



## Development of new approaches to repairing advanced composite structures using nano-enhanced resins



### Project description

The drive towards reducing manufacturing costs in the production of advanced lightweight carbon-fibre composite structures (such as new-generation passenger aircraft wings and military platforms) has resulted in the evolution of larger and highly integrated structures which are costly to replace. Hence, there is a pressing need for the development of repair techniques that can efficiently restore the performance of a damaged composite structure. The repair of such structures presents significant challenges and this research project will focus on the development of technologies and materials that minimise the removal of material from the parent structure, identify suitable resins that can be modified with nano-materials for use in injection type repairs (Fig. 1) and assess the performance of the repair. This project will also aim to characterise the influence of vent-holes (e.g. depth, distribution, number, diameter), introduced during injection repairs, on the performance of the repaired structure.

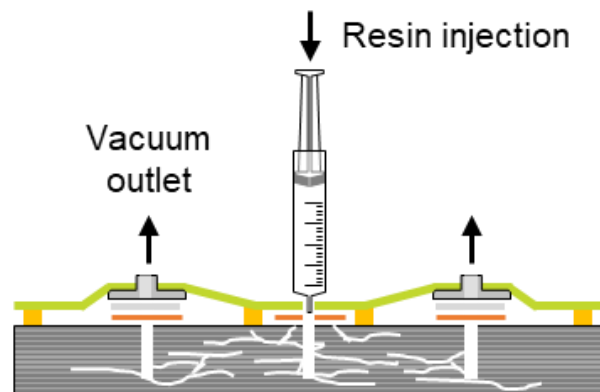


Figure 1: Injection repair of a delaminated composite structure under vacuum.



**Key qualifications and skills required for the post:** A 2:1 or above undergraduate degree in Aerospace / Aeronautical / Mechanical / Materials Engineering or closely related field; basic knowledge of composite materials, evidence of experimental proficiency and knowledge of finite element analysis, excellent communication skills.

**Desirable qualifications and skills:** An MSc in a relevant field; undergraduate/Master's level research experience in the use of carbon nanotubes / graphene; basic programming knowledge.

**Key transferable skills that will be developed during the PhD:** These will include an ability to effectively communicate research outcomes to academic peers and industry, independent analytical thinking and problem solving, time management, and leadership.

<b>First/Lead Supervisor and their contact details</b>	Prof Brian G. Falzon Email: <a href="mailto:b.falzon@qub.ac.uk">b.falzon@qub.ac.uk</a> ; Tel: +44 (0)28 9097 5640
<b>Second Supervisor and their contact details:</b>	Dr Robert Pierce Email: <a href="mailto:r.pierce@qub.ac.uk">r.pierce@qub.ac.uk</a>
<b>Eligibility</b>	<b>Please note that this PhD studentship is only available to UK and European Union Nationals.</b>
<b>Stipend</b>	The studentship covers UK/EU university fees and includes a tax-free stipend of up to £17,000 per annum (comprising a £15,450 PhD award, and the opportunity to undertake teaching and demonstration duties to earn a further £1,550 per annum). A top-up is also available, dependent on the recommendation of the interview panel.
<b>Deadline</b>	31 <sup>st</sup> January 2019 (unless post is filled before this date).

***Queens University Belfast is a diverse and international institution which is strongly committed to equality and diversity, and to selection on merit. Currently women are under-represented in research positions in the School and accordingly applications from women are particularly welcome.***