



Job title	Senior Research Fellow	Job family and level	R&T level 5
School/ Department	Faculty of Engineering, MAS	Location	Jubilee Campus, ETB

Purpose of role

The Mechanical and Aerospace Systems Research Group (MAS) requires a Senior Research Fellow to work on a multi-university, industry supported project focussing on the development of industry relevant predictive models for friction welding. MAS has a large multi-disciplinary team of researchers, engineers, technicians, support staff and academics who work together to deliver research from fundamental to high level TRL. The successful candidate will contribute to the development of the understanding of different types of friction welding (notably linear and inertia methods) by working closely with academic and industrial partners. Machine level models will be developed by MAS researchers that will allow for the interpretation of real production process data and the estimation of near weld conditions such that key process variable can be identified and controlled. Numerous academic institutions are involved in the project, and the successful applicant will work across a diverse set of research areas (including numerical modelling and experimental development) as part of an established team. Dynamic machine models will be established to enable local boundary conditions at the weld interface to be determined from routinely collected machine data, with machine learning techniques implemented to alleviate computational costs in “real time” assessment. In addition, flow stresses and damage accumulation rates will be experimentally investigated using novel testing methods and microstructural underpinnings will be determined using advanced imaging techniques like X-ray diffraction. Through collaboration with other researchers at Nottingham, industrial sponsors, and other academic partners, the successful applicant will contribute to research at the cutting edge of the field and will develop a wide range of transferable analysis skills. The role holder will report to the principal investigator of the project as their line manager.

	Main responsibilities (Primary accountabilities and responsibilities expected to fulfil the role)	% time per year
1	<p>Research Activities</p> <ul style="list-style-type: none"> • Lead and perform high quality research as part of a collaborative team that contributes to the achievements of the research objectives of MAS. ▪ Oversee and lead the development of efficient numerical modelling schemes that enable the prediction of machine response and condition from production data inputs. ▪ Coordinate, in collaboration with academic staff and researchers, experimental activities at the mechanical testing laboratories at the University of Nottingham and on the production welding machines at the industrial partner facility. 	60%

	<ul style="list-style-type: none"> ▪ Resolve problems for self and other researchers on the project to meet research objective and deadlines, escalating any issues effectively to senior colleagues. 	
2	<p>Stakeholder Liaison</p> <ul style="list-style-type: none"> ▪ Regular formal and informal liaison will be required with stakeholders, both internal and external to the group and university. ▪ Responsible handling of commercially confidential data will be required, including managing the secure electronic storage of this data. ▪ Liaison and monitoring of project milestones/deliverables. 	20%
3	<p>Reporting</p> <ul style="list-style-type: none"> ▪ Attendance at meetings with presentation to internal and external stakeholders. ▪ Creation of written reports for internal and external stakeholders ▪ Dissemination activities, paper publication. 	15%
4	<p>Group Collaboration</p> <ul style="list-style-type: none"> • Researchers within the group are expected to contribute to internal seminar and training activities, by attending and where appropriate presenting. • Participation in collaborative activities to further enhance group cohesion and development of new proposals/publications 	5%

Person specification

	Essential	Desirable
Skills	<ul style="list-style-type: none"> • Ability to independently manage both technical and project workload, proactively alerting line manager of issues, with suggestion of potential resolution routes. • Organisation of and leadership of meetings, recording of meeting information and creation of actions from meetings. • Ability to liaise with a wide range of internal and external stakeholders including, but not limited to, industrial technical specialists, experimental researchers, engineering and technicians, project managers, academic staff. • Ability to present complex data to a wide audience to provide a clear analysis and outcomes. • Technical report/journal paper writing for a specialist audience. • Identification of opportunities for research development and, working with academic staff, contribute to the creation of funding applications. • Ability to work in a team, lead both internally and externally, and interact/collaborate actively and professionally with industrial partners. 	<ul style="list-style-type: none"> ▪ Project management skills ▪ Good documentation practice for all work, especially relating to computer coding.
Knowledge and experience	<ul style="list-style-type: none"> ▪ Experience of data management. ▪ Good understanding of deformation mechanisms in metallic materials across a range of loading conditions appropriate to the friction welding processes. ▪ Experience with severe deformation manufacturing processes (<i>i.e.</i> friction welding, forming, forging) and an appreciation of the complications/nuances associated with them. ▪ Extensive experience of the experimental methods or numerical methods used for 	<ul style="list-style-type: none"> ▪ An appreciation of (or practical experience with) X-ray diffraction imaging methods. ▪ Practical experience in mechanical testing for dynamic characterisation. ▪ Practical experience in mechanical testing for material characterisation at elevated temperatures. ▪ Ability to use programming software (particularly Matlab and Python languages) for the modelling and analysis of engineering systems and components.

	<p>mechanical characterisation of materials and systems.</p> <ul style="list-style-type: none"> ▪ Experience in having developed and/or adhered to strict safety systems. ▪ Experience in identifying areas or opportunities for research development and, working with academic staff, contributing to the creation of funding applications. ▪ Experience to actively support knowledge exchange and transfer activities between industrial partners and the University of Nottingham. 	<ul style="list-style-type: none"> ▪ Proven track record in the use of the finite element methods to solve complex engineering deformation problems. ▪ An understanding of uncertainty quantification methods that can be applied in an engineering context.
<p>Qualifications, certification and training (relevant to role)</p>	<ul style="list-style-type: none"> • PhD in relevant subject or significant industrial experience directly related to mechanical engineering or mathematical modelling of engineering relevant systems. 	



The University of Nottingham is focused on embedding equality, diversity and inclusion in all that we do. As part of this, we welcome a diverse population to join our work force and therefore encourage applicants from all communities, particularly those with protected characteristics under the Equality Act 2010.

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

