

**GTA Studentship for September 2024 entry**

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| **Scheme:** | **School of Chemistry Graduate Teaching Assistant (2024 Entry)** |

Enantioselective Fluorinations with the Hypervalent Fluoroiodane Reagent

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| **First Supervisor** | Dr Alison M. Stuart |
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| **Additional Supervisor(s) or Collaborators**  | Dr Yang Li, Dalian University of Technology chyangli@dlut.edu.cn  |

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| **Project Title** | Enantioselective Fluorinations with the Hypervalent Fluoroiodane Reagent |
| **Project Highlights:** | 1. | Develop a new approach to enantioselective fluorinations using hypervalent iodine(III) reagents and chiral hydrogen bond donors |
| 2. | Perform mechanistic studies by multinuclear NMR spectroscopy and DFT calculations  |
| 3. | Provide excellent training for a research career in either academia or industry (e.g. in medicinal chemistry, agrochemistry, process chemistry, as well as in fine and speciality chemicals). |

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| **Project Summary**  |
| An important strategy in the drug discovery process is the incorporation of fluorine into biologically active molecules because fluorine can increase the potency and improve the pharmacokinetic properties. Consequently, 30% of all agrochemicals and 25% of all pharmaceuticals contain fluorine atoms. In 2013 we introduced the hypervalent iodine(III) reagent **1** as a new, easy-to-handle fluorinating reagent for installing carbon-fluorine bonds. Initially, a transition metal was required to activate the fluoroiodane reagent **1** by coordinat-ing to the fluorine atom, but in 2019 we demonstrated that it can be activated by hydrogen bonding to hexafluoroisopropanol. The aim of this exciting new research project is to combine chiral hydrogen bond donors with the fluoroiodane reagent **1** to develop enantioselective fluorinations. The successful candidate will gain hands-on-experience in synthetic organic chemistry, asymmetric catalysis, reaction design, molecular modelling and modern analytical techniques using state-of-the-art equipment (multinuclear NMR spectroscopy, stopped-flow NMR spectroscopy, mass spectrometry, chiral GC and chiral HPLC). This PhD project will provide an excellent training for a student interested in a career in either academic or industrial research such as in synthetic methodology development, medicinal chemistry, agrochemistry, process chemistry, as well as in fine and speciality chemicals.  |

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**Application enquiries to** **chempgr@le.ac.uk**

**See web page for application advice and link to the online application**