ROLE PROFILE

**Job Title:** Research Associate/ Fellow in Structural Design Optimization and Manufacturing of MW-Class aerospace electrical machines

**School/Department:** Engineering

**Job Family and Level:** Research and Teaching Level 4 (Appointment will be Level 4 Career training grade where an appointment is made before PhD has been completed)

**Contract Status:** This full time post will be available immediately and will be offered on a fixed term contract for a period of 24 months.

**Hours of Work:** 36.25 hours per week – (full-time)

**Location:** Faculty of Engineering, Jubilee and University Park Campuses

**Reporting to:** Professor Chris Gerada

**Purpose of the Role:**
Working within a globally recognized, multidisciplinary centre of excellence and alongside key aerospace industrial partners, this post is associated with ongoing research in high performance electrical machine design and development targeting next generation hybrid-electric and all-electric aircraft. The successful candidate will undertake research and develop novel solutions in light-weighting the key mechanical parts of MW-class electrical machines, based on the ingenious exploitation of multifunctional structures (for example metallic and carbon fibre composite truss lattice structures).

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<th>Main Responsibilities</th>
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<td>1. To research/develop lightweight innovative solutions for the key mechanical parts of high power aerospace electrical machines based on advanced manufacturing, and adoption of structures including, but not limited to, metallic and carbon fibre composite truss lattices.</td>
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<td>2. To carry out multi-domain FEA optimisation of lightweight materials to achieve the best solution based on thermal, structural and dynamic performances.</td>
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<td>3. To develop experimental verification procedures of the lightweight solutions, including manufacturing the test samples and carrying out the experimental characterization.</td>
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<td>4. To commission development rigs, liaising with technicians as appropriate.</td>
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<td>5. To deliver research as part of a collaborative team and contribute to the achievement of specific research objectives.</td>
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<td>6. To collaborate in writing papers for submission to journals and conferences and prepare progress reports on the results of research.</td>
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<td>7. To assist in the co-ordination of the research and related administrative tasks, including liaising with external project collaborators and providing assistance with supervision of doctoral students.</td>
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<td>8. To write up research work for publication and/or contribute to the dissemination at national/international conferences, resulting in successful research outputs.</td>
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<td>9. To build relationships with both internal and external contacts in order to exchange information, to form relationships for future collaborations and identify potential sources of funds and/or opportunities for collaboration.</td>
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<td>10. To co-ordinate the operational aspect of research networks, for example, arranging meetings and updating websites etc and contribute to collaborative decision making with colleagues in area of</td>
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11. To provide support, guidance and supervision to other staff within the research team, where appropriate in own area of expertise.

12. To supervise undergraduate and/or postgraduate students projects and placements, as appropriate. To participate in the assessment of student knowledge and co-supervise projects at Masters and PhD level.

13. To utilise and contribute to organising research resources, facilities and laboratories as appropriate.

### Knowledge, Skills, Qualifications & Experience

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<th>Essential</th>
<th>Desirable</th>
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| **Qualifications/Education** | • Good (2.1) first degree (or equivalent) in mechanical/materials/manufacturing engineering or a related subject.  
• PhD or equivalent (or near completion) and research experience in mechanical/materials/manufacturing engineering. | • PhD or post-doctorate research on lightweight multifunctional structures, their modelling and manufacturing. |
| **Skills/Training**      | • Proven Research skills.                                                 | • Ability to foster a research culture and commitment to learn in others.  
• Excellent oral and written communication skills, including the ability to communicate with clarity on complex information.  
• Ability to apply finite element packages, (ex. ANSYS, ABAQUS) to the analysis of metal or composite structures  
• Ability to conduct structural design optimization for complex structures  
• Good programming ability  
• High analytical ability to analyse data, and find technical solutions.  
• Ability to assess and organise resource requirements and deploy effectively.  
• Ability to build relationships and collaborate with others, both internally and externally.  | • Familiarity with the analysis and design optimization of metallic / carbon fibre composite truss lattice structures.  
• Ability to conduct experimental characterization of engineering materials / structures  
• Analytical and numerical skills of heat transfer and thermo-fluid flow.  
• Familiarity with the concept of multifunctional design of engineering structures. |
| **Experience**           | • Previous experience in a research environment.                          | • Experience in manufacturing of metallic or composite truss lattices.  
• Experience of finite element analysis in a research environment. Experience of structural design optimization for complex structures.  
• Mechanical design experience | • Knowledge and experience in designing rotating machines.  
• Experience characterizing engineering materials and structures.  
• Experience with rotor-dynamic analysis of rotating machinery.  
• Mechanical design experience of complex structures |
| **Statutory/Legal**      | • Ability to work well in a team environment.                            | • Demonstrate creativity and leadership in problem solving; liaising with engineers and managers from industry  
• Ability to work to deadlines and prioritise tasks.  
• Excellent presentation skills. |