

Bath Monash Global PhD Programme in Sustainable & Circular Technologies

Project Title:	Electronically-perturbed pnictogens as Earth-abundant and sustainable catalysts
Supervisors at Bath:	David Liptrot (lead)
Supervisors at Monash:	Drasko Vidovic
Home Institution:	University of Bath
Indicative period at Host Institution:	2 years at Bath; 18 months at Monash with exact dates to be confirmed

Project Summary

Catalysis is essential to the modern chemical industries, and an area of intense research. Much of this focus in recent years has been upon the substitution of the precious metals traditionally associated with catalysis by more sustainable alternatives. Significant attention has fallen upon the “rock-forming” metals including aluminium, calcium and iron, but these electrophilic metals provide their own unique challenges in handling and in their possession a unique suite of reactivity. In contrast, less electrophilic reagents, which often have highly attractive practical features such as low air and moisture sensitivity, have received less attention. Work in the Liptrot lab has recently begun to focus on electronically-perturbed pnictogens as catalytic entities, driven by the high abundance and unique chemistry of phosphorus.

Phosphorus has enormous potential as a catalytic reagent in organic transformations and its propensity towards highly covalent bonding makes it ideal for stereoselective catalysis. The ability to generate reactive P(III) under catalytic conditions from bench-stable P(V) precursors would offer a gamut of “bottle-able” catalysts ideal for use by organic chemists. Thus this project will focus on the development of *in situ* reduction chemistry to access highly reactive electronically-perturbed phosphorus species with catalytic activity already established in the group. Beyond this, the investigation of chiral ligands to allow stereoselective catalysis will become a focus, in concert with the Vidovic group.

Features of the programme

- PhD researchers will be registered at both institutions and will be awarded a joint PhD degree.
- PhD researchers will be jointly supervised by academics from both Monash and Bath Universities.
- All PhD researchers in the joint programme will also undertake a bespoke advanced training plan covering a range of topics focusing on sustainability.
- Applicants can apply to either Monash University or the University of Bath as their nominated home institution.
- PhD researchers will undertake a period of no less than 12 months at the partner institution.
- Up to four scholarships/studentships will be offered. Additional and suitably qualified applicants who can access a scholarship/studentship from other sources will be also considered. Evidence of funding must be provided.
- The scholarships/studentships include:

- a *full tuition fee sponsorship* provided by Monash or Bath for the course duration (up to a maximum 42 months) .Note, however, that studentships for Bath-based projects will provide cover for UK/EU tuition fees ONLY.
- a *living allowance (stipend)* provided by Monash or Bath Universities.

Note: Overseas Student Health Cover (OSHC) must be paid by the student, unless covered by the university.

How to apply

You MUST express interest for three projects in order of preference. Please submit your application at the Home institution of your preferred project ('Home' institution details can be found in the project summary). However, please note that you are applying for a joint PhD programme and applications will be processed as such.

The deadline to submit applications is 23rd February 2020

Monash University

Expressions of interest (Eoi) can be lodged through <https://www.monash.edu/science/bath-monash-program>. The Eoi should provide the following information:

CV including details of citizenship, your Official Academic Transcripts, key to grades/grading scale of your transcripts, evidence of English language proficiency (IELTS or TOEFL, for full requirements see: <https://www.monash.edu/graduate-research/faqs-and-resources/content/chapter-two/2-2>), and two referees and contact details (optional). You must provide a link to these documents in Section 8 using Google Drive (Instructions in Section 8).

University of Bath

Please submit your application through the following link: <https://www.csct.ac.uk/bath-monash-global-phd-programme/>

Please make sure to mention in the "finance" section of your application that you are applying for funding through the joint Bath/Monash PhD programme for your specified projects.

In the "research interests" section of your application, please name the three projects you are interested in and rank them in order of preference. Please also include the names of the Bath lead supervisors.