

Candidate Information

Position:	Research Fellow
School/Department:	School of Mechanical and Aerospace Engineering
Reference:	24/111711
Closing Date:	Monday 25 March 2024
Salary:	£37,841 per annum
Anticipated Interview Date:	Wednesday 10 April 2024
Duration:	24 Months or until 30/04/2026 (whichever is sooner)

JOB PURPOSE:

To be a highly productive, ambitious, and collaborative member of the OVERCOMP research project/team, focusing on interface formation and bond strength prediction in composite injection overmoulding. This role involves contributing to the development of a multi-scale model to predict interfacial strength in overmoulded components, aiming to enhance the manufacturing efficiency and reliability of composite materials in the automotive and aerospace sectors. The successful applicant will engage in computational analyses, and experimental validation including CFD and FEA, to understand and predict the flow behaviour and interface bonding during injection overmoulding. The successful candidate will work closely with leading partners, including Collins Aerospace, CIMCOMP, Denroy Plastics, and academic collaborators from the University of Nottingham, to drive innovations in high-volume manufacture of hybrid thermoplastic composite components for the automotive and aerospace sectors.

MAJOR DUTIES:

1. Conduct comprehensive research under supervision within the OVERCOMP project, leveraging both computational (CFD and FEA) and experimental approaches to understand and predict the flow behaviour and interface bonding during injection overmoulding.
2. Design, develop, and validate a multi-scale predictive model for interfacial strength in overmoulded components, incorporating experimental characterisation and strength measurements to ensure model accuracy and reliability.
3. Carry out analyses, critical evaluations, and interpretations of experimental data and the literature using methodologies and other relevant techniques.
4. Produce high quality research outputs consistent with project aims and commensurate with career stage. This will include collaborating and co-authoring with PI and project team (as appropriate) on outputs.
5. In consultation with the project team, promote research milestones and outputs at national and international conferences and through social media.
6. Assist grant holder in the preparation of funding proposals and applications to external bodies.
7. Carry out occasional educational supervision, demonstrating or lecturing duties within the post holder's area of expertise and under the direct guidance of a member of academic staff.
8. Undertake supplementary duties relevant to the success of the project including administrative duties and additional training and development activities as required.

ESSENTIAL CRITERIA:

1. Normally have or be about to obtain a PhD in a field relevant to polymer composite materials, fluid mechanics, mechanical engineering, or a related discipline, with a focus on computational modelling, materials science, or polymer engineering.
2. Demonstrable experience in computational analyses, specifically CFD and FEA, applied to the study of material behaviour and interface bonding in composite materials.
3. A track record of research in the context of composite injection overmoulding or similar high-volume manufacturing processes.

4. Recent relevant research experience to include:
 - Computational and experimental research in composite materials, particularly focusing on interface formation and bond strength in injection overmoulding processes.
 - Working effectively as part of a research team in the development and promotion of the OVERCOMP research theme, with a collaborative approach to problem-solving and innovation.
 - A proven track record of using computational fluid dynamics (CFD) and finite element analysis (FEA) models to carry out analyses, complemented by experimental validations through material characterisation and mechanical testing, critical evaluations, and interpretations of experimental data as relevant to the research project.
 - Strong publication record commensurate with stage of career.
5. Ability to contribute to broader management and administrative processes within the scope of the project.
6. Contribute to the School's outreach programme by links with industry, community groups etc
7. Willingness to undertake additional training in research methods and other related skills as required.
8. Practical problem solving skills, independence of thought and initiative
9. Ability to communicate complex information from computational analyses and experimental findings effectively in oral and written format.
10. Ability to build relationships to develop internal and external networks, particularly with project partners and stakeholders in the composites manufacturing sector.
11. Ability to assess and organise resources effectively to meet project deadlines and objectives.
12. Demonstrates resilience and adaptability in a research environment, with a keen focus on detail and quality of work.
13. Exhibits a high degree of initiative and independence, coupled with a collaborative spirit necessary for interdisciplinary research.

DESIRABLE CRITERIA:

1. Experience in Computational Fluid Dynamics (CFD) of polymer melts, and injection moulding process.
2. Experience of translating research findings into educational materials, research and conference papers, etc.
3. Experience in presenting technical presentations in professional settings