



Job title	Senior Research Fellow	Job family and level	Research & Teaching 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 who is experienced in the fields of solid mechanics and stress analysis to work across several industry relevant projects and for the development of future group research strategy. MAS has a large intra-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 several projects by managing a growing research team while conducting their own investigations. As a senior research fellow, the successful applicant will also have an opportunity to work with the management team and direct future group research strategy. It is expected that the successful application will contribute to the development of several funding applications with a wide range of industrial partners and will be able to demonstrate a high degree of independence by proposing new research themes and approaches. The nature of the position demands a confident and self-starting individual who is looking to develop a wide academic skillset and who is keen to offer their own ideas. Applicants who are skilled and knowledgeable in the areas of stress analysis (including the Finite Element Method), material characterisation (particularly flow stress determination and modelling), mechanical testing methods (particularly under extreme conditions), and/or the use of machine learning for solid mechanics/stress analysis problems are encouraged to apply. The job description presented here is deliberately broad due to the advanced level of the position, however it may help applicants to note several existing projects in the group and consider how they may contribute. The following are active areas of research in MAS for solid mechanics:

- The analysis of friction welding machines and the friction welding process. A major industrial project focuses on the determination of key process variables in production linear and inertia friction welds. Work here includes the characterization of production machines using additional instrumentation, the simulation of the process using several numerical methods, and the development of structural health models.
- The mechanical testing of materials using standard and non-standard test piece geometries for the development of material constitutive models, and the mechanical testing of component representative specimens for the generation of model validation data using full field visualization methods.
- Manufacturing process simulation, particularly for welding and additive manufacturing technologies.
- Failure and degradation process simulation for transmission components and materials, notably wear, fretting, and thermo-mechanical fatigue. Experimental studies to support these modelling activities are also of great interest to the group.
- Multiscale stress analysis and simulation of industry representative structures.

	Main responsibilities (Primary accountabilities and responsibilities expected to fulfil the role)	% time per year
1	Research Activities <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. ▪ Coordinate, in collaboration with academic staff and researchers, experimental and analytical activities across a variety of solid mechanics relevant projects. ▪ Collaborate with academic staff to develop group level solid mechanics strategy and explore funding opportunities. ▪ Resolve problems for self and other researchers on the project to meet research objective and deadlines, escalating any issues effectively to senior colleagues. 	60%
2	Stakeholder Liaison <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	Reporting <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	Group Collaboration <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 present complex data to a wide audience to provide a clear analysis and outcomes. • Technical report/journal paper writing for a specialist audience. • Identify opportunities for research development and, working with academic staff, contribute to the creation of funding applications. 	<ul style="list-style-type: none"> ▪ Project management skills ▪ Good documentation practice for all work, especially relating to computer coding. ▪ 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.
Knowledge and experience	<ul style="list-style-type: none"> ▪ Good understanding of several elements of solid mechanics and how these can be utilised across a range of applications. ▪ Ability to use programming software (particularly Matlab and Python languages) and manage large data sets for the modelling and analysis of engineering systems and components. ▪ Experience in the design of experimental and/or numerical studies for solid mechanics relevant problems. ▪ Demonstrable experience in uncertainty estimation and error quantification. ▪ Experience of having developed research strategies and/or funding applications. ▪ Experience of having managed large research projects involving multiple academic and industrial partners. ▪ Experience in having developed and/or adhered to strict safety systems. ▪ Experience in the management and reporting of engineering research projects. 	<ul style="list-style-type: none"> • Ability to manage a team of researchers/engineers working on a technical project and contributing to the timely delivery of project outputs.

Qualifications, certification and training (relevant to role)	<ul style="list-style-type: none"> ▪ Degree in a subject relevant to mechanical engineering ▪ PhD in relevant subject or significant industrial experience directly related to mechanical engineering or mathematical modelling of engineering relevant systems. 	
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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



