Project title: **Chemical modification of proteins to probe Leishmania biology**  
Supervisor name(s): Dr Martin Fascione and Dr Michael Plevin  
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**Project Description:**

Following the discovery that only 25,000 protein encoding genes exist in the human genome, it has become abundantly clear that the post-translational modification (PTM) of proteins must play a more significant role in generating the complexity of life than previously appreciated. The ability of chemists to characterise and harness the rich biological function of proteins both *in vitro* and *in vivo* is therefore becoming increasingly reliant on strategies to mimic such modifications site-specifically using chemical methods compatible with biological systems- a field known as bioorthogonal chemistry. In particular, the development of new bioorthogonal methods for protein modification has become essential to facilitate the evermore demanding modulation of function and utility required in chemical medicine, specifically by pharmaceutical companies with interests in the therapeutic applications of biologics.

In this project we aim to redefine the bioorthogonal chemistry by establishing a new method for the chemical modification of proteins that generates a stable bonds under biologically relevant conditions and also enables multi-functionalisation. In this ambitious program, we will utilise existing expertise in chemical biology in combination with a range of interdisciplinary methods including chemical synthesis, organocatalysis, protein chemistry, unnatural amino acid mutagenesis and molecular biology to showcase the utility of these new bioconjugation reactions in collaborative ‘real world’ chemical biology studies and in the development of novel biomedical protein conjugates, including exploration of the structural and functional effects of N-terminal lipidation of immunogenic, *Leishmania* hydrophilic acylated surface proteins (HASPs).

**Training:**

All research students follow our innovative Doctoral Training in Chemistry (iDTC): cohort-based training to support the development of scientific, transferable and employability skills. All research students take the core training package which provides both a grounding in the skills required for their research, and transferable skills to enhance employability opportunities following graduation. Core training is progressive and takes place at appropriate points throughout a student’s higher degree programme, with the majority of training taking place in Year 1.

The candidate will receive interdisciplinary scientific training in synthetic chemistry, strategies for the chemical modification of proteins, protein purification, molecular biology and protein NMR.

**Equality and Diversity:**

The Department of Chemistry holds an Athena SWAN Gold Award and is committed to supporting equality and diversity for all staff and students. The Department strives to provide a working environment which allows all staff and students to contribute fully, to flourish, and to excel. Chemistry at York was the first academic department in the UK to receive the Athena SWAN Gold award, first attained in 2007 and then renewed in October 2010 and in April 2015. This PhD project is available to study full-time or part-time (50%).
**Funding:**

**Value:** Studentships are fully funded either by the EPSRC or a Department of Chemistry Teaching Studentship, and cover: (i) a tax-free annual stipend at the standard Research Council rate (£14,553 for 2017-18), (ii) tuition fees at the UK/EU rate.

**Eligibility:** EPSRC studentships are available to UK and EU students who meet the UK residency requirements. Students from EU countries who do not meet the residency requirements may still be eligible for a fees-only award. Chemistry Teaching Studentships are available to any student who is eligible to pay tuition fees at the home rate. Further information about eligibility for Research Council UK funding can be found at the following website: [http://www.bbsrc.ac.uk/documents/studentship-eligibility-pdf/](http://www.bbsrc.ac.uk/documents/studentship-eligibility-pdf/)

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**Candidate selection process:**

- Applicants should submit an application for a PhD in Chemistry by **17:00 on Wednesday 10 January 2018**
- Supervisors will interview their preferred candidates either by email, telephone, web-chat or in person
- Supervisors may nominate up to two candidates to the assessment panel
- The assessment panel will shortlist candidates for interview from all those nominated
- Shortlisted candidates will be invited to a panel interview at the University of York on **13 or 15 February 2018**
- The Chemistry Graduate Awards Panel will award studentships following the panel interviews
- Candidates will be notified of the outcome of the panel’s decision by email

For more information contact chemgrad@york.ac.uk or see our web page: [http://www.york.ac.uk/chemistry/postgraduate/](http://www.york.ac.uk/chemistry/postgraduate/)