

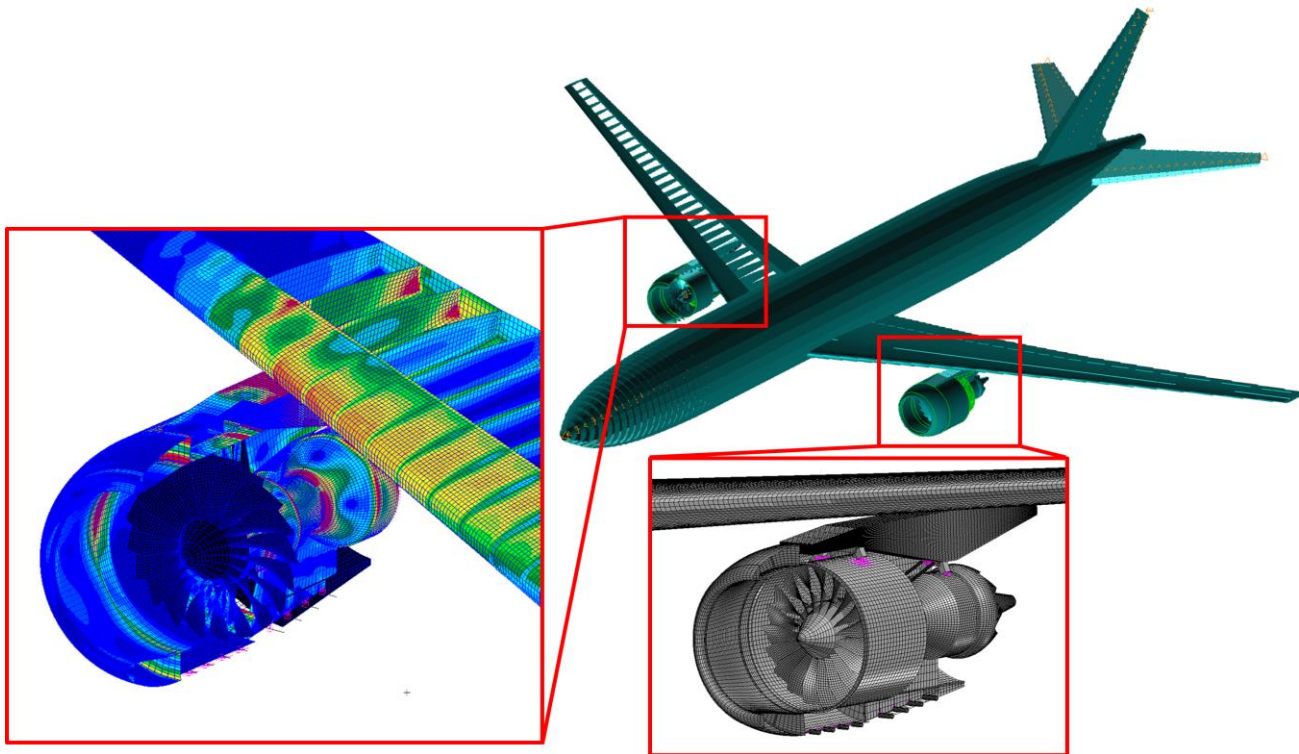
# QUB - Mechanical and Aerospace Engineering PhD Project

**Title: Understanding the influence of flexible aircraft and pylon behaviour on optimum engine-nacelle load share**

**Project description:**

This project is funded through a prestigious EPSRC iCASE award and will be carried out within a large research team (including academics, PhDs and Post-Doctoral researchers) who conduct exciting and innovative research in collaboration with Rolls-Royce. It will investigate novel computational methods for modelling and assessing load share opportunities in future engine and aircraft design concepts.

Current aerospace design approaches often design and optimise subsystems in isolation and make use of comparatively rigid elements in order to facilitate analysis. However, this can lead to systems not fully taking advantage of assembled system performance for the benefit of overall weight optimisation. The work will review a number of powerplant design targets and examine how these are currently achieved via baseline engine design. Through the adaptation of existing processes, this PhD will look to understand the benefits of a more integrated design using more flexible elements. The powerplant design targets will be tracked as design options are explored to meet these through other means with the combined system. The work will also identify other parameters which are significantly affected by the design studies and provide commentary on how these may affect the aircraft without exploring this in such a level of detail. It is also expected that sensitivity analysis will lead to a more detailed understanding of the risks and challenges of such approaches, this will need to be coupled with some review of the current aerospace regulatory landscape into which such designs must operate.



The powerplant design targets are expected to include [but not be limited to] areas such as structural mass, specific fuel consumption (influence by structural stiffness and rotor tip clearance), minimum internal reaction forces and minimum Standard Deviation of internal reaction forces, etc..

**Aims and Objectives:**

The aim is to understand the influence of pylon and aircraft behaviour on load share. This will be met through the following objectives:

1. Understand power plant design targets
2. Determine structural behaviour of existing power plant designs
3. Determine opportunities for load share in engine power plants
4. Evaluate performance of different design options.

**Key skills required for the post:****Key transferable skills that will be developed during the PhD:**

<b>Lead supervisor:</b>	TBD: Contact Dr T Robinson ( <a href="mailto:t.robinson@qub.ac.uk">t.robinson@qub.ac.uk</a> ), Prof. A Murphy ( <a href="mailto:a.murphy@qub.ac.uk">a.murphy@qub.ac.uk</a> ), Dr D Quinn ( <a href="mailto:d.quinn@qub.ac.uk">d.quinn@qub.ac.uk</a> ) if interested.
<b>Other supervisor(s):</b>	
<b>Guaranteed stipend:</b>	£18,500.
<b>Conditional top-up available:</b>	

PhD students in the School have the opportunity to apply to be demonstrators on undergraduate modules. Compensation for this can amount to in excess of £2,400 per year.

*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.*