Title: Low-frequency Vibration of Sandwich Composites

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

Applications are invited for a research studentship in the field of development of advanced non-destructive evaluation (NDE) techniques leading to the award of an Engineering Doctorate (EngD) degree.

One-sided in-service inspection of certain composite structures (honeycomb-, balsa- and foam-core sandwich) can be successful using a low-frequency vibration method but defect detection is limited, and classification of defects is not currently supported. Data-acquisition equipment had hardly advanced in 20 years, bar moving from analogue to digital, until the new ‘Bondcheck’ bond testing system from Baugh and Weedon. This offers full-waveform capture at every location, with the potential to expand to an array of sensors, opening up greater potential for structure analysis algorithms and comparison with modelled responses.

Prior work has showed the potential for improved pitch-catch probe design to enhance the resolution and frequency range, whilst the use of full-frequency capture offered the potential for defect classification, depth and size estimation. This project will use low-frequency vibration to classify defects in sandwich composites and determine their depth, location and size, based on comparison with the modelled low-frequency (5 kHz -100 kHz) responses of a range of structures with different defect types. Bristol has considerable experience of both acoustic modelling and inversion methods using modelled responses. For this project a database method coupled with multi-dimensional optimisation to invert the data and determine the type and 3D location of defects will be used initially, with potential for refinement of the method in a variety of ways.

The student will be based at the Ultrasonics and Non-Destructive Group at the University of Bristol before relocating to the Baugh & Weedon’s offices in Hereford.

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 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, Baugh and Weedon.

**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/](https://www.epsrc.ac.uk/skills/students/help/eligibility/)

**Informal enquiries**

For informal enquiries, please email Dr Mahdi Azarpeyvand, m.azarpeyvand@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](http://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 Dr Mahdi Azarpeyvand.

**Apply now**