

**THE UNIVERSITY OF NOTTINGHAM**  
**Recruitment Role Profile**

- Job Title:** Research Fellow in Rotordynamics of Electrical Machines
- School/Department:** Mechanical, Materials & Manufacturing Engineering.
- Job Family and Level:** R&T4
- Contract Length:** Fixed term, 30 months
- Hours of Work:** Full-time 36.25hrs per week within the hours 08:00 – 17:30 Monday-Friday
- Location:** Energy Technologies Building, UNIP, Jubilee Campus.
- Reporting to:** Prof. Seamus D. Garvey

**Purpose of the New Role:** The present role arises as a part of a major new (£12M) research programme called CORNERSTONE funded by EPSRC under their "Prosperity Partnerships" scheme. That programme spans numerous areas but the area of specific relevance here is that of "electromechanical interactions" – the interplay between the dynamics of electrical systems and the physical displacements and velocities inside electrical machines. There is a substantial workpackage within CORNERSTONE dedicated to this topic. The work will focus very largely on electrical machines embedded within gas turbine engines.

The role-holder will sit within G2TRC – the gas turbine transmissions research centre. However, although funding for this post comes from the CORNERSTONE project, there is substantial scope for synergistic overlap with work in other areas. There is also very significant overlap with the activities of the "Propulsion Futures" beacon of excellence. G2TRC is intent on expanding its customer base to include stationary industrial and power-generation gas turbines and there is very significant scope to exploit this area of work into that sector as well.

Most knowledge at the University in the specific area of transverse forces between rotor and stator of electrical machines is held, at present, by S. Garvey. The appointee will gain the role of being another host for this knowledge.

	<b>Main Responsibilities</b>	<b>% time per year</b>
1.	Lead WP6 of the CORNERSTONE programme. This will involve coming to a clear understanding of the potentialities and limitations of installing embedded electrical machines in gas turbine engines, appreciating the typical dynamic characteristics of these machines and developing new electrical and mechanical configurations such that the possibilities are both demonstrated and exploited. There will be experimental work undertaken at Nottingham within G2TRC but there will also be interaction with other bodies of experimental work.	70%
2.	Publish high-quality papers on findings from the work on rotordynamics control using the controlled "Unbalanced Magnetic Pull" (UMP).	10%
3.	Support the process of securing external work in this area – including bringing-in test work that can be conducted on the three-shaft test facility.	10%
4.	Contribute to the supervision of relevant undergraduate projects, supporting	10%

PhD researchers (especially but not exclusively within CORNERSTONE) and generally supporting both senior and junior colleagues to ensure that the research environment within G2TRC at Nottingham is productive and enjoyable.	
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### Knowledge, Skills, Qualifications & Experience

	Essential	Desirable
<b>Qualifications/ Education</b>	<p>Mechanical Engineering Degree or Electrical Engineering with 1<sup>st</sup> class honours or 2:1</p> <p>A PhD involving substantial rotordynamics or use of active magnetic bearings or including some study on unbalanced magnetic pull.</p>	
<b>Skills/Training</b>	<p>Excellent written and verbal communication skills</p> <p>A full understanding of what analysis is possible using existing magnetic FEA analysis.</p> <p>Excellent skills in basic linear algebra (esp eigenvalues and eigenvectors).</p> <p>Good ability to write and understand engineering calculations (especially on rotordynamics) implemented in MATLAB or similar package.</p>	<p>Fluency with MATLAB is especially desirable as the computational tool of choice.</p> <p>Knowledge of some major magnetic FEA package such as MAGNET or OPERA.</p>
<b>Experience</b>	<p>Some experience of operating electrical machines or operating machines.</p> <p>Demonstrable ability and willingness to adapt past knowledge to a new problem/context.</p>	<p>Any background of having done experimentation with mechanical equipment will be valued.</p> <p>Experience of having connected together power electrical circuits.</p>
<b>Statutory/Legal</b>		<p>The successful candidate will be trained in the necessary safety practices whether or not they have prior knowledge but this prior knowledge will be valued.</p>

### Additional Information

This is an area that we expect to grow very significantly. The role holder will have very good opportunities for career development without changing area.
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<b>Head of School/Department (or nominee):</b>	Prof. Seamus D. Garvey.
<b>Date completed:</b>	January 2018