Wolfson School of Mechanical, Electrical and Manufacturing Engineering

Loughborough University

Research Associate – Aircraft Vibration Energy Harvesting

Part-time, Fixed term until 31 January 2026

REQ250346

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

School/Department summary

A part-time Research Associate is required to undertake research on designing vibration energy harvester for aircrafts. The project is funded by the EU (project title AVATAR, https://www.avatar-project.eu/).

An important requirement in aircrafts is the collection of data from various locations of the structure using a variety of sensors. The necessity to power these sensors without using batteries or extensive harnessing through the aircraft structure (to avoid replacing batteries and to reduce weight) leads to the development of solutions that harvest energy from the motion and oscillations present at the aircraft components in order to power the sensors, the data postprocessing and their transfer. The above landscape requires various interrelated disciplines to be considered under the same framework (electromagnetics and/or piezoelectric energy harvesting transduction mechanisms, component flexibility, transient dynamics, mechanical vibrations, and electronics).

The proposed research aims to design vibration energy harvesters appropriate for more than one aircraft locations, which will be manufactured and tested in the laboratory and in an aircraft demonstrator.

The Research Associate will join the vibrant Dynamics Research Group (https://www.lboro.ac.uk/departments/meme/research/research-groups/dynamics-and-tribology/) at the Wolfson School of Mechanical, Electrical and Manufacturing Engineering, Loughborough University, and also collaborate closely with the project academic and industry partners.

The research outcomes will serve as a driving force to boost the development of vibration energy harvesters for aircrafts and aerospace applications in general.

Job Description

Job Grade: Research Grade 6

Job Purpose

To design vibration energy harvesters appropriate for more than one aircraft locations, which will be manufactured and tested in the laboratory and in an aircraft demonstrator.

Job Duties

- Carry out vibration energy harvesting design studies for aircrafts as required by the project supervisors (Dr Jingjing Jiang, Prof. S. Theodossiades and Prof. A. West) including:
  - Develop a model of vibration energy harvester for aircrafts, and selecting appropriate transduction mechanism(s).
  - Design the vibration energy harvester based on the model results and available experimental measurements from an aircraft demonstrator.
  - Build the vibration energy harvester prototype.

    - Test the above harvester prototype in the laboratory to validate the model work.
    - Prepare the vibration energy harvester prototype for testing in an aircraft.
- Keep accurate records of work, other research work and meetings (in written and/or electronic format).
- Search for and study research publications related to the research topics.
- Analyse modelling and experimental results and prepare reports.
- Present the results of the research at project meetings, seminars and International Conferences.
- Publish the research findings in International Journals.
- Maintain confidentiality of results and other confidential information until authorised to disclose them.
- Comply with University Health and Safety Policy.
- Comply with all University Rules and Regulations.
- Engage in training programmes in the University (e.g. through Staff Development) which are consistent with the needs and aspirations of the post holder and those of the project team and the host department.
- Carry out specific other duties as may be reasonably requested by the project leader 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.

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.

All staff should hold a duty and commitment to observing the University's Equity & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equity & Diversity legislation and University policies/procedures.

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

Organisational Responsibility

Reports to the project PI (Dr Jingjing Jiang).

Person Specification

Your application will be reviewed against 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. Stages of assessment are as follows:

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

Essential Criteria

Area	Criteria	Stage
Experience	Recent experience in an academic or Industrial environment	1, 2, 3
	Experience of vibration energy harvesting modelling, design, and testing	1, 2, 3
	Experience of dynamics experimental measurements and rig setup	1, 2, 3
	Publications record on vibration energy harvesting	1, 2, 3
Skills and abilities	Ability to work accurately and precisely and to record information gathered	1, 3
	Self-motivated and able to work without close supervision	1, 3
	Ability to work to deadlines	1, 3
	Good report writing and presentation skills	1, 2, 3
	Ability to work independently and as part of a team	1, 3
	Ability to maintain confidentiality at all times	1, 3
Training	A willingness to undertake further training as appropriate and to adopt new procedures as and when required	3
Qualifications	Mechanical or Electrical Engineering Degree	1
Other	Evidence a good working knowledge of equal opportunities and understanding of diversity in the workplace	1, 3

Desirable Criteria

Area	Criteria	Stage
Experience	Electromagnetic and/or piezoelectric modelling for energy harvesting	1, 2, 3
	Transient dynamics modelling for energy harvesting	1, 2, 3
	Vibration energy harvesting experimental measurements	1, 2, 3
Skills and abilities	Knowledge of relevant Health & Safety issues	1, 3
	Ability to collaborate with industrial partners	1, 3
Qualifications	PhD (or near completion) in vibration energy harvesting	1

Conditions of Service

The position is PART TIME and FIXED TERM until 31 January 2026. Salary will be on Specialist and Supporting Academic Research AND GRADE 6, SALARY BAND (£35,166 - £45,413) 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 Equity 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/