PhD Studentship

Dr Mark Greenhalgh

**PhD project:** Harnessing Unconventional Molecular Interactions for Catalysis

**Supervisors:** Dr Mark Greenhalgh

**Funding availability:** UK Students & EU Students

**Deadline:** 31st March 2020

**Project description:**

An impressive range of small molecule catalysts have been developed that utilise well understood molecular interactions, such as hydrogen bonding or ion pairing. The aim of this Ph.D. is to develop new approaches to catalysis by exploiting commonly overlooked chemical phenomena. In particular, the concept of σ-holes will be used to develop Lewis acidic catalysts based on traditionally Lewis basic group 15–17 elements. A key aspect of this work will be to develop a deep fundamental understanding of how these new catalysts operate.

The Ph.D. project will involve both the design of new catalyst structures and their application in a range of transformations to showcase the complementary and improved reactivity relative to currently-available methods. The synthesis of products containing structural motifs relevant to the pharmaceutical and agrochemical industries will be targeted. This work will be supported by mechanistic studies, with opportunities available to develop skills in both experimental and computational investigations.

**Requirements:**

This project will suit a candidate who has an interest in synthesis and catalysis, is motivated, enthusiastic and most importantly is interested learning new skills. The Ph.D. programme will allow the candidate to develop further skills in organic, main-group and organometallic synthesis, reaction design and optimisation, mechanistic investigations, X-ray crystallography, computational modelling and analytic techniques (NMR, HPLC, IR, etc.).
**Funding:**

Funding for this studentship is available for UK Nationals and EU students who satisfy UK residency requirements. This will cover tuition fees and provide a stipend at the UKRI Doctoral Stipend rate for a period of 3.5 years.

**How to apply:**

Informal enquiries should be made by first contacting Dr Mark Greenhalgh - mdg7@st-andrews.ac.uk.

Please include in your email a 1–2 page CV and your current/predicted grades.

More information about the research group can be found at: [https://cha06mg.wixsite.com/greenhalghgroup](https://cha06mg.wixsite.com/greenhalghgroup)

Formal applications should then be made using the University of Warwick’s online application process: [https://warwick.ac.uk/fac/sci/chemistry/postgraduateresearch/](https://warwick.ac.uk/fac/sci/chemistry/postgraduateresearch/)