



Job title	Research Associate/Fellow in Laser Beam Welding Analysis and Characterisation	Job family and level	Research & Teaching Level 4 (Appointment will be Level 4 Career Training Grade where an appointment is made before PhD has been completed)
School/ Department	Faculty of Engineering, G2TRC	Location	Jubilee Campus

Purpose of role

The Mechanical and Aerospace Systems (MAS) group welcomes applications for a researcher to work on an industry supported collaborative project focussing on laser beam welding – a crucial technology for the development of more efficient future propulsion systems. Laser beam welding produces narrow welds with a small heat affected zone, at high rates. The highly repeatable process, offering low distortion, will be used in the short term to reduce cost associated with non-conformance. In the longer term, it is recognised that the stringent new emissions targets set by ICAO will necessitate further increases in engine temperatures, meaning higher performance, more efficient cooling systems requiring multiple laser welds will be needed.

The successful candidate will contribute to the development of this understanding by working closely with industry and academia to develop an industry relevant modelling capability of the welding process including the effects of variation in supply of material. This model will also involve some quantitative prediction of the evolution of microstructure for widely used titanium alloys (such as Ti-6Al-4V) to enable a link to weld quality to be developed.

The successful applicant will work across a diverse set of research areas as part of an established team comprising experts in materials science, mechanical engineering and laser technology. Through collaboration with researchers at Nottingham and at the 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>Contribute to the development of process models which simulate the dynamic characteristics of the laser welding process.</p> <ul style="list-style-type: none"> ▪ The successful applicant will be required to contribute to the development of an industrially relevant thermo-mechanical modelling capability for laser welding. ▪ They will also be required to incorporate a microstructure model for titanium alloys which will be incorporated into the weld model. ▪ They will be required to develop a model of the cooling solution used in industrial application and incorporate this into the model. ▪ They will also be required to support the development and undertaking of weld trials to enable the weld model to be validated. 	75%

2	<p>Stakeholders Liaison</p> <ul style="list-style-type: none"> ▪ The role holder will have to make regular reports to industrial and academic partners. ▪ They will be responsible for monitoring and communicating project milestones/deliverables. ▪ They will also be expected to explain their work to co-workers within the MAS group and occasionally to parties from close collaborators in research groups in other Universities. 	10%
3	<p>Documentation and Reporting</p> <ul style="list-style-type: none"> ▪ The role holder will be responsible for ensuring that their work is thoroughly documented such that other researchers can advance this work either simultaneously or subsequently. This applies to any computer programming done as well as design calculations and development of research papers. ▪ They will attend meetings with colleagues and stakeholders, both within the university and with industrial partners. ▪ They will be required to produce written reports on their work. The individual will need to make these reports professionally written in English and easy to read without extra support. 	10%
4	<p>Other</p> <ul style="list-style-type: none"> ▪ Researchers within the MAS group are expected to contribute to internal seminar and training activities, by attending and where appropriate presenting. ▪ The role holder will be asked to ensure that they undertake regular continued professional development. ▪ Any other duties as appropriate to this post as requested by the line manager. 	5%

Person specification

	Essential	Desirable
Skills	<ul style="list-style-type: none"> ▪ Ability to work independently and within a team and to proactively manage workload whilst highlighting issues and giving potential solutions. ▪ Ability to present complex data using different methods (written, oral, etc.) clearly to a wide audience to show analysis and outcomes. ▪ Experience in technical report writing and presentation skills for a specialist audience, and able to collaborate productively and professionally with others. ▪ Ability to attend and present at industrial partner meetings with a minimum of supervision. 	<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"> ▪ A good understanding of fusion welding processes. ▪ Ability to use programming software (e.g Matlab or Python) for both data-processing and the modelling and analysis of engineering systems and components. ▪ Experience in solving engineering numerical problems using finite element analysis or other appropriate computational methods. ▪ Experience in the metallurgy of titanium alloys and its microscopy characterisation and its effect on and their mechanical properties. ▪ Experience in modelling of titanium microstructures. 	<ul style="list-style-type: none"> ▪ Experience in having developed and/or adhered to strict safety systems. ▪ Experience with the use of finite element analysis, computational fluid dynamics or other numerical approach to model welding processes. ▪ Experience in modelling of the evolution of titanium microstructures in extreme environments (e.g. high temperature). ▪ A good understanding laser technology and/or laser beam welding processes including experience in programming laser paths.
Qualifications, certification and training (relevant to role)	<ul style="list-style-type: none"> ▪ An honours degree in Materials or Mechanical Engineering or similar. ▪ Holds (or studying towards) a PhD in Mechanical Engineering or a related discipline, ideally in a field closely related to welding or modelling of material microstructures. 	
Statutory, legal or special requirements	<ul style="list-style-type: none"> ▪ Satisfactory basic disclosure obtained from the Disclosure and Barring Service. 	



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

