

Mechanically Chiral Rotaxanes in Catalysis, Sensing and Materials

PhD Supervisor: Dr Steve Goldup

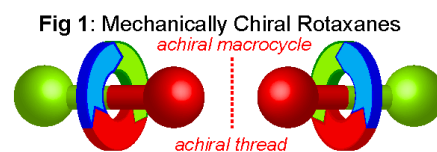
Application Deadline: Rolling deadline; applications will be considered in order they are received.

Scholarship type: Full (covers fees and an annual tax free stipend of £14,057)

Are you an enthusiastic young scientist with excellent work ethic and organisational skills? Do you want to carry out cutting edge synthetic organic chemistry research, working at the interface between molecular chirality and molecular machines? Are you an EU citizen with a first or upper second class degree (or equivalent) in Chemistry? If so, there is a PhD position available to start in September 2017 for an outstanding candidate in the group of Dr Steve Goldup at the University of Southampton.

Background – Mechanically Chiral Rotaxanes

Mechanically chiral rotaxanes are molecules in which the mechanical bond between a macrocycle and dumbbell-shaped component is the source of asymmetry rather than the covalent structure of the components themselves (Fig. 1). These unusual molecules represent a novel and unexplored chiral environment because the lack of a scalable synthetic approach for their isolation in enantiopure form has prevented all but the most cursory investigation of their properties. Thus, mechanical chirality remains an unexplored frontier of molecular asymmetry with the potential to deliver novel functions and impact across a range of chemical disciplines from materials chemistry to the synthesis of pharmaceutically active compounds. We have recently demonstrated the first practical method for the synthesis of enantiopure mechanically chiral rotaxanes using a flexible active template methodology and thus the stage is finally set for the study and exploitation of this novel form of molecular asymmetry. The successful candidate will join a research team applying our group's recently developed methodology for the synthesis of mechanically chiral molecules to investigate their properties and applications in catalysis, sensing and materials.



For recent relevant papers and an overview of the field see:

Mechanical chirality: <http://pubs.acs.org/doi/abs/10.1021/ja412715m>

Rotaxane materials: <http://pubs.acs.org/doi/abs/10.1021/jacs.6b08958>

Rotaxane catalysts: <http://onlinelibrary.wiley.com/doi/10.1002/anie.201505464/abstract>

Applications of rotaxanes: <http://pubs.rsc.org/en/Content/ArticleLanding/2014/CC/c3cc47842d>

Training

During your studentship, training will be provided in a range of modern organic and inorganic synthetic techniques and analytical methods in a world leading interdisciplinary research environment. You will also have opportunities to develop your supervisory, written and oral communication skills, excellent preparation for a career in academia or industry. Group members are expected to present their published work at national and international conferences and funding is available to support this.

The Goldup Group

The Goldup Group is based in the modern synthetic chemistry laboratories in the School of Chemistry at the University of Southampton. Support for synthetic chemistry is excellent with world class MS, NMR and X-ray facilities, each supported by dedicated specialist staff. For more information see: <http://goldup.soton.ac.uk>

Eligibility

To be eligible for funding you must:

- Be an EU citizen
- Have or expect to obtain a good (first or upper second-class) degree or equivalent in chemistry.

Application Process

In the first instance please contact Dr Goldup directly (s.goldup@soton.ac.uk) and he will guide you through the application process.