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| Last updated: | <date> |

**JOB DESCRIPTION**

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| Post title: | **Research Fellow in Composite Materials** | | |
| Standard Occupation Code: (UKVI SOC CODE) |  | | |
| School/Department: | School of Engineering/Mechanical Engineering | | |
| Faculty: | FEPS | | |
| Career Pathway: | Education, Research and Enterprise (ERE) | Level: | 4 |
| \*ERE category: | Research pathway | | |
| Posts responsible to: | Dr Meisam Jalalvand | | |
| Posts responsible for: |  | | |
| Post base: | Office-based and Non Office-based (see job hazard analysis) | | |

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| Job purpose |
| The EPSRC funded project is to apply recent developments in composites materials at the University of Southampton to real composite products manufactured by the project’s industrial partner, Magma Global.  Magma Global are a UK manufacturing business with research and development, production, engineering, and test all on one site. They are an innovative technology company and strive to become the Composites Centre of Excellence for TechnipFMC.  Magma Global's novel Thermoplastic Composite Pipe (TCP) simplifies subsea architecture due to its low-weight, high-strength, flexible design. Its primary application is for flowlines, jumpers and intervention systems to deliver hydrocarbon, water and gas. Applications in alternative energy are now also becoming a potential source of revenue.  This project aims to explore application of new Structural Health Monitoring methods at an industrial level and assess their efficiency for detection of damage / Overloads for loading conditions outside the design regime through combined physical testing and simulations, undertaken by the Research Fellow. Different composite specimens will be manufactured under a variety of parameters. Analytical and Finite Element modelling will be used to design testing specimens and understand the obtained results. A key objective is to enhance the Technology Readiness Level (TRL) of the academic achievements from 2-3 to industrially acceptable range of 4-5.  The associate will undertake leadership, management and engagement activities, leading and adapting the project workplan as necessary in order to secure the projected outcomes. |

| Key accountabilities/primary responsibilities | | % Time |
| --- | --- | --- |
|  | Undertake research and knowledge transfer activities in alignment to the project workplan including:   * Manufacture of thermoplastic composite samples. * Development of analysis methodologies and modelling techniques for both mechanical and electrical response of carbon fibre reinforced polymers. * Plan and carry out testing campaigns to assess the efficiency of the structural health monitoring techniques to detect overloads. * Project management and reporting. * Work in close collaboration with Magma Global to understand current design loading scenarios and define overload conditions. * Any other duties as allocated by the line manager following consultation with the post holder and Magma Global. | 75 % |
|  | Regularly disseminate findings by taking the lead in preparing publication materials for referred journals, and / or exhibiting work at other appropriate events, participating in outreach activities including high-school events to promote STEM to younger generation. | 10 % |
|  | Communicating with line manager, other investigators and the other Research Fellow in the project and Magma Global technical staff to provide project updates and adapt project plan as required | 5 % |
|  | Undertake personal development and training opportunities. | 5 % |
|  | Any other duties as allocated by the line manager following consultation with the post holder | 5 % |

| Internal and external relationships |
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| Direct responsibility to both the research award academic supervisor from the University of Southampton.  May have additional reporting and liaison responsibilities to external funding bodies or sponsors.  May be asked to serve on a relevant School/Department committee, for example research committee.  Collaborators/colleagues in other work areas and institutions. |

| Special Requirements |
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| Must be able to regularly commute to Magma Global in Portsmouth (located near Portchester train station).  *Applications for Research Fellow positions will be considered from candidates who are working towards or nearing completion of a relevant PhD qualification. The title of Research Fellow will be applied upon successful completion of the PhD. Prior to the qualification being awarded the title of* ***Senior Research Assistant*** *will be given.* |

**PERSON SPECIFICATION**

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| Criteria | Essential | Desirable | How to be assessed |
| Qualifications, knowledge and experience | PhD or equivalent professional qualifications and/or experience in a quantitative research discipline: engineering, materials science, physics.  Detailed knowledge and understanding of continuous fibre reinforced polymer composites especially carbon fibre composites, experience of finite element analysis (FEA) simulations of composite materials, experience and knowledge of Classical Laminate Theory of composite materials.  Experience with composite materials manufacture and testing | PhD related to composite materials and FE modelling of composites  Knowledge and experience of modelling and testing the electrical behaviour of carbon fibre composites  Knowledge of x-ray computed tomography and experience of data processing and image analysis  Knowledge and experience with non-linear FEA techniques  Experience with Design of Experiments | Application CV and Interview |
| Planning and organising | Able to organise own research activities to deadline and quality standards with minimum supervision |  |  |
| Problem solving and initiative | Able to develop understanding of complex problems and apply in-depth knowledge to address them  Able to develop original techniques/methods to achieve a desired outcome |  |  |
| Management and teamwork | Self-motivated to lead the project workplan, adapting where necessary to secure the projected outcomes  Able to supervise work of junior research staff, delegating effectively  Able to contribute to management and administrative processes  Work effectively in a team, understanding the strengths and weaknesses of others to help teamwork development |  |  |
| Communicating and influencing | Communicate new and complex information effectively, both verbally and in writing, engaging the interest and enthusiasm of the target audience.  Report research and technical findings, ensuring the language is understandable to non-experts in the field and relevant to the manufacturing process  Able to present research results at group meetings, meetings with commercial clients and offshore standards agency  Able to write up research results for publication in leading peer-viewed journals  Work proactively with colleagues in other departments (from manufacture, quality assurance, engineering, sales and project management), contributing specialist knowledge to achieve outcomes |  |  |
| Other skills and behaviours | An interest in business development, willingness to learn and an appetite and aptitude for complex tasks and innovation to ensure the success of the project: The Research Fellow will be challenged to develop the project plan and progress outcomes (beyond this project) to ensure business success.  Understanding of relevant Health & Safety issues  Positive attitude to colleagues and students |  |  |
| Special requirements | Able to travel to Magma’s site for performing some of the tests |  |  |

**JOB HAZARD ANALYSIS**

**Is this an office-based post?**

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| Yes | If this post is an office-based job with routine office hazards (eg: use of VDU), no further information needs to be supplied. Do not complete the section below. |
| No | If this post is not office-based or has some hazards other than routine office (eg: more than use of VDU) please complete the analysis below.  Hiring managers are asked to complete this section as accurately as possible to ensure the safety of the post-holder. |

## - HR will send a full PEHQ to all applicants for this position. Please note, if full health clearance is required for a role, this will apply to all individuals, including existing members of staff.

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| **ENVIRONMENTAL EXPOSURES** | **Occasionally**  (<30% of time) | **Frequently**  (30-60% of time) | **Constantly**  (> 60% of time) |
| Outside work |  |  |  |
| Extremes of temperature (eg: fridge/ furnace) |  |  |  |
| ## Potential for exposure to body fluids |  |  |  |
| ## Noise (greater than 80 dba - 8 hrs twa) |  |  |  |
| ## Exposure to hazardous substances (eg: solvents, liquids, dust, fumes, biohazards). Specify below:   * Polymers e.g. thermoplastics including PEEK or adhesives while being processed * Carbon fibre composite debris | √ |  |  |
| Frequent hand washing |  |  |  |
| Ionising radiation |  |  |  |
| **EQUIPMENT/TOOLS/MACHINES USED** | | | |
| ## Food handling |  |  |  |
| ## Driving university vehicles(eg: car/van/LGV/PCV) |  |  |  |
| ## Use of latex gloves (prohibited unless specific clinical necessity) |  |  |  |
| ## Vibrating tools (eg: strimmers, hammer drill, lawnmowers) |  |  |  |
| **PHYSICAL ABILITIES** | | | |
| Load manual handling |  |  |  |
| Repetitive crouching/kneeling/stooping |  |  |  |
| Repetitive pulling/pushing |  |  |  |
| Repetitive lifting |  |  |  |
| Standing for prolonged periods |  |  |  |
| Repetitive climbing (ie: steps, stools, ladders, stairs) |  |  |  |
| Fine motor grips (eg: pipetting) |  |  |  |
| Gross motor grips |  |  |  |
| Repetitive reaching below shoulder height |  |  |  |
| Repetitive reaching at shoulder height |  |  |  |
| Repetitive reaching above shoulder height |  |  |  |
| **PSYCHOSOCIAL ISSUES** | | | |
| Face to face contact with public |  |  |  |
| Lone working |  |  |  |
| ## Shift work/night work/on call duties |  |  |  |