

# High throughput robotics, mass spectrometry and metabolomics: state-of-the-art approaches to characterise the environmental toxicity of chemicals and nanomaterials

## NERC and Thermo Scientific sponsored PhD CASE studentship at the University of Birmingham (2014-18)

An exciting 4-year studentship is available funded by NERC in collaboration with Thermo Scientific. A major focus of Thermo Scientific is the development of novel chromatography and mass spectrometry solutions to study complex biological samples, including in metabolomics. In 2013, the University of Birmingham and Thermo Scientific entered into a Technology Alliance Partnership focused on developing solutions for metabolomics.

The PhD project lies at the interfaces of bioanalytical chemistry and environmental toxicology. Nanotechnology has been the greatest impetus to industrial development in the 21st century with a global market of \$250B in 2009. Concern is warranted, however, because environmental discharges are increasing and adverse effects on human and environmental health have been shown, yet there is much uncertainty as to the toxic mechanisms of engineered nanomaterials (ENMs). Metabolomics is a transformative technology that measures 1000's of metabolites in organisms, yielding information-rich molecular responses that can reveal so-called 'Adverse Outcome Pathways'. AOPs are a concept for linking molecular toxicity to whole organism responses that are relevant to risk assessment. Characterising AOPs for thousands of ENMs is essential to determine the nature of the risks. This PhD will address these challenges, **(1) to develop novel ultrahigh throughput methods for toxicity testing using robotics, chromatography and mass spectrometry, and (2) to employ these tools to discover adverse outcome pathways for the safety assessment of ENMs**, and will provide training in how these methods can be translated into regulatory toxicology and risk assessment.

Our partners on this project include scientists at Birmingham (Prof John Colbourne, Dr Steven Vaughan, Dr Warwick Dunn) and Thermo Scientific, as well as experts from the Birmingham Law School and the Joint Research Centre (JRC) in Italy. The PhD will provide Specialist Training: in LC, MS and extraction chemistry; in metabolomics, nanotoxicology and more broadly analytical environmental sciences; and in risk assessment and policy. Also the PhD will provide Transferable Skills through the extensive courses in the Biosciences Graduate Research School. This training will be truly multidisciplinary to enrich the student experience, and you will work as part of a team of ca. 20 metabolomics scientists with expertise in bioinformatics, analytical chemistry as well as environmental metabolomics.

We seek an exceptional candidate with an undergraduate or Masters degree (can be pending) in fields such as bioanalytical chemistry, analytical toxicology or environmental forensics. Please find additional funding text below. For further details on the research in Viant's laboratory, including relevant research papers, visit: <http://www.biosciences-labs.bham.ac.uk/viant>

### **How to apply?**

Via <http://www.birmingham.ac.uk/postgraduate/courses/research/bio/biosciences.aspx> or email Professor Mark Viant ([m.viant@bham.ac.uk](mailto:m.viant@bham.ac.uk)) for the link. The deadline for applications is **4<sup>th</sup> July 2014**.

### **Funding notes and eligibility for both PhD studentships**

Fully funded studentships are only available to UK nationals (or EU nationals who have been resident in the UK for 3 years). This studentship additionally includes financial support from Thermo Fisher Scientific.