

THE UNIVERSITY OF MANCHESTER
PARTICULARS OF APPOINTMENT
FACULTY OF BIOLOGY, MEDICINE & HEALTH
SCHOOL OF MEDICAL SCIENCES
DIVISION OF DEVELOPMENTAL BIOLOGY AND MEDICINE
RESEARCH ASSOCIATE IN HUMAN REPRODUCTION
VACANCY REF: BMH-022372

Salary: Grade 6 £35,308 per annum
Hours: Full Time (1 FTE)
Duration: Fixed Term until 31st August 2026
Location: Oxford Road, Manchester

Enquiries about the vacancy, shortlisting and interviews:

Name: Dr Peter Ruane (Research Fellow)

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

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 are committed to expanding our world-leading research, and exploiting our capability for interdisciplinary research; transforming the way our students learn to make them the most employable graduates and truly global citizens; and ensuring that all our activities make a positive difference to society. The new vision and strategic plan for The University of Manchester will take us into our third century. It builds on a rich heritage of discovery, social change and pioneering spirit that is at the heart of our University and our city region.

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 is comparable in size to a medium-sized UK university. Thirty undergraduate and 90 postgraduate programmes offer our students opportunities to develop the skills and knowledge they need for a successful career.

The Faculty has an integrated structure, developed to deliver its key research and innovation goals (I) to undertake world-class discovery science, (II) to develop new approaches to prevention and early detection of disease, and (III) to develop the next generation of person-centred therapies. This structure facilitates interdisciplinary working and enables us to learn from each other and

share best practice, 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.

The Faculty has established 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. Cardiovascular research is a pillar of MAHSC, which applies discovery and translational science, and excellence in clinical care, to improve life expectancy for patients with cardiovascular disease in Greater Manchester.

Key partnerships in the charitable sector include British Heart Foundation; Cancer Research UK; Diabetes UK; and the Wellcome Trust; and the Faculty also has 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.

Division of Developmental Biology and Medicine

The Division of Developmental Biology and Medicine is comprised of approximately 20 principal investigators made up of both clinicians and basic scientists with national and international reputations in their respective fields.

Members of our Division work closely with colleagues within the Faculty of Biology, Medicine and Health and benefit from multidisciplinary collaborations between molecular biologists, physiologists and clinicians accessing a population catchment of over 1.5 million people.

Our research groups are diverse and work in a host of model organisms and human tissues and model systems on questions directed at understanding fundamental mechanisms and translational interventions genetic, cellular and physiological levels. We employ a wide range of

approaches that include genome manipulation, advanced imaging of cells and tissues, and quantitative measurement of RNA and protein in single cells. This work is illuminating the mechanisms by which different cell types and tissues arise during development, and mechanisms regulating stem cell maintenance and differentiation.

Most of the groups are based in the state-of-the-art purpose-built research laboratory and office suites in the Michael Smith Building and at St. Mary's Hospital, providing an integrated and stimulating research environment for our biomedical scientists.

About the Research in Dr Ruane's Group

Dr Ruane's research group uses in vitro models of human development to study fertility and early pregnancy, with a particular focus on embryo implantation and placental development. Recent projects in the group have characterised mechanisms of early human embryo implantation (Hum Reprod 2022; 37: 777-792; Reprod Med 2023; 4: 40-56). Current projects include further studies of implantation using stem cells and organoid models, differentiation dynamics during placental development, and pollution effects on placenta, with funding from MRC, NERC, Rosetrees Trust and Tommy's Baby Charity.

Background

Organoid models, single cell 'omics technologies and computational analyses are revolutionising studies of human development and pathology. This position will leverage these state of the art biomedical techniques to delineate the aetiology of pre-eclampsia, a common yet serious disease of pregnancy that lacks treatment options due to limited understanding of pathogenesis. The PDRA will join the Maternal and Fetal Health Research Centre (MFHRC) in Manchester, a vibrant research environment at the forefront of translational research in human reproduction and pregnancy, benefiting from both discovery science and clinical perspectives. The position also includes a visiting period to the University of Toronto, Canada, to work with a collaborator. Skills gained in this position will form an excellent foundation for future academic and translational research, and as such personal and professional development will be strongly supported.

The successful applicant will have a PhD (or equivalent) in a relevant discipline, with experience of in vitro biomedical experimentation and 'omics analysis. The appointee will receive full training as appropriate, however, the ability to conduct experimental and computational work independently is essential. Candidates must be strongly motivated to run a research project and provide significant intellectual contribution.

Overall Purpose of the Job

The project will utilise endometrial and placental organoid models, single cell transcriptomics and computational analyses to model placental development in novel ways, with the ultimate aim to determine how the uterine environment drives the pathogenesis of pre-eclampsia. This will require consistent application of tissue culture techniques, the construction, de-construction and targeted intervention of organoid models in vitro, extensive analytical processing of single cell transcriptome and other 'omics data, and 3D fluorescence microscopy. This work will be performed within a team of skilled and dedicated technicians, students and PDRAs. The progression of the project must be clearly communicated at regular meetings with the Principal Investigator and research team, and at internal and external seminars and conferences.

Key Responsibilities, Accountabilities or Duties

- Work directly with Dr Ruane, the Principal Investigator, and collaborators to plan and conduct in vitro experiments and computational analyses
- Assist in the maintenance of organoid, stem cell and primary cultures
- Optimise combined organoid cultures to model placental development in pre-eclampsia and prepare samples for single cell transcriptomic analysis
- Infer and compare cell populations from transcriptomes of organoids models
- Generate and analyse 3D fluorescence microscopy images of organoid models
- Compare organoid model data to normal and pre-eclampsia tissue at different developmental stages and infer trajectories to pathology
- Work closely with technicians, students and PDRAs in the group
- Actively read the scientific literature relating to the project and beyond
- Analyse and interpret data and provide significant intellectual contribution to the project
- Prepare and present regular reports on research progress
- Present work at national and international meetings
- Draft research work of suitable quality for publication in peer-reviewed journals
- Contribute to appropriate grant proposal preparation
- Take an active part in group meetings, and present work at these when required
- Perform routine laboratory tasks and duties including reagent ordering, COSHH assessment and safety training
- Keep detailed records of experimental procedures
- Work with other members of MFHRC, the wider University and external collaborators
- Act at all times in accordance with the University's policies and procedures relating to Health and Safety, Equal Opportunities, and all other policies and procedures that apply to the post

Other Duties:

- Assist in the laboratory supervision of undergraduate and postgraduate students, and new members of staff
- Contribute to the delivery of undergraduate and postgraduate programmes within MFHRC and the Faculty of Biology, Medicine and Health

PERSON SPECIFICATION

Essential Skills, Knowledge and Experience;

- Hold a PhD awarded (or near completion), or equivalent, in an appropriate biomedical sciences field
- Substantial experience of 'omics data handling and analysis (coding in R and/or Python)
- Experience of mammalian cell culture techniques
- Ability to interpret and summarise biological data and develop experimental plans
- Familiarity with the application of appropriate statistical methods
- Excellent attention to detail
- Evidence of good writing, oral communication and presentation skills
- Ability to work independently and as a part of a team
- Excellent communication and interpersonal skills
- Excellent time management and organisational skills
- Flexible approach to dealing with research problems as they arise
- Willingness to learn and develop
- Ability to meet deadlines

Desirable Skills, Knowledge and Experience;

- Research experience in reproductive biology and pregnancy
- Experience with fluorescence microscopy
- Experience with biochemical experimentation
- A good publication record appropriate to their level of experience