



School of Chemical Sciences,
Dublin City University,
Glasnevin,
Dublin 9
IRELAND

07/09/2022

4-Year PhD Scholarship in the Kellett Research Group (Ru-TherON)

Dublin City University (www.dcu.ie) is a research-intensive, globally-engaged, dynamic institution that is distinguished both by the quality and impact of its graduates and by its focus on the translation of knowledge into societal and economic benefit. Through its mission to transform lives and societies through education, research and innovation, DCU acts as an agent of social, cultural and economic progress. DCU is Ireland's fastest growing university, and now hosts more than 17,000 students across its three academic campuses: DCU Glasnevin Campus, DCU St Patrick's Campus and DCU All Hallows campus. DCU has a strong track record in attracting both Irish and European Union funding under FP7, Horizon 2020, Marie Curie Actions and Erasmus. We offer a dynamic and internationally focused environment in which to advance your academic career.

School of Chemical Sciences

The School of Chemical Sciences is one of Ireland's most progressive and highest achieving Schools with outstanding facilities, housed within a modern and dynamic city campus. Our goal is to develop graduates with the ability to critically evaluate, and then to solve, chemical and pharmaceutical problems, preparing the highest quality graduates capable of meeting the challenges of modern industry and research. The School is highly successful at attracting large scale research funding, with our researchers having significant roles within nationally significant university/industry collaborative initiatives and European funded Integrated Training Networks. The School is one of the leading academic schools within DCU and is ranked in the top 300 chemistry schools/departments in the world (QS Rankings), a reflection of the School's ambitious research activities and its undergraduate/postgraduate degree programmes.

Andrew Kellett's research group is based in the specifically designed research facilities, National Institute of Cellular Biotechnology (NICB) and Nano Research Facility (NRF), on the DCU Glasnevin Campus. His researchers therefore have access to a wide range of high-end facilities and equipment including custom-built synthetic laboratories, cell culture suites, Leica confocal and STED microscopes, Roche LightCycler, Cary and Shimadzu UV-vis instruments and Bruker 600 MHz NMR. The Kellett Research group (<https://andrewkellettgroup.com/>) is at the forefront of bio-inorganic medicinal chemistry, and has published extensively in this area including recent work in Nucleic Acids Research and Angewandte Chemie. The group is a multi-interdisciplinary research environment, with individuals from a wide variety of backgrounds including inorganic, organic and medicinal chemistry, chemical biology and genetics. This ensures a wealth of knowledge transfer occurs within the group and ensures the performance of high-impact research.

Background

This is an opportunity to join a fully funded PhD position (4-years) in the area of artificial gene editing. You will become part of a larger Irish Research Council (IRC) research project called *ENACT: Gene Editing with Nucleic Acid Click Chemistry* which seeks to develop a breakthrough class of artificial gene editing system for the treatment of human cancer. The technology is based on conjugating a therapeutic oligonucleotide (TherON) probe, which hybridises with a soecific genetic sequence, to a metal complex that can trigger targeted damage at the DNA interface. In this project you will target unique base-base sequences present in genetic elements of recalcitrant cancers including triple negative breast cancer (TNBC) and glioblastoma multiforme (GBM). Using state-of-art 'click chemistry' technology, each TherON will carry a unique artificial metallonuclease (AMN) programmed to direct cutting a specific genetic locus that leads to targeted tumour destruction.

As a PhD candidate you will be registered in the structured PhD programme at DCU within the School of Chemical Sciences under the supervision of Associate Professor Andrew Kellett.

Project Description: Synthesis & biological evaluation of novel artificial metallonucleases for gene-targeted therapy:

- Main areas of expertise/skills training which will be undertaken by the candidate include:
 - Inorganic synthesis of new azide-containing ruthenium complexes.
 - Nucleic acid click chemistry for the preparation of chemically modified oligonucleotides using solid-phase synthesis and enzymatic protocol.
 - Molecular biology and biophysical analysis to assess the biological activities and target specificity of new Ru-TherONs hybrids, including qPCR and nucleic acid sequencing.
 - Cell-free assay development for the screening of hybrid TherONs including encapsulation efficiency in liposomes and delivery capability.

Duties and Responsibilities:

- Conduct a specified programme of research under the supervision and direction of the Principal Investigator (PI).
- Assist the PI and research group in the design and development of the research programme.
- Disseminate research results through journal publications and at scientific meetings.
- Engage in scientific communication and tutor undergraduate research students working in the laboratory.

Applicant Requirements:

Applicants require a B.Sc. (Hons) (or equivalent) in (bio)inorganic, medicinal or organic chemistry, biochemistry, genetics or molecular biology. An M.Sc. in a related discipline is advantageous but not essential. Experience in chemical synthesis and molecular biology would be beneficial. Applicants must have an excellent track record in laboratory techniques directly related to the project. Strong oral and written English communication skills are essential.

Eligibility:

Applicants from all countries are eligible.

Conditions:

Applicants at the time of recruitment must not yet have been awarded a doctoral degree and must meet the DCU postgraduate research entry requirements.

Application procedure:

Applications must be emailed to andrew.kellett@dcu.ie and contain a cover / motivational letter, full CV, and a list of three suitable referees.

Application deadline: October 14th 2022.