



## ROLE PROFILE

<b>Job Title:</b>	Research Associate/Fellow in Composites Manufacturing
<b>School/Department:</b>	Faculty of Engineering
<b>Job Family and Level:</b>	R&T Level 4 (Appointment will be Level 4 Career Training grade where an appointment is made before PhD has been completed)
<b>Contract Status:</b>	This post will be offered on a fixed-term contract for 12 months
<b>Hours of Work:</b>	Full-time (36.25 hours per week)
<b>Location:</b>	Advanced Manufacturing Building, Jubilee Campus
<b>Reporting to:</b>	Dr Louise Brown and Prof Andy Long

### **Purpose of the New Role:**

This role will support the delivery of fundamental research at the University of Nottingham, funded by the EPSRC Future Composites Manufacturing Research Hub. The role holder will collaborate with the University of Manchester to develop “New Manufacturing Techniques for Optimised Fibre Architectures”.

The project aims to establish a computational framework for textile preform optimisation not limited to existing manufacturing technologies. The framework will be built and extended based on a series of case studies to identify classes of materials with improved properties. In particular, the role holder will be modelling the permeability of 3D fibre architectures and manufacturing composites by liquid transfer moulding. New manufacturing technologies will be developed for these materials by colleagues at the University of Manchester, which will be used to validate the predicted properties.

For more information about the Hub and the project, please visit our website: [www.cimcomp.ac.uk](http://www.cimcomp.ac.uk)

The role holder will lead the delivery of specific research tasks and will work closely with colleagues from the University of Nottingham, other Hub members and a number of industrial partners from the UK composites sector. The person appointed will have the opportunity to use their initiative and creativity to identify areas for research, develop research methods and extend their research portfolio. They will work within the Composites Research Group at Nottingham and have access to excellent research facilities.

The person appointed will be expected to plan and conduct work using appropriate approaches or methodologies, and will be responsible for writing up their work for publication. The role holder will be expected to be developing a research track record, contributing to major research projects in the field of composites manufacturing, enabling opportunities to be identified for new research proposals and collaborations within this field. Experience in either numerical modelling of composite materials or experimental validation of models is essential. Experience of fibre reinforced composites would be beneficial, particularly manufacturing technologies, including Resin Transfer Moulding and 3D weaving. Experience of unit cell modelling would also be advantageous, to develop models to study the effects of resin flow through porous media and the formation of defects at both meso and macro scales.

Candidates must have (or be about to obtain) a PhD, or equivalent in a relevant area, together with the relevant research skills, knowledge and track record.

	<b>Main Responsibilities</b>	<b>% time per year</b>
1.	<b>Research</b> <ul style="list-style-type: none"> <li>• To analyse and illuminate data, interpret reports, evaluate and criticise texts and bring new insights to the research area.</li> <li>• To plan and conduct research using recognised approaches, methodologies and techniques to support current activities within the Composites Research Group at the University of Nottingham, which include: <ul style="list-style-type: none"> <li>• Modelling of flow through porous media at the meso-scale</li> <li>• Creating Python and Matlab scripts to automate the modelling procedure</li> <li>• Investigate formation of defects at meso- and macro-scales</li> <li>• Experimental model validation</li> </ul> </li> </ul>	50%
2.	<b>Publications</b> <ul style="list-style-type: none"> <li>• Write up research work for publication and/or contribute to the dissemination at national/international conferences, resulting in successful research outputs.</li> </ul>	20%
3.	<b>Project management</b> <ul style="list-style-type: none"> <li>• Define research objectives in collaboration with senior colleagues and Hub partners.</li> <li>• Develop internal work plans/timetables with research staff, support staff, and project partners.</li> <li>• Manage resources in order to achieve research outputs.</li> <li>• Organise and participate in Hub meetings with other project partners to clarify objectives and communicating research outcomes.</li> <li>• Collaborate with Hub partners throughout the UK.</li> </ul>	10%
4.	<b>Funding applications</b> <ul style="list-style-type: none"> <li>• Identify opportunities and assist in writing bids for research grant applications with Hub partners. Prepare proposals and applications to both external and/or internal bodies for funding or contractual purposes.</li> </ul>	10%
5.	<b>Collaboration</b> <ul style="list-style-type: none"> <li>• Build relationships with both internal and external Hub partners in order to exchange information, form future collaborations and identify potential sources of funding.</li> </ul>	5%
6.	<b>Other duties</b> <ul style="list-style-type: none"> <li>• Perform other duties appropriate to the post as required by their line manager. Such as collaborating with academic colleagues on areas of shared interest, course development or joint research projects.</li> </ul>	5%

## Knowledge, Skills, Qualifications & Experience

	Essential	Desirable
<b>Qualifications/ Education</b>	<ul style="list-style-type: none"> <li>• PhD in relevant subject area (such as Mechanical Engineering or Materials Science).</li> <li>OR near to completion of a PhD in a relevant subject area.</li> </ul>	<ul style="list-style-type: none"> <li>• PhD relating to polymer composites.</li> </ul>
<b>Skills/Training</b>	<ul style="list-style-type: none"> <li>• Strong analytical ability to analyse and present data, interpret reports, evaluate and criticise texts and bring new insights.</li> <li>• Practical engineering skills to facilitate experimental programme or experience in numerical modelling of composite materials</li> <li>• Experience in writing computer programs (e.g. in Python, Matlab or Fortran)</li> <li>• Excellent oral and written communication skills, including the ability to communicate with clarity on complex information.</li> <li>• Project management and leadership skills.</li> <li>• Ability to plan and conduct high quality research.</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge of CFD or FEA packages</li> <li>• Experience with meso-scale modelling of textiles for 3D reinforcements</li> <li>• Experience in modelling of flow through porous media, using packages such as Ansys CFX or Fluent</li> <li>• Experience in the following experimental techniques: RTM, micro-CT, mechanical testing</li> <li>• Knowledge of numerical non-linear optimisation techniques</li> <li>• Experience with permeability testing</li> <li>• Ability to play a leading role in a research group</li> </ul>
<b>Experience</b>	<ul style="list-style-type: none"> <li>• Practical experience working with polymer composites in an academic or industrial environment.</li> <li>• Track record of publishing research material in high impact factor journals and/or proceedings of international conferences</li> <li>• Ability to promote and maintain collaborative links with industry</li> <li>• Delivering industrial standard reports</li> </ul>	<ul style="list-style-type: none"> <li>• Previous experience of writing successful funding proposals</li> <li>• Previous experience working on large research projects with multiple industrial/academic partners</li> <li>• Research experience in composites manufacturing, including: <ul style="list-style-type: none"> <li>▪ high rate deposition and rapid processing technologies</li> <li>▪ design for manufacture via validated simulation</li> <li>▪ multifunctional composites and integrated structures</li> <li>▪ inspection and in-process evaluation</li> <li>▪ recycling and re-use</li> </ul> </li> </ul>
<b>Personal attributes</b>	<ul style="list-style-type: none"> <li>• Self-starting and pro-active, and with the ability to work alone and in a team to meet deadlines and to prioritise tasks.</li> <li>• Willingness to adopt the ethos and principles of the Faculty of Engineering to deliver high quality research and knowledge exchange.</li> </ul>	
<b>Statutory/Legal</b>	Awareness of health and safety policies and procedures in the laboratory	<ul style="list-style-type: none"> <li>• Experience of writing Risk and COSHH assessments for new apparatus and processes in the laboratory</li> </ul>

For job levelling/benchmarking purposes only – please remove before publishing

### Decision Making

#### i) taken independently by the role holder

Day-to-day processes including:

- Organisation of research

- Investigation of working methods
- Identification of research deliverable priorities
- Structure of research reports and papers
- Ensuring quality of research deliverables
- Assessing risks and corrective action
- Liaison with internal and external resources
- Development of delivery project plans
- Advice on small scale purchasing

**ii) taken in collaboration with others**

- Agreement of project delivery plans
- Writing and submission of papers to academic journals/conferences, progress reports and grant applications
- Research direction – form and content
- Identification of focus for published research findings in peer-reviewed journals and conferences
- Identification of areas for future research
- Development of proposals

**iii) referred to the appropriate line manager (please name) by the role holder**

- Wider research strategy of our research group
- Dissemination strategy
- Purchasing of larger items of consumables/equipment and repair/service of any equipment

**Additional Information**

The Faculty of Engineering is committed to reviewing its work and practices to ensure organisational effectiveness. Candidates should be aware that roles and responsibilities will inevitably evolve over time and should therefore be prepared to adapt as necessary.



*The University of Nottingham 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.*