

Senior Research Associate in Systems Engineering Design with Integrated Smart Component Digital Twin Models

Job Ref: REQ240120

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

The Wolfson School of Mechanical, Electrical and Manufacturing is one of the leading Engineering Schools in the country. With a strong tradition in Manufacturing and in the discovery and application of Materials for applications in a broad range of industrial sectors (e.g. electronics, bioengineering & healthcare, automotive, food industry, etc), we strive for academic excellence and research at the leading edge.

Project Description

Next Wing is a £20m multi-institutional InnovateUK Programme, co-funded by Airbus and a consortium of Industrial Collaborators. The project will involve development of new Model Based Systems Engineering (MBSE) approaches to support digital engineering and manufacturing techniques for next generation commercial aircraft wings. Research will develop new MBSE approached with co-simulation of models of Smart Component models - Smart components in this context are parametrically scalable to adapt to changing requirements to rapidly research optimum design solutions across the aerospace design and manufacture. The goal is to use the World's 'best in class' systems engineering tools to create an interactive collaborative design space environment that facilitates tradespace analysis.

Job Description

Job Grade: Specialist and Supporting Academic Grade 7

Job Purpose

To conduct research in next generation MBSE to assist designers perform difficult tradespace analysis of different design configurations associated with complicated large scale manufactured components. The collaborative design environment will support co-simulation based around Dassault's Catia Magic Cyber Systems Engineer, Model Analyst in conjunction with Matlab and Python. To develop new scientific understanding on the application of next generation advanced assistive visualization systems for factory deployment. To generate high quality scientific reports and papers suitable for publication in International Journals. To work as part of a multidisciplinary team across several institutions and companies. To generate high quality scientific reports and papers suitable for publication in International Journals. To work as part of a multidisciplinary team across several institutions and companies.

Job Duties

Research

- To research into requirements capture for new model based systems engineering in support of smart components as applied to complex manufacturing processes for the manufacture of large components, such as commercial aircraft wings
- To conduct research of academic rigour and scientific standard, carry out authoritative literature reviews, and publish in top quality journals, consistent with the quality and ambition of the School.
- To apply experience in the representation of model based systems engineering using SysML
- To explore different co-simulation architectures in conjunction with high fidelity models running alongside surrogate (simple models) associated with smart components
- To develop and implement usability evaluation of AR techniques for the interrogation of these models

- To lead in the use case analysis analysis underpinning the use of a collaborative design space for trade studies
- To lead in the design of the underpinning MBSE information architecture comprising different model artefacts
- To lead the identification of future work and generation of new funding proposals to support continuation of research and implementation of research results and findings.
- To liaise with academic and industrial project partners and manage and plan activities across the project team.

General, technical

- To supervise undergraduate, MSc and PhD students project work and day-to-day supervision and support of other researchers.
- Write up regular progress reports and present outcomes to all Investigators and Collaborators (incl. those located at other Institutions), making recommendations for next steps.
- To support the project team by enhancing relationships with existing collaborators and by assisting the establishment of relationships with new collaborators.
- Travel to external partners and collaborators to undertake experimental trials, attend meetings and make presentations, when required.
- To attend and contribute to conferences.
- To contribute to project promotion and public engagement events.
- Contribute ideas for new research and enterprise directions.
- To be responsible for the day-to-day running and maintenance of the specific resources required in this role.

General, Administrative

- Maintain confidentiality (especially commercially sensitive information/data) at all times and ensure that intellectual property (IPR) agreements are not violated.
- To work as part of a multi-disciplinary, multi-location team that addresses different aspects of the design, manufacturing, test/validation cycle.
- To work effectively with relevant administrative, technical and academic staff in the School and across the University.
- To engage in training programmes in the University (e.g. through Staff Development) which are consistent with the RA's ongoing professional development, and the needs and aspirations of the project team and those of the School.
- Engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project and those of the Department.
- Undertake other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.

Points To Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed. Training will be provided as necessary and in support of the Researchers' professional development, and an attitude for learning will be an essential criterion in the selection of a successful candidate.

Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Respecting Diversity and, where appropriate, Recruitment and Selection.

Organisational Responsibility

Reports to the Project Investigator, Professor Roy S. Kalawsky

Person Specification

Your application will be reviewed with respect to meeting the essential and desirable criteria listed below.

Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application. It is highly recommended that the candidates express in their Cover Letter how they fit to the Job Purpose and Job Duties described above. Stages of assessment are as follows:

- 1 – Application
- 2 – Test/Assessment Centre/Presentation
- 3 – Interview

Essential Criteria

	Criteria	Stage
Experience	Significant relevant experience within a high-quality research or development environment	1, 3
	Authoring original work for academic journal papers, conference papers or technical reports	1
	Using own initiative to identify areas for research, developing new research methods and extending the research portfolio	1, 3
	Competence in modern computing language eg Python, Matlab or SysML tools - (Not novice level)	1, 3
	Track record of publishing research papers for publication in peer-reviewed journals	1
Skills and abilities	Ability to work independently and also as part of a team, interacting with different academic and industrial partners	1,3
	Ability to organise resources to support and further own and the team's research activities within the scope of their work	1, 3
	Ability to plan own workload and the work of others in the team in accordance with the overall project objectives and work, both independently and managing a team, to meet deadlines	3
	Ability to write project reports and make technical presentations to industrial and academic research groups	1, 3
	Excellent written and oral communication skills in English	1, 2, 3
	Self-motivated, attention to detail and a flair for meeting the project(s) objectives and deadlines	1, 3
	Excellent interpersonal and organisational skills	1, 3
	Ability to mentor and supervise others	1, 3
	Skills in finding information in the scientific literature and proposing original ideas	1,3
	Knowledge of relevant Health & Safety issues	1, 3
Training	Evidence of having undertaken further training and a willingness to be trained if necessary to fulfil the requirements of the job	1, 3
Qualifications	At least a 2:1 Bachelors or Master's level Degree PhD in Mathematics, Physics, Engineering, Computer Science or related discipline	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	3
	Commitment to maintain confidentiality, where relevant, at all times	1,3

Desirable Criteria

Area	Criteria	Stage
Experience	Involvement in, or having worked across different projects, demonstrating an ability to manage own time and competing priorities	1, 3
	Experience in undertaking systems engineering	1, 3
	Experience of using MBSE tools	1, 3
	Knowledge of modelling and simulation	1, 3
	Previous experience of prototype system validation and performance analysis	1, 3
	Experience of modelling techniques that could inform the direction of experimental activity	1, 3
	Current or recent relevant work experience at post-doctoral level in an academic or industrial environment	1, 3
	Writing research proposals for funding (of any kind, e.g., travel grants, access to research facilities, etc) from internal/external sources.	1, 3
	Validation and verification of products and processes involving human participants	1, 3
	Development of digital representations for novel manufacturing techniques.	1, 3
	Experience of teaching and / or supervision of students in relevant areas	1, 3
	Dealing with problems which may affect the achievement of research objectives and deadlines	3
	A strong publication track record	1
Skills and abilities	Understanding of systems engineering methodologies as a framework to inform product and system development	1, 3
	Knowledge of aerospace engineering/manufacturing	1,3
	A self-starter who can operate effectively with minimal supervision	3
Other	Travel / Able to travel Independently / Willing to work flexibly	1, 3

Conditions of Service

The position is FULL TIME and FIXED TERM until 31 March 2026. The role is also suitable to REMOTE-WORKING or part time patterns by prior agreement. Salary will be on Specialist and Supporting Academic Grade 7 (£45,585-46,974 per annum) at a starting salary to be confirmed on offer of appointment.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Academic and Related staff/Operational and Administrative staff, details of which can be found [here](#).

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which are available at <http://www.lboro.ac.uk/services/hr/a-z/family-leave-policy-and-procedure---page.html>.

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: <http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html>)

In addition, the University is supportive, wherever possible, of flexible working arrangements.

We also strive to create a culture that supports equality and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see <http://www.lboro.ac.uk/services/hr/athena-swan/>