Title: Insitu Processing of Composite Components using Computed Tomography

Type of award: PhD Research Studentship

Department: Aerospace Engineering

Scholarship Details: Scholarship covers full UK/EU (EU applicants who have been resident in the UK for 3 years prior to 1st September 2018) PhD tuition fees and a tax-free stipend at the current RCUK rate (£14,777 in 2018/19)

Duration: 3.5 years

Eligibility: Home/EU applicants only

Starting Date: 1 November 2018

PhD Topic Background/Description
This project will use *insitu* computed tomography and dedicated image processing tools to experimentally identify critical information about defect formation during composite manufacturing processes. We will answer important questions concerning when and where defects form that *exsitu* measurements cannot replicate. This multi-disciplinary project will offer the candidate international leading expertise in composites processing at Bristol and computed tomography at Southampton. The student will be registered at Bristol, with regular research visits to Southampton. The expertise across both centres has positioned the team perfectly to take the lead in identifying defect mechanisms that form in composite materials.

Composite materials have seen unprecedented growth in recent years, with high-performance carbon fibres delivering lighter solutions than previously available from metals. Unlike their metallic counterparts, composites present an added complexity in that the material and final structure are intricately linked through the manufacturing process. Even though composites have become increasing popular for structural components, the incidence of microstructural defects in the manufacturing process remains largely unknown. To date, the key to the successful production of advanced carbon fibre composites has been slow careful laying of plies to minimise microstructural defects, followed by high-pressure consolidation in an autoclave to ensure optimal performance is achieved in the finish component. As new manufacturing processes are introduced, defects are more likely to form in the composite.

During the PhD, the candidate will design and execute distinctive *insitu* processing experiments. Based on the temporal tomographic CT scans (performed at Southampton) of the samples, the candidate will develop image processing routines to trace and quantify the defects as they evolve during curing. With this vast amount of data at hand, these cutting-edge experiments will be compared to state-of-the-art process models with the aim of adjusting the prediction models and developing more robust composite manufacturing processes.
**Further Particulars**

Bristol Composites Institute: [http://www.bristol.ac.uk/composites/](http://www.bristol.ac.uk/composites/)

Southampton µ-VIS Centre: [https://www.southampton.ac.uk/muvis/about/about.page](https://www.southampton.ac.uk/muvis/about/about.page)

**Candidate Requirements**

Applicants with a high 2:1 or 1st honours or master’s degree in Engineering, Science or Maths are invited to apply.

The ideal candidate for this project will be practically-minded, comfortable with independent study, not shy of a little bit of coding, and most importantly enthusiastic to learning new skills and techniques.

**Informal enquiries**

For informal enquiries please contact Dr James Kratz, [james.kratz@bristol.ac.uk](mailto:james.kratz@bristol.ac.uk)

For general enquiries, please email [came-pgr@bristol.ac.uk](mailto:came-pgr@bristol.ac.uk)

**Application Details**

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 Aerospace Engineering Department” and specify the title of the scholarship in the “other” box below with the name of the supervisor, Dr James Kratz.

**Closing date for applications:** **1 October 2018**

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