# 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** | **Developing a controlled release biodegradable platform for nanomedicine delivery** |
| **Value / what is covered?**  |  |
| **Awarding body** |  |
| **Number of studentships** |  |
| **\*Summary descriptive text / Example of research project**  | Approximately 20-30% of prostate cancer (PC) patients initially diagnosed with intermediate favourable disease will develop treatment failure. However, innovative treatments would help improve cure rates. Heavy metal nanoparticles (e.g. gold) enhance effectiveness of radiotherapy, by compressing the radiation dose deposition field, limiting damage to normal tissue. The clinical potential of metal nanoparticles as radiosensitisers are now emerging (Act.In.Sarc (phase 2/3) and NANO-RAD (phase 1)). Indeed, a recent Lancet Oncology communication reported a 50% increase in complete pathological response of soft tissue sarcomas when radiotherapy was combined with metal nanoparticles (Act.In.Sarc). **Despite these advancements, maximum nanoparticle radiosensitisation is limited by two confounding factors, poor intra-tumoural and poor intra-cellular delivery.** Utilising the RALA drug delivery system, Coulter and McCarthy have developed a combined gold nanoparticle formulation (RALA/AuNP) capable of delivering the gold nanoparticle directly to the nucleus, resulting in highly significant increases in tumour radiation sensitivity. This clearly addresses the problem of intra-cellular delivery. This project will address the issue of poor intra-tumoural delivery though the development of a novel controlled release (CR) platform, impregnated with RALA/AuNP. Using materials such as biodegradable hydrogels or electrospun nano-fibres, the appointed student will characterise RALA/AuNP loading and release rates, aiming to achieve release characteristics that align with clinical radiotherapy treatment plans. Furthermore, the student will undertake a range of established *in vitro* and *in vivo* cell and molecular biology based assays to established the effectiveness of the released nanoparticles as effective anti-cancer agents. This projects forms part of an exciting collaborative partnership between Dr Jonathan Coulter, a prostate cancer expert in translational medicine and Professor McCarthy, a nucleic acids drug delivery expert and CEO of Phion Therapeutics.  |
| **\*Supervisor(s)** | Dr Jonathan Coulter & Professor Helen McCarthy |
| **\*Eligibility / residence Status** | Home (DfE Scholarship deadline 8th January 2021), International Scholarship, International self-funding  |
| **Country** |  |
| **\*Start date and duration**  | September 2021 |
| **\*Faculty** | Medicine Health and Life Sciences |
| **\*Research centre / School** | School of Pharmacy |
| **Subject area** | Nanomedicine |
| **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, Molecular Biology, 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** | All postgraduate research applicants for Pharmacy who are interested in the project must submit an application all required supporting documents via the Direct Applications Portal (link below). UK students considering applying for DfE scholarship support, applications must be submitted before **Friday 15th January 2021.** Any interested applicants can informally contact Dr Coulter by email at j.coulter@qub.ac.uk <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/><https://www.qub.ac.uk/schools/SchoolofPharmacy/Research/ResearchThemes/>NanomedicineandBiotherapeutics/https://www.qub.ac.uk/schools/SchoolofPharmacy/Research/find-a-phd-supervisor/dr-jonathan-coulter.html<https://www.qub.ac.uk/schools/SchoolofPharmacy/Research/find-a-phd-supervisor/professor-helen-mccarthy.html> |
| **Keywords for search filters** | Prostate Cancer, Nanomedicine, Drug Delivery, Radiotherapy |
| **Training provided through the research project** | Right from the start the PhD student will be using academic research designed to have translational/clinical application. This dual approach spans:1) Research Skills: the academic supervisors will ensure excellent training in nanoparticle analysis, prostate cancer techniques, *in vitro* and *in vivo* skills. Further training with industrial regulators and awareness of a typical data package required for pre-clinical development will give the student a unique perspective. 2) Record keeping & monitoring: Monthly meetings with the student will take place with electronic records. Students must also complete a 3-month initial review and annual progress review to proceed to years 2 & 3. The annual progress review involves written work, presentation and/or mini *viva*. However, at each of these meetings, the primary supervisor will also be present ensuring that the maximal training benefit can be derived from these processes.3) Additionally, there will be opportunities to present at academic meetings, building professional networks, personal development on courses for animal licenses, advanced statistics, skills which are all relevant to subsequent employment opportunities. |
| **Expected impact activities** | Impact activities include but are not restricted to presenting the research to academic and industry peers through scientific conferences and students from different disciplines through the Graduate School. The student will also engage with patients, clinicians and key stake holders through a series of webinars/focus groups to understand how they can feed and shape the research plan. Other impact activities relate to commercialisation though IP protection processes, competitor analysis and engagement with clinical collaborators.  |