# PGR Studentship Information Template 2021 entry

* Please complete the template with as much information as possible.
* \*fields are essential.
* If you have information that does not have a label, please create a new row in the table for it.

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| **\*Title of studentship** | Chemical tools for antimicrobial target discovery and bacterial profiling |
| **Value / what is covered?** | 3-years (fully funded) |
| **Awarding body** | DfE |
| **Number of studentships** | 1 |
| **\*Summary descriptive text / Example of research project** | Antimicrobial resistance (AMR) is one of the most urgent scientific, medical, and societal challenges of today. AMR is predicted to result globally in >10 million deaths per year and >100 trillion USD in lost economic output by 2050, if no immediate action is taken (<https://amr-review.org>). AMR arises when microorganisms that cause infection (e.g. bacteria) survive exposure to a medicine (e.g., an antibiotic) that would normally kill them or stop their growth.  The goal of this project is the development of a chemical toolbox for the identification and tracking of protein markers that drive resistance development and bacterial virulence.  Small molecule electrophiles are powerful tools for the interrogation of the bacterial proteome (e.g., [Curr Top Microbiol Immunol 2019](https://pubmed.ncbi.nlm.nih.gov/30232601/)). Carbohydrates represent an attractive chemical scaffold for the design of such tools from both a chemistry and biology perspective. We have recently exemplified this design concept with the successful labelling of protein targets in the bacterial pathogens *Haemophilus influenzae* and *Klebsiella pneumoniae* with a carbohydrate-based probe ([BMC 2021](10.1016/j.bmc.2020.115900), [OBC 2021](https://pubs.rsc.org/en/content/articlelanding/2021/ob/d0ob01971b#!divAbstract)).  In this project, you will develop carbohydrate-based probes with bespoke reactivity and selectivity for bacterial proteins involved in AMR and virulence. You will use your probes for the profiling of bacterial pathogens, including the tracking of bacterial protein expression in response to environmental factors, and the identification of novel targets for antibiotics and diagnostics development.  The project will provide extensive multidisciplinary training at the chemistry/biology interface, including chemical probe design, carbohydrate synthesis, bioanalytical techniques, protein mass spectrometry, and bacterial growth assays. It is ideally suited for a student with a strong background in organic/medicinal chemistry, chemical biology, or a related area, who wants to broaden their skill set in proteomics, microbiology, and carbohydrate chemistry.  He/she will be primarily based in the John King Laboratory in the School of Pharmacy at QUB, but also have the opportunity to experience different research environments through collaboration with external partners. The project will also provide an ideal opportunity to acquire transferable and generic skills in time and project management, science outreach, and knowledge transfer and commercialisation. |
| **\*Supervisor(s)** | Professor Gerd Wagner |
| **\*Eligibility / residence Status** | UK/EU |
| **Country** | Northern Ireland |
| **\*Start date and duration** | The position is available immediately for 3 years. |
| **\*Faculty** | MHLS |
| **\*Research centre / School** | Pharmacy |
| **Subject area** | Chemistry, Medicinal Chemistry, Organic Chemistry, Chemical Biology, Pharmacy, Pharmaceutical Sciences |
| **Candidate requirements / Key skills required for the post** | Applicants should have a 1st or 2.1 honours degree (or equivalent) in a relevant subject. These include Chemistry, Chemical Biology, Pharmacy, Pharmaceutical Sciences, Biochemistry, Biological/Biomedical Sciences, Engineering, or a closely related discipline. Students who have a 2.2 honours degree and a Masters 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** | Applications will be reviewed on a rolling basis and the position will be considered filled once a suitable candidate has been identified.  Closing date: 21 June 2021 |
| **\*How to apply / contacts** | Applications must be submitted electronically via the Queen’s Direct Applications Portal, including ALL required supporting documents.  <https://dap.qub.ac.uk/portal/user/u_login.php>  Informal enquiries should be directed to [g.wagner@qub.ac.uk](mailto:g.wagner@qub.ac.uk)  The title of the studentship should be referenced in all correspondence. |
| **Relevant links / more information** | <https://www.qub.ac.uk/schools/SchoolofPharmacy/Research/find-a-phd-supervisor/dr-gerd-wagner.html>  <http://www.qub.ac.uk/schools/SchoolofPharmacy/Research/> |
| **Keywords for search filters** | chemical biology, carbohydrate chemistry, organic synthesis, medicinal chemistry, proteomics, glycobiology, multidisciplinary, antibacterial |
| **Training provided through the research project** | The student will receive in-depth training in a broad range of experimental techniques in medicinal chemistry and chemical biology, including rational inhibitor design, advanced organic synthesis, protein biochemistry, and *in vitro* assays. He/she will be primarily based in the John King Laboratory in the School of Pharmacy at QUB, but also have the opportunity to experience different research environments through collaboration with external partners.  The project will also provide an ideal opportunity to acquire transferable and generic skills in time and project management, science outreach, and knowledge transfer and commercialisation. |
| **Expected impact activities** | It is anticipated that chemical probes developed in this project will create opportunities for knowledge transfer, translation, and commercialisation in the areas of drug and diagnostics development for bacterial infections. The project will also offer an opportunity for the student to contribute to a range of outreach activities such as the regular delivery of science workshops for school children and lay audiences. |