

THE UNIVERSITY OF MANCHESTER
PARTICULARS OF APPOINTMENT
FACULTY OF BIOLOGY, MEDICINE & HEALTH
SCHOOL OF BIOLOGICAL SCIENCES
DIVISION OF EVOLUTION, INFECTION & GENOMICS
LISTER SUMMER STUDENTSHIP ON PATHOGEN INTERACTIONS IN CYSTIC FIBROSIS
VACANCY REF: BMH-028225

Salary: Grade 2 £23,414 to £24,900 per annum, depending on relevant experience

Hours: 35 hours per week

Duration: Fixed term from 28 July 2025 until 7 September 2025

Location: Manchester

Enquiries about the vacancy, shortlisting and interviews:

Name: Dr Fiona Whelan.

Email fiona.whelan@manchester.ac.uk

Project description:

This 6-week summer project will offer an undergraduate student the opportunity to gain experience of a research lab, participate in lab group meetings, attend departmental seminars, and develop both lab-based and data analysis skills.

The research project will focus on cystic fibrosis (CF). CF is a life-limiting genetic disorder which is often characterised by recurrent respiratory infections that significantly impact patient outcomes. These infections are polymicrobial and interactions between pathogens can contribute to worsening patient outcomes.

The canonical CF pathogens include *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Burkholderia cepacia* complex (BCC) and non-tuberculosis mycobacterium (NTM) species, such as *Mycobacterium abscessus*. While much attention has been given to the individual impact of these pathogens, little is known about how they interact during co-infection. Understanding these

interactions could provide critical insights for developing more effective therapeutic strategies that target multiple pathogens simultaneously. This summer studentship aims to investigate the interactions between key CF pathogens within a hydrogel biofilm model and will be completed via the following objectives:

This project offers the student an opportunity to develop valuable microbiological research skills, many of which are not routinely covered at the undergraduate level. These include: advanced microbial culture techniques, including pathogen co-culture and hydrogel models; quantification of bacterial competition using CFU enumeration and inhibition assays; molecular microbiology techniques, such as RNA extraction and qRT-PCR. In addition to technical skills, this project will provide the student with experience in independent research, enhancing problem-solving abilities, critical thinking, and data interpretation. The findings will contribute to a poster presentation and may be integrated into a future publication, offering the student valuable networking and academic development opportunities.

You must currently be enrolled as an undergraduate student – usually at the end of your second year – at an UK institution and be eligible to work in the UK.

Whelan Lab / Microbial Evolution Research Manchester Group (MERMan):

The student will join the Whelan lab led by Dr. Fiona Whelan. The Whelan lab is a member of the Division of Evolution, Infection and Genomics (EIGen) in the School of Biological Sciences. Fiona is a 2023 Lister Fellow and 2024 UKRI Future Leaders Fellow, interested in microbe-pathogen interactions and their impact on the microbiome in the context of human/animal health and disease. The Whelan lab combines cutting-edge bioinformatic software development and analyses with classical microbiology culture and techniques to understand these bacterial interactions in a number of *in vitro* and *in vivo* model environments. The student will be part of a dynamic and supportive team comprising postdoctoral researchers, research fellows, and PhD students (group size approx. 7-10 people). The Whelan lab is based in a newly-equipped state-of-the-art microbiology lab facility with access to a range of analytical instruments and robotic automation. We hold weekly lab meetings and journal clubs focussed around developing skills in microbiology, statistics, and bioinformatics. For more information about the Whelan lab, including access to our lab manual, mission statement, and current research topics please visit <http://whelanlab.co.uk>.

The Whelan lab is part of a wider consortium of evolutionary microbiology labs forming the Microbial Evolution Research Manchester (MERMan; <https://sites.manchester.ac.uk/merman/>) group. MERMan is one of the largest and most diverse groups of evolutionary microbiologists in the UK, comprising 14 group leaders and >50 research staff all working on microbial ecology and evolution projects. Research topics include antimicrobial resistance evolution (Prof. Michael Brockhurst, Dr. Danna Gifford; Dr. Mato Lagator; Dr. Michael Bottery; Dr. Norman van Rhijn), mobile genetic elements and horizontal gene transfer (Dr. Claudia Iglar, Prof. Michael Brockhurst), single-cell evolutionary biology (Dr. Rok Krasovec), and the ecology and evolution of microbiomes (Dr. Chris Knight; Dr. Kat Coyte; Dr. Sophie Nixon; Dr. William Smith). The MERMan

group holds a weekly group meeting and is co-located within shared laboratories and write-up desk spaces forming an exciting and cohesive community of likeminded scientists.

Introduction to the University of Manchester research environment

The University of Manchester is the largest single-site university in the UK with over 50,000 students and staff. The University is 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.

The Faculty of Biology, Medicine, and Health (FBMH) has an integrated structure to deliver a truly translational approach to the life sciences, ensuring smooth research pathways that unite pure discovery/basic science to clinical application and patient care. FBMH is comparable to a medium-sized UK university in terms of its annual income (>£300 million) and staff (3,000 members). Thirty undergraduate and 90 postgraduate programmes offer our 11,000 students opportunities to develop the skills and knowledge they need for a successful career.

FBMH is divided into three Schools (Biological Sciences, Medical Sciences, and Health Sciences) which collectively integrate discovery biology, clinical application, and patient care within a single Faculty.

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.

The University of Manchester has a genuine commitment to equality of opportunity for our staff and students, and are proud to employ a workforce that reflects the diverse community that 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, information is available on passports/visas, travel to the UK, accommodation, and a number of other practical considerations.

Overall Purpose of the Role

The student will be funded by a 6-week Lister Student Summership both led by Dr. Fiona Whelan. Overall, the project is aimed at understanding microbe-pathogen interactions on the health of individuals with cystic fibrosis.

The student will conduct a wide range of research activities in the field of microbiology and molecular biology and learn key skills in microbiology, experimental design, and scientific research.

Key Responsibilities, Accountabilities or Duties

- To assist, under supervision, with laboratory- based experiments
- To conduct data analysis and take care with procedures and record keeping to ensure the validity and reliability of the data at all times
- To contribute to the general activities of the laboratory including following all Health & Safety protocols, laboratory meeting planning and monitoring of research materials.
- Ensure that all appropriate PPE (personal protective equipment) is used at all times.
- Perform microbiology experiments (including bacterial-bacterial competition assays)
- Perform genomic DNA extractions and prepare sequencing libraries
- Perform molecular biology experiments (including PCR)
- Use own initiative to find solutions to problems and implementing appropriate changes to working practices.
- Work in compliance with relevant Health and Safety regulation, Data Protection Act and University policy legislation and regulations, eg. Human tissue Act, Equality & Diversity, etc. Advise and ensure others within the Group also comply with current regulations of the School, Faculty and University.
- Attend and contribute to research group and staff meetings.
- Positively contribute to the laboratory culture and environment by positively interacting with members of the Whelan lab and wider MERMan group.
- Any other reasonable duties commensurate with the grade to support the strategies of the School or Faculty
- Actively participate as a member of a research team.
- Attend and contribute to relevant meetings.
- Make use of standard research techniques and methods.
- Continue to update knowledge and develop skills.

Personal Specification

Essential Knowledge, Skills, Experience and Qualifications:

- Working towards a Bachelors degree in a relevant biological science subject (likely at the end of their 2nd year of undergraduate studies).
- Ability to clearly present information verbally, electronically, and on paper
- Ability to follow and deliver clear instructions and communicate effectively and politely with staff and students
- Ability to work to a high standard with good reproducibility of results

- Willingness to undertake any necessary training and deliver in-house training to others
- To attend and contribute to research group and staff meetings

Desirable Knowledge, Skills and Experience:

- Extensive relevant and specific laboratory experience in the field of microbiology, molecular biology and molecular microbiology, with a breadth and depth of knowledge in a wide range of highly specialised techniques (such as: bacterial culturing, phenotyping, PCR, electrophoresis, DNA sequencing, construction of mutant or labelled bacterial strains) and experience of working with Hazard Group 2 bacterial pathogens
- Knowledge of and compliance with relevant Health and Safety regulation, the Data Protection Act, Standard Operating Procedures and risk assessments including COSHH risk assessments.
- Previous experience of preparing Standard Operating Procedures and risk assessments including COSHH risk assessments.