

## Rotaxanes and Catenanes of Artificial Biomolecules as Chemical Biology Tools

**PhD Supervisor:** Profs Steve Goldup and Ali Tavassoli

**Application Deadline:** 22<sup>nd</sup> of June 2018

**Scholarship type:** Full (covers fees and an annual tax-free stipend of £14,553) for 3 years.

Are you an enthusiastic scientist with excellent work ethic and organisational skills? Do you want to carry out cutting edge research working at the interface between supramolecular chemistry and chemical biology? 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 2018 or before for an outstanding candidate at the University of Southampton working with Profs Steve Goldup and Ali Tavassoli.

### Background – Rotaxanes and Catenanes in Biology

Rotaxanes, in which a linear component is trapped within a ring-shaped molecule like a bead on a thread, and catenanes, molecules formed of two rings threaded through one another like links in a chain, are the archetypal interlocked molecules. Holding the molecular components together like this changes their properties considerably and leads to new functions and applications. Indeed, nature has taken advantage of this approach to stabilise DNA in catenane structures ([Nature 1967](#)) and peptides as rotaxanes ([Acc. Chem. Res. 2015](#)). For an introduction to the properties of mechanically interlocked molecules see: “*Chemical consequences of mechanical bonding in catenanes and rotaxanes*” ([Chem. Commun. 2014](#)).

### The Project – Interlocked Molecules as Chemical Biology Tools

In this project, you will use cutting edge techniques developed in the Goldup Group ([J. Am. Chem. Soc. 2018](#)) to synthesise rotaxanes and catenanes based on artificial biologically active molecules developed by the Tavassoli Group ([Nature Chemistry 2017](#)) and demonstrate their application as new tools for chemical biology.

### Training

During your studentship, training will be provided in a range of modern organic and chemical biology 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 and Tavassoli Groups

Both groups are based in the modern chemistry laboratories in the School of Chemistry at the University of Southampton. Support for synthetic chemistry and chemical biology is excellent with world class, synthesis, molecular biology, cell biology facilities in the Goldup and Tavassoli laboratories as well as MS, NMR and X-ray facilities, each supported by dedicated specialist staff. For more information see: [Goldup Group](#), [Tavassoli Group](#)

### The Funding

The project is funded for 3 years and welcomes applicants from the UK and EU who have or expect to obtain at least an upper second class (or equivalent) degree in Chemistry. Funding will cover fees and a stipend at current research council rates of £14,553 per annum.

**Due to funding restrictions this position is only open to UK/EU applicants**

### Application Process

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