Title: Rapid Simulation Tools for Optimised Thermo-forming Manufacture of Large-Scale Prepreg Stacks

Type of award  PhD Research Studentship

Department  Aerospace Engineering, Bristol Composites Institute

Scholarship Details  Minimum £16,062 p.a. subject to eligibility and confirmation of award

Duration  3.5 years

Eligibility  Home (UK) and EU citizens who have confirmation of UK settlement or pre-settlement status under the EU Settlement Scheme

Start Date  From January 2023

PhD Topic Background/Description

This project will create new optimisation tools that can help the development of the manufacturing process of large-scale, high-value composite parts. Although numerical simulation is an integral part of the design process of any composite parts, it has struggled to make progress in helping the development of their manufacturing processes. This is largely due to the current lack of scalability of process models and the difficulty to analyse full-size industrial components. This project will build on recent breakthroughs made at Bristol Composites Institute in the development of fast simulation tools for the prediction of consolidation-induced defects in thick autoclave moulded composites parts. The project is co-funded by Airbus and will look more specifically at the thermoforming of thick thermoset prepreg stacks.

The main objectives of the project can be summarised as follows:

1. Implement a solid-shell element for the thermoforming of thick prepreg stacks;
2. Integration of BCI’s homogenised formulation for thick prepreg stacks into the newly developed element;
3. Investigate strategies to define Bayesian optimisation techniques with a particular focus on the methods used to generate a synthetic dataset that can be used to train a surrogate model of Airbus’ component manufacturing process;
4. Contribute to technical reporting and dissemination of scientific outcomes through publications and participation in international conferences.

The project will be based in the Bristol Composites Institute (BCI), a world-leading research centre at the University of Bristol. The institute has over 150 researchers and works closely with the £60M National Composites Centre, which is a wholly owned subsidiary of the University engaged with industry to fully exploit and develop composites technology. The student will be expected to make a number of visits to Airbus’ facilities in Toulouse (France) during the duration of the project.
Further details of our composites research can be found via www.bris.ac.uk/composites/research

**Candidate Requirements**
Applicants must hold/achieve a minimum of a master’s degree (or international equivalent) in a science, mathematics, or engineering discipline. Applicants without a master’s qualification may be considered on an exceptional basis, provided they hold a first-class undergraduate degree. Please note, acceptance will also depend on evidence of readiness to pursue a research degree.

If English is not your first language, you need to meet this profile level:
**Profile E**
Further information about [English language requirements and profile levels](#).

**Basic skills and knowledge required:**
**Essential:** Excellent analytical and programming skills
**Desirable:** A background understanding in one or more of the following: Material Science, Solid Mechanics, Data Science, Manufacturing Engineering

**Scholarship Details**
Stipend at the UKRI minimum stipend level will also cover tuition fees at the UK student rate. Funding is subject to eligibility status and confirmation of award.

For eligibility and residence requirements please check the [UKRI UK Research and Innovation](#) website

**Informal enquiries**
For questions about the research topic, please contact Dr Jonathan Belnoue and Professor Stephen Hallett
For questions about eligibility and the application process please contact CAME Postgraduate Research Admissions came-pgr-admissions@bristol.ac.uk

**Application Details**
To apply for this studentship, submit a PhD application using our [online application system](#)

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

Closing date: **10 September 2022**