Title: Ultrasonic Inspection for Complex Geometry

Type of award  PhD Research Studentship

Department  Mechanical Engineering

Scholarship  Minimum £20,000 p.a.

Duration  4 years

Eligibility  Home / EU only

Deadline  1 October 2019

PhD Topic Background/Description

The Ultrasonics and Non-Destructive Group at the University of Bristol and Rolls Royce Aero-engines are seeking a top class candidate to undertake research leading to the award of an Engineering Doctorate (EngD) awarded by the University of Bristol.

Rolls-Royce is responsible for the design, manufacture and maintenance of the power plants in civil and military aircraft. Safety critical components are inspected using a range of non-destructive evaluation (NDE) techniques. Many of today’s inspection issues are due the geometric constraints, restricted access and anisotropic material properties. Near net shape manufacturing creates complex geometric components where in-service inspection can be very challenging. Good examples are single crystal turbine blades and additive manufactured parts.

In-situ inspection of such components is constrained by access issues affecting the ability to detect defects. Ultrasonic inspection methods are required where direct line of sight to the defect does not exist. New ultrasonic imaging techniques have recently been developed with potential for inspecting such awkward geometry, such as multi-mode array imaging. However, there are several challenges that remain to transfer the ideas to real components.

The project will concentrate on delivering

• An assessment of existing concepts to image defects where line of sight does not exist
• Modelling to understand limitations and create best practice for employing such techniques
• Coping with anisotropic and isotropic material properties.
• Optimisation of inspection technique, for example comparing advantages of 1D or 2D arrays and investigating the use of piezo transducers or laser UT.

The student will work at the University of Bristol before relocating to Rolls-Royce in Filton (Bristol) for a significant portion of their studies, where they will work within the NDE Research team, with frequent trips to the University of Bristol. The student will work alongside engineers developing inspections and will have the opportunity to influence future inspection capability for aero-engine components.

url for further information:
https://www.rcnde.ac.uk/how-to-apply/
Further Particulars

The studentship is offered through the EPSRC Centre for Doctoral Training in Future Innovation in NDE (FIND CDT), which is a partnership between a select group of universities (Bristol, Manchester, Strathclyde, Nottingham, Warwick and Imperial College London) and companies offering a 4-year Engineering doctorate designed to launch outstanding graduates into an engineering career. With close links to the related UK Research Centre in NDE, students are part of a vibrant community of more than 200 researchers and have access to a range of technical training courses delivered by world leading experts.

The post is supported by a bursary and fees (at the UK/EU student rate) provided by EPSRC, together with a generous top up by the sponsor company, Rolls Royce.

Candidate Requirements

Applicants must hold a minimum of an upper 2nd class honours degree in Mechanical Engineering, Physics or a related subject.

Basic skills and knowledge required.
An enquiring and rigorous approach to research together with a strong intellect and disciplined work habits. Good team-working, observational and communication skills are essential.

Scholarship Details

Scholarship covers full UK/EU (EU applicants who have been resident in the UK for 3 years prior to application) PhD tuition fees and a tax-free stipend of a minimum £20,000 subject to contracts and eligibility criteria.

Candidates can check the eligibility criteria for the award at https://www.epsrc.ac.uk/skills/students/help/eligibility/

Informal enquiries

For informal enquiries, please email Prof Anthony Croxford, A.J.Croxford@bristol.ac.uk or find-cdt@bristol.ac.uk

For general enquiries, please email came-pgr-admissions@bristol.ac.uk

Application Details

Prior to application Interested applicants should send an up-to-date CV to find-cdt@bristol.ac.uk

To apply for this studentship submit a PhD application using our online application system [www.bristol.ac.uk/pg-howtoapply]

Please ensure that in the Funding section you tick “I would like to be considered for a funding award from the Mechanical Engineering Department” and specify the title of the scholarship in the “other” box below with the name of the supervisor Prof Anthony Croxford.

Apply now