Imperial College London
Department of Mechanical Engineering

PhD Studentship in Structural Contact Interactions in Aircraft Engines

Applications are invited for a research studentship in the field of aero engine bladetip-casing interactions, leading to the award of a PhD degree. The post is supported by a bursary and fees (at the UK/EU rate), funded by industry. The researcher will be part of Rolls-Royce Vibration UTC in the Dynamics Group within the Department of Mechanical Engineering. The candidate will work closely with computational analysts and experimental vibration researchers, as well as the industrial sponsor.

The topic of this research is to develop a new contact rubbing model for the bladetip-casing interaction, improvement of the existing frequency domain approach to account for non-smooth dynamics and validation of the numerical model against existing experimental test data.

In modern aero engines, blade tip running clearances produce aerodynamic losses. Small blade tip clearances improve efficiency but tend to increase direct contact between the blades and the casings leading to vibration and potentially blade failure. The non-linear behaviour of the blade-casing interactions can excite modes that are different from those predicted by the linear vibration analysis.

The aim of this project is to work on different tools of nonlinear vibration analysis such as finite element methods and harmonic balance method with new approaches such as wavelet Galerkin methods, multi-time scale methods, component mode synthesis methods, error estimators and model updating.

You will be an enthusiastic and self-motivated person who meets the academic requirements for enrolment for the PhD degree at Imperial College London. You will have a background in Mechanical or Aeronautical Engineering, Physics, Applied Mathematics, Computational Engineering or a related field. You have an enquiring and rigorous approach to research, together with a strong intellect and disciplined work habits. You must have a strong interest and proven track record in numerical methods and software code development in computational mechanics and dynamics. Good team-working and communication skills are essential.

To find out more about research at Imperial College London in this area, go to:
http://www.imperial.ac.uk/mechanical-engineering

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

For further details of the post contact Dr C. Schwingshackl c.schwingshackl@ic.ac.uk. Interested applicants should send an up-to-date curriculum vitae to Dr Schwingshackl. Suitable eligible candidates will be required to complete an electronic application form at Imperial College London in order for their qualifications to be addressed by College Registry.

Closing date: Until position is 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.