Postgraduate Scholarship Information Sheet (Advert)

Scholarship Project Title	Developing an Artificial Intelligence (AI)-Powered In Vitro and In Cell Correlation Model for Anticancer therapeutics
Advert Reference number	TURISE_2024_212
Supervisor(s)	Dr. Muhammad Sarfraz – OTRG, PMBRC (SETU) Dr. Laurence Fitzhenry – OTRG, PMBRC (SETU) Dr. Indrakshi Dey – Walton Institute (SETU) Dr. Kenneth Fahy - SiriusXT Ltd
Research Group	Ocular Therapeutics Research Group (OTRG), Pharmaceutical and Molecular Biotechnology Research Centre (PMBRC)
Department /School/Faculty	School of Science and Computing, Walton Institute of Information and Communications Science, SiriusXT Ltd (Industry)
Duration	4 Years/48 Months
Status: Full-time / part-time	Full Time
Funding information	SETU TU RISE PhD Scholarships
Value of the scholarship per year for four years	Stipend: €19,000 per annum Fees of €5,750 per annum Research costs- €5,000 per annum with an additional €1,650 awarded for the purchase of a laptop in year 1
Closing date and time	**Wednesday, 17th July 2024 at 4pm Irish Time**
Interview date	***Tuesday, 6th August 2024***
PhD commencement date	**Friday, 01 November 2024**

Project Key Words: Nanomedicine, Breast Cancer, Artificial Intelligence

Post summary

Cancer remains a significant global health challenge, being one of the leading causes of morbidity and mortality worldwide. Despite extensive efforts by scientists to develop effective treatments and therapies, the journey to find more efficient and less harmful anticancer drugs is ongoing. In recent years, nanomedicines have emerged as a promising frontier in this battle. Compared to conventional formulations, nanomedicines offer superior performance primarily due to their potential for targeted delivery and minimal side effects, which enhance their therapeutic efficacy and patient safety. However, the current reliance on animal models for efficacy testing presents significant ethical concerns and practical limitations. High failure rates in clinical trials and severe toxicities in humans, despite promising animal model results, underscore the urgent need for alternative testing methods that adhere to the principles of Replacement, Reduction, and Refinement (3Rs) in animal testing. To address these challenges, we propose the development of an AI-powered In-Vitro and In-Cell (IVIC) correlation model to predict the efficacy of anticancer drugs/products. This innovative approach integrates advanced computational techniques with cutting-edge biological research to create a more accurate, efficient, and sustainable drug testing paradigm.

The PhD researcher will first develop novel nanoformulations of anticancer drug/s, with preliminary testing using in-vitro drug release, followed by cell-based studies. Pharmacokinetic and Pharmacodynamic (PK/PD)/Bioinformatics/other related software will be used for IVIC modelling. An artificial neural network (ANN)/artificial intelligence (AI), will be applied on this IVIC model to predict drug/product efficacy.

We seek a highly motivated PhD candidate with a formal background of drug delivery and related field. The ideal candidate will have a keen interest in nanomedicine and cancer research with AI applications in drug product efficacy testing. It is a multidisciplinary project where the student will be trained in analytical and biomedical skills. During industry placement, the student will get advance training on cell imaging. Involvement of cancer clinicians and patients in the project will give opportunity to the student to understand breast cancer management. The student will be enrolled in the structured PhD program at SETU. The program aims to equip the student with the necessary research and soft skills to pursue a career in academia, industry, or both.

QUALIFICATION

Essential

- Honours Degree (minimum 2:1) in Pharmacy, Molecular and Cell Biology, Nanotechnology, Bioinformatics or related area.

Desirable

- A first class honours or Masters degree in the abovementioned or related areas.
- An M.Phil degree in one of the abovementioned or related areas.
- Relevant industry experience.

KNOWLEDGE & EXPERIENCE

Essential

- Research project carried out in one of the above disciplines.
- Demonstrated knowledge and experience in at least three of the following: pharmaceutical nanotechnology, molecular and cell biology techniques, Mathematical modelling tools related to biology/bioinformatics, Cell culturing techniques, bioanalytical science.

Desirable

- A demonstrated knowledge and experience of sterile work environment.
- A strong understanding of research principles and methodologies in mammalian cell culture.
- A strong understanding of computer aided drug design.
- A strong understating of molecular and cell biology techniques (e.g. ELISA, Flow cytometry, western blot)
- Experience communicating research to non-scientific audiences.

SKILLS & COMPETENCIES

Essential

- Evidence of interest, aptitude and research experience in the above disciplines.
- Excellent communication skills (Oral, Written, Presentation, etc).
- Applicants whose first language is not English must demonstrate on application that they meet SETU's English language requirements and provide all necessary documentation. See Page 7 of the Code of Practice
- In order to be **shortlisted for interview,** you must meet the SETU English speaking requirements so please provide evidence in your application.

Desirable

- An evidence of presentation in a scientific conference by a recognized society and/or publication as a 1st author in a SCOPUS-indexed journals.
- If applicable, an IELTS score of 7 or equivalent

Further information

For any informal queries, please contact Muhammad Sarfraz and Laurence Fitzhenry on emails

muhammad.sarfraz@setu.ie; laurence.fitzhenry@setu.ie.

For queries relating to the application and admission process, please contact the Postgraduate Admissions Office researchadmissions@setu.ie or telephone +353 (0)51 302883.

For queries relating to the funding programme, please email scholarships2024@setu.ie

University Website https://www.setu.ie/

Application procedure

Download the Research Postgraduate Application Form from here and return the completed application to researchadmissions@setu.ie quoting TURISE_2024_212 in the email subject line.

Please note that paper submissions will not be accepted.

The University may decide to interview only those applicants who appear from the information they provided, to be the most suitable in terms of experience, qualifications and other requirements of the post.

The University will short-list and interview those applicants who provide the most suitable information in terms of experience, qualifications and other requirements relevant to the scholarship.

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