Applications are invited for a research studentship in the field of Thermofluids with focus on fuel spray formation for Internal Combustion (IC) engines leading to the award of a PhD degree. The post is supported by a bursary and fees (at the UK/EU student rate) provided by an EPSRC CASE award with Shell. Only UK and EU candidates are fully eligible for this award.

Project Description

The structure and evaporation of fuel sprays in Direct-Injection Spark-Ignition (DISI) engines has a profound impact on combustion efficiency and emissions. If the spray atomisation and air mixing process leads to pockets of rich fuel/air mixture, the effect can be increased particulate emissions and lower engine efficiency. In a fully warmed-up engine, the presence of light ends in gasoline can assist with spray breakup via flash boiling. In this project, the main focus will be on spray breakup at cold conditions where the flash boiling mechanism does not typically apply and the penetration length of the fuel spray can be longer. Nowadays there is much more focus on emissions using Real World Driving, hence it is important to understand the effect of cold conditions on the structure of the fuel spray and the potential impact on emissions and performance of DISI engines. The project will use advanced experimental techniques with emphasis on optical diagnostics to explain the behaviour of cold fuel spray formation and atomisation in the controlled environment of a constant volume injection chamber where thermodynamics conditions relevant to modern DISI engines will be reproduced. The potential impact of various factors such as in-nozzle cavitation and additives on spray formation under such conditions will also be explored. The project is in close collaboration with Shell Global Solutions (UK) within Shell’s University Technology Centre (UTC) for Fuels and Lubricants in the Department of Mechanical Engineering at Imperial College London. The studies and will take place in the research labs of the Thermofluids Division of the Department. The Thermofluids Division has an internationally leading record, established over several decades, in pure and applied research into multiphase flows and heat and mass transfer. Collaboration has also been planned with the Tribology Group of the Department that also has an international reputation for research excellence.

You will be an enthusiastic and self-motivated person who meets the academic requirements for enrolment for the PhD degree at Imperial College London. Ideally you will have a 1st class honours degree in mechanical engineering or a related subject, and an enquiring and rigorous approach to research together with a strong intellect and disciplined work habits. A keen interest in experimentation and engine systems is essential. Good team-working, flexibility, observational, practical and communication skills are all essential for this post.

To find out more about research at Imperial College London in this area, go to: http://www3.imperial.ac.uk/mechanicalengineering

For information on how to apply, go to: http://www.imperial.ac.uk/mechanical-engineering/study/phd/how-to-apply/

For further details of the post contact Prof Pavlos Aleiferis p.aleiferis@imperial.ac.uk +44 (0)20 7594 7032. Interested applicants should send first an up-to-date curriculum vitae to Prof Aleiferis. Suitable candidates will then be asked to complete an electronic application form at Imperial College London in order for their qualifications to be addressed by College Registry. The starting date for this PhD project is expected to be in October/November 2017.

Closing date: until post filled

Imperial Managers lead by example.

Committed to equality and valuing diversity. We are also an Athena SWAN Silver Award winner, a Stonewall Diversity Champion, a Two Ticks Employer, and are working in partnership with GIRES to promote respect for trans people.