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| ORGANISATION | AVACTA (All-island Vaccine Research and Training Alliance) |
| RESEARCH FIELD | Biological sciences; Medical sciences; Biopharmaceutical sciences; Public health, health psychology and behavioural science |
| PROFILE | PhD studentships/First Stage Researcher (R1) |
| APPLICATION DEADLINE | 1st July 2022 |
| START DATE | September 2022  |
| LOCATIONs | Ireland & Northern Ireland |
| TYPE OF CONTRACT | Studentship |
| JOB STATUS | Full-time |
| HOURS PER WEEK | 39 |

Applications are invited for eleven PhD studentships to be funded by the All-island Vaccine Research and Training Alliance (AVACTA), under the HEA North-South Research Programme.

**Description: Antimicrobial resistance (AMR) poses a major global risk to human health by causing death, disability, longer hospitalisations, and increased healthcare costs. Vaccines are ideally suited to tackle this problem, improving the lives of people worldwide. The All-island Vaccine Research and Training Alliance (AVACTA) is a hub of excellence aimed to develop effective vaccines against ESKAPE pathogens (*Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter cloacae*), a group of bacteria that resist to practically all available antimicrobials, which are considered a major global threat. Complementing vaccine development technologies, AVACTA will also tackle the challenges associated with vaccine hesitancy, developing implementable guidelines to improve vaccine uptake in Ireland and Northern Ireland. AVACTA will provide a unique interdisciplinary PhD program with cross-training in complementary areas of life-sciences, biotechnology, health psychology, public health, ethics, and communication to build capacity in vaccine design, development, and deployment on the island of Ireland.**

**Eligibility criteria for candidates:** We are looking for talented and highly motivated early career researchers with BSc and MSc degrees and experience in microbiology, biology, biochemistry, molecular biology or related disciplines. The successful applicant will be offered a 36 or 48-month studentship (duration depends on the host institution) and will be registered as PhD student.

**Please note that criteria below are mandatory**:

* Admission to the programme is open to applicants who hold a bachelor’s or master’s degree (or equivalent), as required by the partner university for admission to doctoral studies. The above-mentioned degrees must be obtained by the time of recruitment.
* Applicants should be proficient in written and spoken English (minimum level of B2 or equivalent).

**Application and selection process:**

* **Application procedures vary from institution to institution and applications should be submitted as outlined in the application procedure** indicated for each individual project.
* **Each applicant will be notified in writing of the outcome of their application. Incomplete applications will not be considered.**
* **Successful candidates will be invited for an interview. Each interview will be attended by a panel including a principal investigator from the AVACTA consortium. Interviews may also be carried using online platforms.**

***AVACTA values gender balance and is committed to creating a diverse environment. All qualified applicants will receive equal opportunities and consideration for employment.***

**PhD Project – Optimising a protective vaccine against a challenging respiratory pathogen**

**Organisation/Institute**: University College Dublin (UCD, Dublin, Ireland)

**Supervisor**: Associate Professor Siobhán McClean (Second supervisor Dr Anne Moore, UCC)

**Informal enquiries**: Siobhan.mcclean@ucd.ie

**Project description**: The AVACTA programme will develop vaccines against global AMR bacteria, targeting ESKAPE pathogens. This PhD project will focus on three ESKAPE pathogens: *Klebsiella pneumoniae, Acinetobacter baumannii* and *Pseudomonas aeruginosa*. The UCD team have identified panels of novel vaccine candidate antigens targeting three ESKAPE pathogens. This PhD project will involve shortlisting the existing panel of vaccine antigens against *P. aeruginosa, A. baumannii* and *K. pneumoniae,* with a view to selecting lead candidates to develop as viral vectored vaccines. The viral vectored vaccines will be characterised for their immunological and protective responses and compared with subunit vaccine platforms.

**Specific requirements for the project:** BSc Hons degree in Biochemistry, Microbiology or equivalent.

**Duration**: 48 months.

**Application details and Submit applications to:** Applications should be sent to Assoc. Prof. Siobhán McClean by email at **siobhan.mcclean@ucd.ie**.

* Please include a 1-page Cover letter that describes your interest in this project and your experience in infection biology, molecular biology, proteomics or other related areas.
* Please include a short 2-page CV and the names and contact details of two referees.

**PhD Project – Defining protective immunity against respiratory pathogens (QUB PhD1)**

**Organisation/Institute**: Queen’s University Belfast (QUB, Belfast, NI, UK)

**Supervisor**: Dr Beckie Ingram (Second Supervisor Dr Pat Walsh – TCD)

**Informal enquiries:** Dr Beckie Ingram, b.ingram@qub.ac.uk

**Project description**: In the face of ever-increasing antimicrobial resistance, there is an urgent need for vaccines against respiratory bacterial pathogens. A major stumbling block is that we don’t fully understand what protective immunity against these organisms looks like. During infection the immune system is manipulated by the pathogen to enhance its survival. It is essential that determine what response is most effective response for bacterial clearance, so that we can then drive this response with vaccines. This project will in vivo models and immunomodulatory techniques to establish the role of specific subsets of tissue resistant and circulating memory T and B cells in mucosal and systemic immunity.

**Specific requirements for the project:** Appropriate BSc (immunology, biomedicine, microbiology), laboratory experience and/or Masters desirable.

**Duration**: 36 months.

**Application details and Submit applications to:** QUB application portal

<https://www.qub.ac.uk/Study/PostgraduateStudy/How-to-apply/Apply-online/>.

**PhD Project – Defining protective immunity against respiratory pathogens (QUB PhD2)**

**Organisation/Institute**: Queen’s University Belfast (QUB, Belfast, NI, UK)

**Supervisor**: Dr Beckie Ingram (Second Supervisor Prof. Siobhán McClean – UCD)

**Informal enquiries:** DrBeckie Ingram, b.ingram@qub.ac.uk

**Project description**: *Staphylococcus aureus* is a leading cause of antimicrobial resistant infections, in hospitals it is the most frequently associated gram-positive bacteria causing ventilator associated pneumonia in ICU patients. There are currently no licensed vaccines against S. aureus. We have developed a reverse vaccinology approach to identifying bacterial vaccine candidates, this project will apply this approach to *S. aureus*. This will involve both in silico analysis, cloning, protein expression and in vitro screening using memory T cells. The targets identified in this and a parallel project at UCD will then be evaluated using in vivo protection models. This project will allow the students to develop a broad range of skills in fundamental vaccine development.

**Specific requirements for the project:** Appropriate BSc (immunology, biomedicine, microbiology), laboratory experience and/or Masters desirable.

**Duration**: 36 months.

**Application details and Submit applications to:** QUB application portal <https://www.qub.ac.uk/Study/PostgraduateStudy/How-to-apply/Apply-online/>.

**Two PhD Projects – Mucosally delivered vaccines containing novel ESKAPE antigens**

**Organisation/Institute**: Queen’s University Belfast (QUB, Belfast, NI, UK)

**Supervisor**: Dr Vicky Kett

**Informal enquiries:** Dr Vicky Kett, v.kett@qub.ac.uk

**Project description**: Needle-free vaccines offer the possibility to develop new formats that improve both immune response and improve access. Lead vaccine candidates, both protein and nucleic acid-antigen based vaccines developed by partners in the AVATCA programme (QUB, UCD, UCC and TCD) will be formulated into nanoparticles for mucosal delivery, focussing on nasal and inhaled routes. Extensive training will be provided in all aspects of the fundamentals of nanoparticle manufacture together with physicochemical methods required to optimise the drying methods for the specific requirements of the antigen, and to characterise vaccine products such as mucoadhesion for nasal delivery, thermal stability and vaccine potency.

**Specific requirements for the project:** MPharm, BSc Hons degree in Pharmaceutical Sciences Pharmaceutical Biotechnology, Biochemistry, Microbiology or equivalent. Technical experience and knowledge in some of the following would be desirable: pharmaceutical formulation, protein purification.

**Duration**: 36 months.

**Application details and Submit applications to:** Deadline July 1st 2022, apply on the QUB application portal <https://www.qub.ac.uk/Study/PostgraduateStudy/How-to-apply/Apply-online/>.

**PhD Project – Investigating the generation of immunity to novel vaccine candidates *in vivo***

**Organisation/Institute**: Trinity College Dublin (TCD, Dublin, Ireland)

**Supervisors**: Associate Professor Patrick Walsh, TCD School of Medicine (Second supervisor Dr Beckie Ingram, QUB)

**Informal enquiries**: Walshp10@tcd.ie

**Project description**: In collaboration with AVACTA colleagues (QUB, UCD, UCC and TCD) this PhD project will examine the mechanisms associated with the induction of tissue specific immunity in mice using novel vaccine candidates.

**Specific requirements for the project**: Undergraduate degree in Immunology or biomedical science related discipline.

**Duration**: 48 months.

**Application details and Submit applications to**: Please submit CV and contact details of 2 referees to **walshp10@tcd.ie**.

**PhD Project – Mucosal immune responses to novel vaccines for AMR bacteria**

**Organisation/Institute**: Trinity College Dublin (TCD, Dublin, Ireland)

**Supervisor**: Professor Ed Lavelle

**Informal enquiries:** Prof. Ed Lavelle, lavellee@tcd.ie

**Project description**: Protective immunity against AMR bacterial pathogens requires mucosal humoral and cellular immunity. In this project, the ability of mucosal vaccine adjuvants to enhance humoral and cellular immune responses to subunit antigens from AMR bacteria will be assessed using a range of immunological approaches.

**Specific requirements for the project:** MSc or BSc in Immunology, Biochemistry or a related discipline. Laboratory expertise in immunology would be an advantage.

**Duration**: 48 months.

**Application details and Submit applications to:** Please submit CV, cover letter and contact details of 2 referees to **lavellee@tcd.ie****.**

**PhD Project – Production of virus vector and nucleic acid-based vaccine platforms containing novel ESKAPE antigens (UCC PhD1)**

**Organisation/Institute**: University College Cork (UCC, Cork, Ireland)

**Supervisors**: Dr. Anne Moore

**Informal enquiries**: Anne.moore@ucc.ie

**Project description**: In order for a vaccine to induce the most protective immune response it is necessary to develop suitable vaccine platforms in tandem with identifying the most protective antigens. This is an exciting opportunity to develop and test novel vaccines to ESKAPE pathogens. The PhD candidate will produce novel virus vectors and RNA-based platforms that express new antigens identified by AVACTA collaborators. A range of nucleic acid-based approaches will be examined. The candidate will determine the systemic and mucosal immune responses induced by these new vaccines in pre-clinical models. They will examine molecular- and formulation-based approaches to further enhance the breadth, magnitude and duration of the vaccine-induced immune response Once produced, the candidate will also examine scalable production processes of these vaccine platforms to identify processes that accelerate the development of new vaccines.

**Specific requirements for the project**: Master’s degree (or equivalent) in life sciences; preferably virology, molecular medicine, vaccinology or pharmaceutical sciences. Technical experience and knowledge in some of the following: molecular cloning (essential), good lab practice (essential), tissue culture related to virology and/or immunology and/or pharmaceutical formulation.

**Duration**: 48 months.

**Application details and Submit applications to**: [**the UCC application portal**](https://www.ucc.ie/en/apply/)**.**

**PhD Project – Development of easy-to-deploy, easy-to-administer vaccines dosage formats for ESKAPE pathogens (UCC PhD2)**

**Organisation/Institute**: University College Cork (UCC, Cork, Ireland)

**Supervisors**: Dr Anne Moore

**Informal enquiries**: Anne.moore@ucc.ie

**Project description** There is an urgent need to develop technologies that address inequities in vaccine deployment. We are developing injection-free, solid dosage formats, such as dissolvable microneedle patches for skin administration and films for mucosal application, that remove the necessity for immunisation by healthcare professionals and permits vaccines to be deployed outside of cold chain distribution networks. In this project, the PhD candidate will use innovative additive manufacturing processes to incorporate novel vaccines into these needle-free vaccine formats. The candidate will develop formulations that thermostabilise these nanoparticle-based subunit and nucleic-acid based vaccines in solid dosage formats. They will identify leading formats that induce systemic and mucosal immunity in pre-clinical models.

**Specific requirements for the project**: Master’s degree (or equivalent) biopharmaceutical sciences, virology, molecular biology. Technical experience and knowledge in some of the following: formulation sciences (essential), good lab practice (essential), immunology and/or vaccinology.

**Duration**: 48 months.

**Application details and Submit applications to**: [**the UCC application portal**](https://www.ucc.ie/en/apply/)**.**

**Two PhD Projects – Develop Tailored Interventions to Address Vaccine Uptake across the Island of Ireland (UCC and QUB)**

**University**: PhD1: University College Cork (UCC, Cork, Ireland)

 PhD2: Queens University Belfast (QUB, Belfast, NI, UK)

**Supervisors**: PhD 1: Dr Laura J Sahm, Dr A. Fleming, Dr A. Moore (UCC)

 PhD 2: Dr Gillian Shorter, Dr Emma Berry (QUB)

**Informal enquiries**: PhD 1: Dr Laura J Sahm, l.sahm@ucc.ie

 PhD 2: Dr Gillian Shorter, g.shorter@qub.ac.uk

**Project description:** This is an exciting for two funded PhD opportunities, to work on a transdisciplinary, cross-border project, exploring vaccination uptake. The successful candidates will have the opportunity to work with investigators from a range of disciplines. One candidate will be based in University College Cork and the other in Queens University Belfast. They will gain significant experience in mixed-methods and intervention development methodologies. Despite similar accessibility to COVID19 vaccines in Northern Ireland and the Republic of Ireland there were clear cross-border differences in the rates of uptake of this vaccine. The reasons for this are complex and may include socio-demographic differences, trust, and messaging on vaccines. Our understanding of cross-border differences in knowledge, belief and/or attitudes to COVID-19 vaccination and/or Service-related issues have not been addressed. Here, the PhD candidate will use mixed methods approaches to understand how individuals’ capabilities, opportunities, and motivations influence their decision-making behaviour, and how the setting including societal, community, sociodemographic factors, and healthcare service impact on vaccine confidence and complacency. Better understanding of vaccine acceptance across jurisdictions will, in the long term improve population-based protection against all infectious diseases across the island of Ireland. **Specific requirements for the project**:

**PhD 1:** degree in health-related discipline e.g., pharmacy

**PhD 2**: degree in psychology, public health.

Experience with mixed methods research desirable but training will be provided.

**Duration**: 48 months.

**Application details and Submit applications to**:

PhD 1: [the UCC application portal](https://www.ucc.ie/en/apply/).

PhD 2: <https://www.qub.ac.uk/Study/PostgraduateStudy/>



