

**PhD studentships in Biocatalysis. Supervisor: Prof. Dominic Campopiano.
School of Chemistry, University of Edinburgh.**

2 x PhD Studentships for September 2024

Supervisor: Prof. Dominic J. Campopiano (DJC), School of Chemistry, University of Edinburgh. Contact: Dominic.Campopiano@ed.ac.uk

Funding: Two 3.5 year PhDs are available: (1) funded by The School of Chemistry, EPSRC DTA and Johnson Matthey. (2) funded by The School of Chemistry, EPSRC DTA and Croda.

The PhD is open to UK and International students and provides funding to cover stipend and tuition fees. Please refer to [UKRI website](#) and [Annex B](#) of the UKRI Training Grant Terms and Conditions for full eligibility criteria. Applicants **must** have a good first (BSc Hons or Masters) degree (minimum of 2.1) in chemistry or biological chemistry.

Closing date for applications: 30th June 2024.

Background and Aims:

Natural and engineered biocatalysts are already having impact in the manufacture of high value pharmaceuticals by catalysing the conversion of functional groups in high yield. The use of enzymes for organic synthesis will be more routine once their limitations, such as narrow substrate range, are overcome (1). The range of chemical transformations displayed by enzymes continues to grow, fuelled by the discovery of new enzymes involved in natural product biosynthesis and accelerated by genome sequencing. Once a new enzyme is selected, modern enzyme engineering techniques (e.g. directed evolution) can be applied to generate a bespoke biocatalyst with broad synthetic utility. The impact of this technology was recognised by the award of the Nobel prize in Chemistry in 2018 to Prof. Frances Arnold (2). In these projects we will exploit members of large families of enzymes to develop efficient routes for the preparation of both commodity chemicals and high value active pharmaceutical ingredients (APIs, refs. 3, 4).

These projects will source natural enzymes from metabolic pathways and where necessary, evolve them to expand their substrate scope. We will combine these biocatalysts with compatible chemo-catalysts to develop the synthetic utility of the optimised route(s). We will specifically work with various biocatalysts involved in transamination, C-C bond formation and lipid modification. The project will provide training in modern biocatalyst methodology and analysis (recombinant DNA technology, enzyme characterisation and engineering). We will collaborate with experts in x-ray crystallography to guide engineering/evolution of target enzymes. Moreover, each project will have specific links with our industrial biocatalysis partners Johnson Matthey and Croda. Recent examples of our biocatalysis work include references (5-7). More details of our outputs can be found on our www site (<https://campopianosite.wixsite.com/campopiano>)

- (1) Sheldon, RA *et al.*, (2020) *Chem. Sci.*, **11**, 2587-2605.
- (2) Arnold, FH, (2019) *Angewandte Chemie*, **58**, 14420-14426.
- (3) Fryszkowska, A & Devine, PN, (2020), *Curr. Op. Chem. Biol.*, **55**, 151-160.
- (4) Winn, M *et al.*, (2020) *Curr. Op. Chem. Biol.* **55**, 77-85.
- (5) McKenna, C *et al.*, (2022) *Green Chemistry*, **24**, 2010-2016.
- (6) Richardson, SM *et al.*, (2022) *ACS Cat.* **12**, 12701-12710.
- (7) Ashley, B *et al.*, (2023) *ACS Sust. Chem. & Eng.*, **11**, 7997-8002.

Application Process:

To apply for either of these PhD studentships please send a cover letter explaining your motivation to do a PhD in Biocatalysis, a short CV and the names of two referees (or attach their letters of support) to Prof. Dominic Campopiano (Dominic.Campopiano@ed.ac.uk). I will short-list candidates then have interviews as soon as possible.

The School of Chemistry holds a Silver Athena SWAN award in recognition of our commitment to advance gender equality in higher education. The University is a member of the Race Equality Charter and is a Stonewall Scotland Diversity Champion, actively promoting LGBT equality. The University has a range of initiatives to support a family friendly working environment. See our University Initiatives website for further information. University Initiatives website: <https://www.ed.ac.uk/equality-diversity/help-advice/family-friendly>