Applications are invited for a **fully funded 3.5-year PhD studentship in the field of synthetic biology and gene editing**, based in the Department of Chemistry at Cambridge University under the supervision of Dr Julian Willis.

Scientific area
Our vision of synthetic biology is about understanding biology at the molecular level, and engineering proteins and DNA to create systems otherwise not found in nature. By discovering interesting new biological components, using new combinations of parts, and breaking the conventional rules of biology, we can create transformative biotechnologies for modern molecular biology.

Since its emergence 10 years ago, CRISPR/Cas9 has transformed the modern era of gene editing, winning the 2020 Nobel Prize in honour of its importance. We aim to pioneer new technologies that are just as impactful, inspired by the natural protein diversity found in bacteria and viruses. Advances in modern genomics have unearthed vast numbers of new protein and genome sequences, yet the majority of these are uncharacterised and unexplored. We seek to discover and identify protein sequences with novel properties; study and characterise them to understand their molecular details; and re-purpose them to make innovative new biotechnologies for synthetic biology, particularly in the area of gene editing.

This PhD project will explore an unusual and under-studied class of DNA viruses that use a unique mode of DNA replication to replicate their genomes, and then leverage this new understanding to create new gene editing technologies with benefits for human health and the correction of human genetic diseases.

Keywords/Themes
Synthetic biology, gene editing, molecular biology, protein engineering, bioengineering.

Scientific techniques
This research project provides experience across a variety of different techniques – ranging from purified systems to living cells, and computational tools:

- DNA cloning, circuit design, plasmid construction
- Bioinformatics, sequence discovery, sequence analysis, sequence optimisation
- Mammalian cell culture (human and mouse cells) in vitro
- Gene editing experiments
- Next-generation high-throughput sequencing
- Protein purification
- In vitro biochemical analysis (DNA/protein gel electrophoresis, Western blotting)

Highlights
+ Exciting opportunity to join a new lab with a young Assistant Professor of Chemical Biology
+ Receive excellent training and close mentorship and support from Dr Willis
+ Innovative research alongside a scientist with international experience in synthetic biology (genetic code expansion, gene editing), previously working at the Broad Institute of MIT and Harvard, USA, and the MRC Laboratory of Molecular Biology, Cambridge, UK
+ Competitive annual stipend for 3.5 years, full payment of University fees, research expenses and travel costs
+ Excellent state-of-the-art facilities with modern equipment and using cutting-edge techniques
+ A stimulating research environment at the University of Cambridge, one of the world's top universities
+ Membership of a Cambridge College providing a supportive academic culture, social community, and wellbeing support
+ Opportunity to attend myriad talks and seminars held within the Department of Chemistry, across the numerous different Departments of Cambridge University, and the MRC Laboratory of Molecular Biology

(continued overleaf…)

Requirements
Applicants should hold (or expect to obtain) the equivalent of a UK 2.1 or higher in an undergraduate honours or Masters degree in a relevant subject such as biochemistry, molecular biology, genetics, computational biology, nanoscience or chemistry. The studentship is open to both UK and international students.

Previous research experience would be helpful, but is not essential. More important is the ability to quickly learn and understand new concepts, think critically, and ask questions. The ideal candidate would be motivated, independent, creative, inquisitive, and an excellent communicator with proficiency in both written and spoken English.

To apply, submit an application by 5th December through the Cambridge University Applicant Portal www.postgraduate.study.cam.ac.uk/courses/directory/pcchpdpch for the course "PhD in Chemistry" commencing October 2024, naming Dr Julian Willis as potential supervisor. Interviews are likely to take place in mid-December. See also www.ch.cam.ac.uk/pgapp.

For more information, please contact Dr Willis by email at jcww2 [at] cam.ac.uk before applying.

www.ch.cam.ac.uk/person/jcww2
www.ch.cam.ac.uk/group/willis