Title:
PhD Studentship in Mechanical Engineering: Developing and Exploiting Intelligent Approaches for Turbulent Drag Reduction

Value of award:
Full UK/EU fees (eligibility criteria applies to EU students) and annual living allowance of £14,777 (at the 2018/19 UKRI rate.)

Number of awards:
1

Start date and duration:
September 2019 for 3.5 years

Application closing date:
31st January 2019

Overview:
The need to reduce the skin-friction drag of aerodynamic vehicles is of paramount importance. Nominally 50% of the total drag of a commercial aircraft is due to turbulent skin-friction. Reducing skin-friction drag reduces energy consumption, which in turn reduces transport emissions, leading to vast economic savings and wider health and environmental benefits through improved air quality. To place this into context, just a 3% reduction in the turbulent skin-friction of a long-range commercial aircraft would save £1.2m in jet fuel per year per aircraft and prevent the annual release of 3,000 tonnes of carbon dioxide. The overarching aim of this project is to work towards achieving the ambitious goal of turbulent drag reduction by developing state-of-the-art machine learning algorithms to detect and destroy wall-turbulence and thereby reduce the skin-friction drag force experienced by aircraft.

The successful applicant will conduct advanced wind tunnel experiments in a dedicated facility at Newcastle University. They will develop high technical proficiency in state-of-the-art laser-based fluid flow diagnostics, control and instrumentation, data-driven machine learning, and statistical methodology. Training courses on machine learning and advanced statistical methods will be provided. The applicant will be supported to develop their own portfolio to demonstrate significant professional development in order for them to obtain chartered engineer and chartered scientist status.

Sponsor:
Engineering and Physical Sciences Research Council (EPSRC)

Name of supervisor(s):
Dr Richard Whalley (School of Engineering), Dr Kevin Wilson (School of Maths, Stats & Physics) & Dr Yu Guan (School of Computing)

Eligibility Criteria:
The applicant is expected to have a 1st class honours degree in Mechanical Engineering or a related subject, and a strong background in fluid dynamics, mathematics, engineering design and computer programming. It would be desirable for the applicant to have a sound understanding of turbulent flows, and have relevant experience of collecting and analysing experimental data.

**How to apply:**
If you are interested in the above project and meet the criteria you should email a CV, covering letter plus two references to Dr Richard Whalley (Richard.Whalley@newcastle.ac.uk).

The successful applicant will then be asked to apply for University admission using the University’s online postgraduate application system (https://www.ncl.ac.uk/postgraduate/apply/). To do this please create a new account.
• Insert the program code 8090F in the program of study section
• Select PhD MECH (FT) as the programme of study
• Insert the studentship code ENG035 in the studentship/partnership reference
• Attach a covering letter and CV. The covering letter must state the title of the studentship, quote reference code ENG035 and state how your interests and experience relate to the project
• Attach degree transcripts and certificates and, if English is not your first language, a copy of your English language qualifications.

**Contact:**
Dr Richard Whalley (Richard.Whalley@newcastle.ac.uk) School of Engineering, Newcastle University