Job title: Research Associate/Fellow in design and control of mechatronic systems for intelligent aeroengine production lines

Job family and level: Research and Teaching, Level 4 training grade / Level 4

School/Department: Faculty of Engineering, Rolls-Royce Manufacturing and On-Wing University Technology Centre (UTC)

Location: Advanced Manufacturing Building at Jubilee campus

Purpose of role:
The Rolls-Royce Manufacturing and On-Wing University Technology Centre (UTC) at the University of Nottingham is looking to recruit a researcher in design and control of mechatronic systems to contribute to existing projects and conduct research within the expanding research groups. This is an exciting opportunity for an experienced graduate/postgraduate to play a leading role in challenging projects. In particular, to coordinate and carry out theoretical and experimental work for developing control methods and architectures for intelligent production systems of aerospace components.

Main responsibilities:
(Primary accountabilities and responsibilities expected to fulfil the role)

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<tr>
<th>% time per year</th>
<th>Research</th>
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<tr>
<td>70%</td>
<td>To develop concepts of mechatronics systems and end effectors along with appropriate supervision/monitoring approaches</td>
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<td>To design and develop innovative hardware and software architectures for high/low level control modules compatible with industrial requirements</td>
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<td>To conduct theoretical models and control algorithms and implement them in real time applications for mechatronics systems</td>
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<td>Demonstrate the concepts of the mechatronic solutions and test them in “simulated” working environments using different software platforms</td>
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<th>% time per year</th>
<th>Dissemination of research results</th>
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<td>10%</td>
<td>To write research reports and papers in order to disseminate research results and develop a track record of published research findings in internationally respected peer-reviewed journals. Further dissemination of results should also occur through invited oral and poster presentations at international meetings, conferences and seminars.</td>
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<td>To write reports corresponding to the development of the research work as part of the deliverables of external funded projects.</td>
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<th>% time per year</th>
<th>Support junior members of the group</th>
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<td>10%</td>
<td>Supervise and examine research projects undertaken by undergraduate and master level students if required.</td>
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<td><strong>Engagement</strong></td>
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| 4 | - Participate in the regular meetings of the Machining and Condition Monitoring Group (MCM) and Rolls-Royce Manufacturing and On-Wing University Technology Centre (UTC).  
    - Facilitate the growth of both the MCM group and UTC through actively seeking funding sources, leading research proposals, and ensuring research excellence.  
    - Contribute to the research work of the Machining and Condition Monitoring Group and collaborate with their partners as required. | 5% |
| 5 | **Adhere to H&S regulations**  
    - Operate within the safety systems, IT code of practice etc. as required by the Division, Department and University. | 5% |
## Person specification

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<th>Essential</th>
<th>Desirable</th>
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| **Skills**       | • Excellent analytical skills for solving kinematic/dynamic/static calculations of complex mechanisms  
                    • Very good skills in writing computer simulations related to intelligent control of production processes.  
                    • Skills in developing demonstrators for complex kinematic mechanisms /mechatronics/robotics  
                    • Skills in developing monitoring solutions for mechatronics applications  
                    • Excellent analytical skills to evaluate mechatronic systems and develop control architectures, with a track record in developing mechatronic designs. | • Knowledge in sensor systems and electronic interfaces for mechatronic systems  
                    • Knowledge in integration of hardware and software on mechatronic systems  
                    • Knowledge in the development of advanced control algorithms  
                    • Knowledge data processing for intelligent control operations |
| **IT Skills**    | • Highly skilled in programming in MATLAB/Simulink and C/C++applications  
                    • Relevant experience using different API Libraries for control and data analyses  
                    • Good general IT skills, including a good working knowledge of word, PowerPoint, Excel, Outlook, etc. | Experience of using:  
                    • C/C++/Java/Python  
                    • MATLAB/Simulink  
                    • LabVIEW modules: FPGA and real time  
                    • CAD packages (e.g. Solid Works)  
                    • Visual Studio  
                    • Windows/Linux/Android operating system |
| **Knowledge and experience** | • Experience in independent development/construction of mechatronics or robotic systems  
                    • Experience in developing control solutions for autonomous robots  
                    • Experience in developing programs to communicate with electronic devices using USB, RJ45, PCI bus interface units.  
                    • Excellent knowledge of mechanical and mechatronics system design and practical design and control skills  
                    • Excellent analytical skills and ability to evaluate mechanical and mechatronics systems with a track record in producing innovative designs | • Experience in building multi-degree of freedom systems  
                    • Experience in modelling of kinematic/dynamic performances of industrial mechatronics systems  
                    • Track record in demonstrating advanced mechatronics systems  
                    • Experience in developing fast and robust advanced algorithms (e.g. machine learning, iterative learning control, big data analysis) |
The University strongly endorses Athena SWAN principles, with commitment from all levels of the organisation in furthering women's careers. It is our mission to ensure equal opportunity, best working practices and fair policies for all.

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<th>Qualifications, certification and training (relevant to role)</th>
<th>Other</th>
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<td>• Undergraduate degree (BEng / BSc) in mechatronic / control/ manufacturing engineering or in a closely related discipline.</td>
<td>• Innovative and creative thinker.</td>
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<td>• Hold a relevant PhD (or PhD close to completion) ideally in mechatronic control or related field of mechatronics engineering</td>
<td>• Dedicated and hardworking with a good working attitude for a demanding role.</td>
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<tr>
<td>• Postgraduate degree (MPhil/PhD) in mechatronic, control or manufacturing Engineering subject.</td>
<td>• Excellent planning and organisational skills with an ability to ensure deadlines are met.</td>
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<tr>
<td>• Higher degree (MEng/ MSc) in mechatronics, control or manufacturing engineering or in a closely related discipline.</td>
<td>• Excellent communication skills; able to effectively communicate technical information to a variety of audiences.</td>
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- Presence and reporting and publishing skills
- Ability to work in a team as well as on own initiative.
- Have a genuine interest in engineering.
- Desire to develop expertise in this area of engineering research.
Expectations and behaviours

The University has developed a clear set of core expectations and behaviours that our people should be demonstrating in their work, and as ambassadors of the University’s strategy, vision and values. The following are essential to the role:

**Valuing people**
Is always equitable and fair and works with integrity. Proactively looks for ways to develop the team and is comfortable providing clarity by explaining the rationale behind decisions.

**Taking ownership**
Is highly self-aware, looking for ways to improve, both taking on board and offering constructive feedback. Inspires others to take accountability for their own areas.

**Forward thinking**
Driven to question the status quo and explore new ideas, supporting the team to “lead the way” in terms of know-how and learning.

**Professional pride**
Sets the bar high with quality systems and control measures in place. Demands high standards of others identifying and addressing any gaps to enhance the overall performance.

**Always inclusive**
Ensures accessibility to the wider community, actively encouraging inclusion and seeking to involve others. Ensures others always consider the wider context when sharing information making full use of networks and connections.

Key relationships with others

![Diagram showing key stakeholders and roles]

- **Line manager**: Prof Dragaos Axinte
- **Role holder**: Research Associate or Fellow
- **Key stakeholder relationships**: Colleagues, Students