PhD Studentship
Professor Patrick Unwin

PhD project: BBSRC iCASE: Understanding Tooth Decay at the Nanoscale and the Development of Next Generation Treatments

Supervisors: Academic supervisor: Prof Patrick Unwin (Chemistry, University of Warwick)
Co-supervisors: Drs Gareth Owens & Andrew Joiner (Unilever Port Sunlight Laboratory)

Funding availability: Funded PhD Project
Deadline: 27 September 2021
Start date: October 2021

Project description:
This BBSRC iCASE studentship is a partnership between the University of Warwick and Unilever that will tackle an important societal problem: what causes tooth decay and how can it be better treated? You will have the chance to learn many scientific skills of wide applicability, embracing electrochemical methods, microscopy, instrumentation, surface chemistry, scientific programming and data visualization. The Warwick Electrochemistry & Interfaces Group (PI Prof. Pat Unwin), where the project is based, is an international and interdisciplinary group which provides a supportive environment, with an enviable track record of empowering students, who gain excellent positions after graduation. There will be opportunities to build a network, working with scientists at Warwick and some of its collaborators, and at Unilever Port Sunlight Laboratory and associated companies. You will also have the opportunity to become an affiliate member of the Centre for Doctoral Training (CDT) in Analytical Science at Warwick and take courses of interest to you from many offered by Warwick’s CDTs.

Dental caries (tooth decay) is the most common non-communicable disease in the world, affecting many millions of people. It is initiated by microbial processes that drive enamel demineralisation. In this project we shall investigate the initial enamel demineralisation events, using state of the art nanoscale techniques, to develop strategies that protect and repair enamel. You will gain experience in
experimental and modelling methods, and the project will assess new treatments for caries in collaboration with Unilever scientists.

The Warwick Electrochemistry & Interfaces Group is world leading for the invention and implementation of nanoscale methods to study surface processes. Unilever has developed applicable tissue testing techniques in parallel, enabling the nano-world to be linked to practical developments. Warwick and Unilever have worked successfully together for many years, including on the development of new tooth treatments, which have been commercialised. Significant infrastructure for the project is available at Warwick (in Pat Unwin’s group and in various Warwick research technology platforms) and at Unilever, including at the Materials Innovation Factory (MIF) in Liverpool. Pat Unwin’s group has collaborations around the world and publishes in top journals (eg Nature 2021) on a range of topics in the physical and life sciences.

This **interdisciplinary 4 year project** is suitable for students with a background in most areas of science (Chemistry, Physics, Engineering, Biology/Biochemistry, Pharmacy, Maths) and the successful applicant will have a minimum of a 2:1 degree (or equivalent) in one of these subjects. All aspects of the studentship are generously funded, including a tax-free stipend of £19,609 per year (in 2021/22), increasing in subsequent years.  

**Start date: 1 October 2021 or as soon thereafter as possible**

**How to apply:**
For further details please contact Professor Patrick Unwin:  
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www.warwick.ac.uk/electrochemistry