Centre for **Sustainable & Circular** Technologies

MONASH University

UNIVERSITY OF BATH

Bath Monash Global PhD Programme in Sustainable & Circular Technologies

Project Title:	Synthesis and Application of Complexes for 21st Century Challenges
Supervisors at Bath:	Prof Matthew Jones, Prof Matthew Davidson
Supervisors at Monash:	Dr Victoria Blair
Home Institution:	Bath
Indicative period at Host Institution:	12 months

Project Summary

Work in Bath is focused on novel ligands based on salan, salen or salalen complexed to a variety of metal centres and screening for the polymerization of bio-derived cyclic esters.[1] In recent years work has focused on chemical recycling of commodity polymers.[1] Work in the Blair group is focused on main group organometallic chemistry, with an emphasis on mixed-metal reagents for applications in synthesis and medicinal chemistry, for example as anti-inflammatory, anti-tumor and anti-microbial agents. In this programme we cover the following aims:

1. Preparation of novel multidentate ligands based on O, N and P donors (e.g. Schiff bases, salalen, heterocyclic ligands etc) using methodology developed in the Jones and Blair groups respectively. (Bath/Monash)
2. Preparation and characterization of a range of monometallic (e.g. Groups 1-4, Zn(II), Al(III), In(III) Bi(III) etc) and hetetobimetallic systems, for example lithium-aluminate complexes. Multimetallic complexes can offer various advantages compared to their monometallic counterparts in terms of activity and selectivity. (Bath/Monash)
3. The complexes will be screened for a variety of (co)-polymerizations (e.g. lactone polymerization; CO_2/epoxide coupling). Furthermore, the complexes will be screen for commodity polymer (e.g. PET, polyamides, polycarbonate) degradation. (Bath)
4. The complexes that we have developed screened for catalytic reactions relevant to the fine chemicals and healthcare applications. (Monash)

This project compliments others in the CSCT.

[1] Macromolecules, 2021, 8453. ChemSusChem 2021, 4041. ACS Catal, 2019, 409-416; Chem. Sci., 2015,5034. [2] CAEJ, 2021, 2569; CAEJ, 2019, 11876; Dalton Trans., 2016, 10887

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 30th January 2022

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.