

Job Title:	Research Assistant / Associate in Structural Health Monitoring and Digital Twinning of Advanced Composite Structures
Department/Division/Faculty:	Department of Aeronautics, Faculty of Engineering
Campus location:	South Kensington Campus
Job Family/Level:	Research Job Family, Research Assistant or Research Associate* (Research salary scale)
Responsible to:	Professor Zahra Sharif Khodaei
Key Working Relationships (internal):	Professor Aliabadi
Contract type:	Full time, fixed term until 31 December 2024

Purpose of the Post

The post is funded by UKRI as part of a H2020 project AVATAR. The project will investigate and develop Digital Twin for Transformative Air Vehicle with IoT sensors. The successful candidate will be developing advanced computational models (to model the integrity of aircraft structures) which will be used in combination with multi-sensors data (from in-service) to predict the current state of the structure and estimate the future service life of the structure based on hybrid methods (physics based and data-driven models). The methodologies will be verified and validated with down-scaled prototypes in laboratory environment.

Key Responsibilities

Main Duties:

- To develop methodologies and technologies for structural health monitoring and digital twinning of complex structures based on multi-sensor data
- To develop advanced computational tools for fracture and damage behaviour of metallic and composite structure under in service load and environmental condition
- To test the applicability of the developed methodologies under operational conditions
- To assist with the analysis of data
- To ensure the validity and reliability of data at all times
- To maintain accurate and complete records of all findings
- To assist with the writing of reports to research sponsors
- To present findings to colleagues
- To provide advice to other staff and students
- To assist with the publication of findings
- To attend relevant workshops and conferences as necessary
- To develop contacts within the College and the wider community
- To promote the reputation of the Group, the Department and the College

In addition, at Research Associate level:

- Take initiatives in the planning of research
- Direct the work of small research teams

- Write reports for submission to research sponsors
- Submit publications to refereed journals
- Provide guidance to staff and students (including PhD)
- Contribute to bids for research grants
- Conduct and plan own scientific work with appropriate supervision.
- Maintain highly organised and accurate record of experimental Work.
- Actively participate in the research programme of the Group
- Publish in high quality journals and to present data at national and international meetings.
- Participate in Group research meetings and internal seminars.
- Collaborate with other allied scientists within Imperial College and elsewhere in London and abroad, as appropriate.
- Contribute to the smooth running of the Group's laboratories and, facilities with other scientists, clinicians, technicians and students within the laboratories.
- Assist in the supervision of undergraduate and postgraduate research students and research assistants as required.

Where Imperial or funder conditions necessitate, you will be required to complete timesheets for your work on projects in a timely manner.

Other Duties

- Undertake any necessary training and/or development
- Undertake appropriate administration tasks
- Attend relevant meetings

Person Specification

Requirements	Essential (E)/ Desirable (D)
Candidates/post holders will be expected to demonstrate the following:	
Education	
Research Associate: Hold a PhD in in Engineering (Aeronautics, Mechanical, Electrical) or a closely related discipline, or equivalent research, industrial or commercial experience <i>*Candidates who have not yet been officially awarded their PhD will be appointed as Research Assistant until the completion of their degree.</i>	E
Research Assistant: Near completion of a PhD in Aeronautics, Mechanical or Electrical or a closely related discipline	
Experience	
Practical experience within a research environment and publication in relevant and refereed journals	E
Experience of dealing with sponsors	D
Linear and non-linear analysis of metallic and composite Materials	E
Advanced computational methods such as finite element methods	E
Practical experience in a broad range of techniques including:	E

<ul style="list-style-type: none"> Mechanical testing of composite coupons (fatigue test, shear test, compression test, impact test, mechanical characterisation) Instrumentation and signal processing (e.g. strain sensors) Coding and data acquisition through Labview 	
Knowledge	
Knowledge of: <ul style="list-style-type: none"> Programming such as with Matlab, Python, C++, Fortran or equivalent Composite materials and structural analysis Fracture mechanics, fatigue analysis Damage mechanics (damage initiation and evolution composites) Digital twinning through advance analytics (data-driven methods, machine learning) Statistical analysis, reliability analysis, Bayesian analysis. 	E
Knowledge of research methods and statistical procedures	E
Skills & Abilities	
Ability to conduct a detailed review of recent literature	E
Ability to develop and apply new concepts	E
Creative approach to problem-solving	E
Excellent verbal communication skills and the ability to deal with a wide range of people	E
Excellent written communication skills and the ability to write clearly and succinctly for publication	E
Ability to organise own work with minimal supervision	E
Ability to prioritise own work in response to deadlines	E
Advanced computer skills, including word-processing, spreadsheets and the Internet	E
Ability to direct the work of a small research team and motivate others to produce a high standard of work	E (Associate)
Other	
Willingness to work as part of a team and to be open-minded and cooperative	E
Flexible attitude towards work	E
Discipline and regard for confidentiality and security at all times	E
Willingness to undertake any necessary training for the role	E
Willingness to travel both within the United Kingdom and abroad to conduct research and attend conferences	E
Willingness to work out of normal working hours (including weekends) if the requirements of the project demand	E

Further Information

Please note that job descriptions cannot be exhaustive, and the post-holder may be required to undertake other duties, which are broadly in line with the above key responsibilities.

Imperial College is committed to equality of opportunity and to eliminating discrimination. All employees are expected to follow the [Imperial Values & Behaviours framework](#). Our values are:

- Respect
- Collaboration
- Excellence
- Integrity
- Innovation

Employees are also required to comply with all College policies and regulations paying special attention to: Confidentiality, Conflict of Interest, Data Protection, Equal Opportunities, Financial Regulations, Health and Safety, Information Technology, Smoking, Private Engagements and Register of Interests. They must also undertake specific training and assume responsibility for safety relevant to specific roles, as set out on the [College Website Health and Safety Structure and Responsibilities](#) page.

The College is a proud signatory to the San-Francisco Declaration on Research Assessment (DORA), which means that in hiring and promotion decisions, we evaluate applicants on the quality of their work, not the journal impact factor where it is published. For more information, see <https://www.imperial.ac.uk/research-and-innovation/about-imperial-research/research-evaluation/>

The College believes that the use of animals in research is vital to improve human and animal health and welfare. Animals may only be used in research programmes which are ultimately aimed towards finding new treatments and making scientific and medical advances, and where there are no satisfactory or reasonably practical alternatives to their use. Imperial is committed to ensuring that, in cases where this research is deemed essential, all animals in the College's care are treated with full respect, and that all staff involved with this work show due consideration at every level. [Find out more about animal research at Imperial.](#)

We are committed to equality of opportunity, to eliminating discrimination and to creating an inclusive working environment for all. We therefore encourage candidates to apply irrespective of age, disability, marriage or civil partnership status, pregnancy or maternity, race, religion and belief, gender identity, sex, or sexual orientation. We are an [Athena SWAN Silver Award](#) winner, a [Disability Confident Leader](#) and a [Stonewall Diversity Champion](#).

January 2023