real opportunity to have a very significant and positive impact on people's lives.

Our strategic partnerships
The new Faculty inherited a number of key strategic partnerships that underpin its ambitions to develop ground-breaking research.

Working alongside six local NHS Trusts, the Faculty is a key member of the Manchester Academic Health Science Centre (MAHSC) - a federation of equal partners that unites leading healthcare providers with world-class academics and researchers. It aims to be a global centre for the delivery of applied health research and education and provide leadership for our local and regional health systems.

The Faculty also play 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 life science related business resources across the region to deliver an innovative health ecosystem that can help accelerate innovation into our local health and social care systems, enhance our global scientific standing and act as a magnet for inward investment.

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 development.

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.

Project Title: Prospecting for pH-sensors in host and pathogen systems

Project Description

This is a Postdoctoral Research Associate opportunity to take part in a BBSRC funded project based in the Manchester Institute of Biotechnology, at the University of Manchester, UK. The position is mostly computational, and is available from 1st August for 3 years. It is a collaboration between 3 groups, Dr Jim Warwicker (algorithm development), Professor Perdita Barran (biophysical testing of pH-sensors), and Dr Siddharth Banka (genetics).

As measurement technologies advance rapidly in biology, it remains a challenge to find the most productive ways in which molecular simulation and modelling methods can add value. Bioinformatics is crucial for processing and classifying 'omics data. Modelling complements structural analysis, facilitating discovery of the optimal fit to experimental data, latterly in the burgeoning set of cryo-EM structures. It is beyond these points that clear rationale for use of predictive computational methods by experimental groups is often lacking. This project addresses that gap, for pH-dependence and molecular pH sensors. A user-friendly web interface will be developed for predicting pH sensing regions in proteins, from structure or sequence-based structural models. Focus will be on two application areas, with experimental validation. First, many viruses exploit the endosome entry pathway, where acidic pH sensing drives viral genome release. Cryo-EM is fuelling a renewed structural interest of viruses, so that a wealth of data exists for user interrogation of pH sensing. Second, somatic mutations in tumour growth will be mined for those predicted to underpin adaptation in altered intra and extracellular pH environments. Here, large-scale data acquisition (deep sequencing of cancer genomes) couples with metabolic adaptation (and potential therapeutic intervention), via molecular analysis of pH sensing. Calculations on this scale require a coarse-grained approach, central to which are pKa prediction schemes, allied to static and dynamic (elastic network model) analysis of interfaces. Prior to experimental validation of pH sensors, benchmarking will be made against literature biophysical data. Although our focus is on viral infection and tumour adaptation to altered pH, equally important is delivery of a simple to use web tool and downloadable open source code to encourage widespread usage in hypothesis creation.

Applicants should have a PhD, with experience in computational chemistry or computational bioscience, or a closely related discipline. The PDRA will receive training directly relevant for a career in modelling of bioscience processes.

Overall Purpose of the Job:

This post will be carried out at the University of Manchester under the direct supervision of Jim Warwicker and co-supervisors. The technical work will include building on computational models that predict the pH-dependent solution behaviour of proteins, and to use those models to probe biological systems for pH-sensors of potential functional importance. A few such examples will be test biophysically in order, for model benchmarking. Algorithms will be delivered to the wider academic community by a web server, using similar practice to that for our existing server at www.protein-sol.manchester.ac.uk. Dissemination and communication with external groups will be an important element of the work.

Key Responsibilities, Accountabilities or Duties:

- Further develop software packages for predicting pH-dependence from macromolecular structure, to couple enhanced speed of calculation with maintenance of accuracy.
- Benchmark computational models with experimental data gathered for the literature.
- Combine pH-sensor predictions with large bodies of proteomic and genomic data that cross-cut with pH-dependence, in collaboration with Dr Siddharth Banka's group.
- For a small number of examples of newly predicted pH-sensors, experimentally test pH-conformational coupling in a collaboration with Professor Perdita Barran's group.
- Package the models into a web implementation, for general usage by the research community.
- To take initiatives in the planning of research.
- To maintain accurate and complete records of all findings.
- To prepare material for presentation in oral and poster formats.
- To draft publications and prepare them for submission to refereed journals.
- To provide guidance to staff and students.
- To attend relevant workshops and conferences as necessary.
- To work alongside the PI and other colleagues in a collegiate manner and build rapport within the team and the wider Faculty.
- 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.

PERSON SPECIFICATION

Essential Knowledge, Skills and Experience:
- PhD (or equivalent) in computational chemistry, computational biosciences, or related discipline.
- Evidence of an ability to maintain appropriate records of software procedures and data.
- An interest in delivering computational models for the research community.
- Demonstration of an awareness of the importance of Health and Safety in the workplace.
- Able to work as part of a research team.
- Demonstrable interest in the field of computational biosciences, as evidenced by peer reviewed publications and/or active CPD.
- Good verbal and written communication skills.

Desirable Knowledge, Skills and Experience:

- Experience with visualisation of protein structure, and writing code to manipulate protein structural data.