EPSRC supported EngD: Engineering the next generation of sustainable aerosol sprays: experimental and modelling routes linking thermodynamics, fluid properties, and spray patterns

Professor Gary Leeke, Dr Matt Keith, Professor Mark Simmons and Dr Calum Ferguson
School of Chemical Engineering, University of Birmingham
Unilever

Tax free bursary of £ 28,505 per annum plus fees paid.

Project Description:
Consumer products in the form of aerosols comprise product bases, with a range of physical and chemical properties blended with propellant(s) in a range of base - propellant ratios. Aerosol packaging or hardware consists of specific pressure rated cans fitted with valves made up of several sections (stem, spray channel, orifice insert and actuator) with a range of designs and flow channel / orifice sizes. The spray performance of an aerosol is dependent on several factors including multiphase fluid behaviour and thermal effects arising from liquid-gas transitions.

Working with industrial partner Unilever, this project aims to investigate the role of liquid-gas transitions governing spray formation using experimental methods and computational modelling. The outcomes from this project will be used in the development of future spray products. The project has the following objectives:

- Develop & operate lab set-up to measure thermodynamic properties for a range of formulations & propellants.
- Develop thermodynamic models using measured properties.
- Measure spray pattern properties of aerosol deodorants.
- Develop empirical models to predict spray pattern properties from thermodynamic data.

We are seeking a student with a First Degree (2i or above) and skillset in Chemical Engineering or Analytical Chemistry. They will develop a range of skills in measurement technique development, experimental methods, modelling and data analysis, as well as transferable skills such as project management and communication. The project will be based at the University of Birmingham and include short periods of working at Unilever Research & Development Labs in Port Sunlight – Wirral.

Funding Details:
To be eligible for EPSRC funding candidates must have at least a 2(1) in an Engineering or Scientific discipline or a 2(2) plus MSc.

For details on the Engineering Doctorate scheme visit the homepage.