

## **Post-doctoral Research Associate Façade Engineering: FRP-Glass Composite Structures**

A position exists, for a post-doctoral Research Associate at the Glass and Façade Technology Research Group ([www.gft.eu.com](http://www.gft.eu.com)) to develop and characterise a new generation of FRP-Glass composite structures. The project aims to bring about step-change improvements in the performance and sustainability of buildings and other glazed enclosures and involves a high degree of creativity with bespoke materials and novel techniques.

### **The Research**

Glass is a ubiquitous material in building envelopes, where it is typically used in multiple flat plates to form insulated glazing units (IGUs) that are simply supported by rectilinear framing members. Despite recent technological improvements in this field, state-of-the-art glazing systems fail to make efficient use of materials, have a low robustness, a relatively high thermal conductivity, and are rarely recycled.

Recent research developments in glass engineering, adhesive bonding and fibre-reinforced polymer (FRP) composites provide an opportunity to explore a novel combination of these materials in the form of FRP-glass composite structures. These consist of glass plates that are bonded to pultruded FRP profiles by means of high strength - high stiffness thermosetting adhesives, thereby forming an FRP-glass composite panel. This is a novel, yet relatively simple concept, but it involves a radical shift in the role of glass in buildings: from its current use as an inefficient infill panel in a layered system, to a structurally and thermally efficient component within a robust and recyclable composite structure.

The aim of this 24 month project is two-fold: Firstly to characterise the thermo-mechanical properties and environmental impact of a first generation, yet novel, form of composite FRP-glass panel; and secondly to explore the feasibility of more adventurous second generation composite glass panels. The latter offer further improvements over the basic FRP-glass panels, in terms of structural performance, adaptability and recyclability. This aim will be achieved by means of coordinated thermo-mechanical investigations involving physical experiments, numerical modelling and theoretical analyses at three levels: (1) material level, (2) FRP-glass connection level; and (3) full-scale composite glass panel level,

The evaluation of the potential benefits of composite glass panels and the fundamental properties characterised in this project will: (1) provide a basis for future research and product development in this new sub-field; (2) help produce novel glazed building envelopes that significantly out-perform existing state-of-the-art glazing systems; (3) lead to step-change improvements in the sustainability and resilience of new and existing buildings.

### **The Role**

The research programme planned in the materials and structures domains of this project involves a high degree of creativity with several bespoke test set-ups and novel uses of equipment. The quantity and complexity of this critical work requires a person with 3-5 years research experience for the duration of the project (24 months).

The key responsibilities and duties are:

*1. Research and scholarship*

Develop research objectives and proposals for own or joint research; conduct individual and collaborative research tasks; write up / communicate research work for presentation and publication; continually update knowledge and understanding in field or specialism; manage own research and administrative activities, with guidance if required; assist in the preparation of proposals and applications to external bodies, e.g. for funding and contractual purposes.

*2. Teaching and learning support*

May assist in the supervision of student projects and student research skills; provide limited supervision/instruction to classes; may plan and deliver seminars relating to research area.

*3. Liaison and networking*

Liaise with colleagues and students; build internal and external contacts and participate in networks for the exchange of information and to form relationships for future collaboration.

*4. Planning and organising*

Plan the use of research resources, laboratories and workshops as appropriate; plan and manage own research activity in collaboration with others; contribute to planning of joint research projects led by principal investigator.

The successful candidate will:

- Have obtained or is close to obtaining a PhD in a relevant specialist subject.
- Have knowledge and experience of the experimental characterisation and/or numerical modelling of structural materials, preferably with direct experience in advanced composites, adhesives and/or glass.
- Have a strong theoretical understanding of fundamental mechanics of materials.
- Communicate effectively with a wide range of stakeholders e.g. other senior and junior researchers, industrial partners, practitioners etc.
- Have experience of managing own workload.
- Have the right to reside and work in the UK.

The research associate will join an established and dynamic research group and will have access to excellent computing and laboratory resources. The project also involves collaboration with researchers at other universities and with international industrial partners.

## **How to apply**

To submit an application for this vacancy, please do so online via the University's Job Opportunities pages (<http://www.jobs.cam.ac.uk/>).

Please ensure that you upload a covering letter, your Curriculum Vitae (CV) including a list of research outputs / publications and up to 3 recent research outputs (from your list of outputs / publications) in the Upload section of the online application.

For further details about the research project or if you have any questions about this vacancy please contact: Mrs Lorna Everett-Walters (email: [lje31@cam.ac.uk](mailto:lje31@cam.ac.uk) Tel: +44 01223 332725)

**Closing date:** 7<sup>th</sup> December 2014

**Start Date:** 5<sup>th</sup> January 2015 (or soon as possible thereafter)

**Salary Range:** £28,695-£37,394

**Contract duration:** 24 months