

Bath Monash Global PhD Programme in Sustainable & Circular Technologies

Project Title:	Supramolecular Photosystems
Supervisors at Bath:	Dr. G. Dan Pantos (lead)
Supervisors at Monash:	Dr. Toby Bell
Home Institution:	University of Bath
Indicative period at Host Institution:	2-2.5 years at Bath; 12-18 months at Monash with exact dates to be confirmed

Project Summary

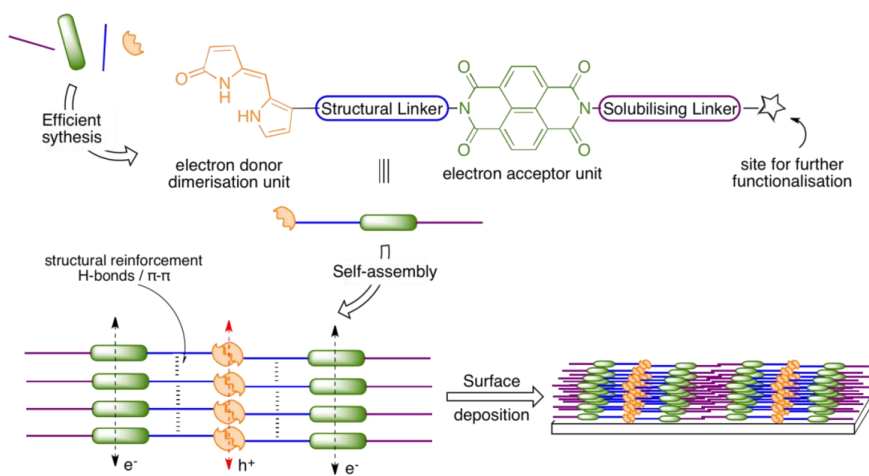
Photovoltaics use semiconducting materials to convert sunlight directly into electricity through the excitation of electrons to higher energy states by photons of light. This project seeks to utilise naphthalenediimides (NDIs) as an n-type semiconductor for the construction of next-generation organic supramolecular solar cells.

The p-type materials will be based on self-complementary molecules and will be covalently attached to the NDIs using structural linkers. A series of

NDI containing materials have been designed to self-assemble utilising π - π stacking (NDI cores) and hydrogen bonding interactions (structural linkers and dimerization units). The structural linkers are designed in such a way that the n- and p- type materials cannot form

n-/p- alternating stacks. Instead they form an ordered arrangement of donor and acceptor units (ordered bulk heterojunctions) for the efficient charge separation of generated excitons and the resulting transport of holes and electrons to their respective electrodes (Figure). The Pantos group has the expertise in the synthesis of these molecules (previous CSCT MRes students have made very good progress in their synthesis), while the Bell group has the expertise in photochemical characterization and ultrasensitive photophysical investigation.

This project is aligned with the sustainable technologies theme and brings together two research groups with complementary expertise and two supervisors that have known each other for a number of years.



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.