

|  |  |
| --- | --- |
| **\*Title of studentship** | Microbiome exploitation of extreme environments for applications in biotechnology and the pharmaceutical industry |
| **Value / what is covered?** | Fully funded |
| **Awarding body** | DfE |
| **Number of studentships** | 1 |
| **\*Summary descriptive text / Example of research project** | The microbiomes of extreme environments harbour a vast repository of industrially relevant genes, yet their huge potential for use in biotechnology remains largely untapped. Biocatalysis, the use of enzymes to enable chemical reactions, is an increasingly vital technology in the production of pharmaceuticals. The majority of enzymes currently available for industrial biocatalysis are derived from bacteria, in particular those that thrive under 'normal' conditions of ambient temperature and neutral pH. However, many industrial processes require much harsher reaction conditions, rendering existing enzymes ineffective. Extremophiles are microorganisms which thrive under extreme conditions, and as such, their enzymes are ideally suited to many of these processes.  The successful candidate will join a dynamic research group focused on the analysis and functional exploitation of microbiomes from extreme environments for the discovery of robust enzymes for use in biocatalysis, such as those from volcanic hot springs, oil-contaminated soils and a Triassic period salt mine. This will be achieved using a combination of DNA analysis and functional metagenomics, alongside culture-based techniques for the cultivation of extremophile bacteria and archaea. The student will build on existing expertise in the group to develop effective cloning and enzyme expression protocols using bacterial and archaeal-based expression systems, with subsequent enzyme characterisation and reaction profiling. Finally, exciting enzyme discoveries will be driven towards application in collaboration with partners in the pharmaceutical industry. |
| **\*Supervisor(s)** | Dr Stephen Kelly, Prof Brendan Gilmore |
| **\*Eligibility / residence Status** |  |
| **Country** | Northern Ireland |
| **\*Start date and duration** | October 2022 – September 2025 |
| **\*Faculty** | MHLS |
| **\*Research centre / School** | Pharmacy |
| **Subject area** |  |
| **Candidate requirements / Key skills required for the post** | Applicants should have a 1st or 2.1 honours degree (or equivalent) in a relevant subject. Relevant subjects include Pharmacy, Pharmaceutical Sciences, Biochemistry, Biological/Biomedical Sciences, Chemistry, Engineering, or a closely related discipline. Students who have a 2.2 honours degree and a Master’s degree may also be considered, but the School reserves the right to shortlist for interview only those applicants who have demonstrated high academic attainment to date. |
| **\*Deadline for applications** |  |
| **\*How to apply / contacts** | Postgraduate Research applicants must have applied to Queen’s, via the Direct Applications Portal.  <https://dap.qub.ac.uk/portal/user/u_login.php> |
| **Relevant links / more information** | <http://www.qub.ac.uk/schools/SchoolofPharmacy/Research/PostgraduatePositions/>  <http://www.qub.ac.uk/schools/SchoolofPharmacy/Research/> |
| **Keywords for search filters** | Microbiome, extremophile, enzymes, biocatalysis, biotechnology |
| **Training provided through the research project** | The successful candidate will be trained in microbiology, including extremophile microbiology, molecular biology techniques including molecular cloning, and microbial bioinformatics for analysis of large DNA datasets, as well as project management and data analysis training. Training received during this studentship will ensure the successful candidate possesses a comprehensive skillset, of high relevance to a career in the pharmaceutical industry or in academia. |
| **Expected impact activities** | Attendance at international conferences, including the opportunity for conference presentations. Publication in international, peer-reviewed journals. Potential for industrial collaboration and application of novel discoveries. |