

Job Description

Job Title:	Research Assistant - SPOTBlade Project Wind Turbine Erosion and Repair	Vacancy:	35945
Department:	Aerospace and Mechanical Engineering	Location:	Carlow Campus
Funding:	Funded by SEAI	Duration:	6 months (up to Sept 2025)
Reporting to:	Principal Investigator	Date of Issue:	February 2025

Overall role and context:

SPOTBlade (Strategies for erosion and fouling Protection of Offshore Turbine Blades) project is funded by the Sustainable Energy Authority of Ireland under the SEAI Research, Development & Demonstration Funding Programme 2021.

Lowering maintenance costs and increasing operational efficiency are primary challenges for the wind industry. A major cause of damage to wind turbine blades is erosion by repeated impacts of water droplets (IEA Wind Task 46). Such damage results in a loss of energy generation, caused by changes to the aerodynamic profile of the blade's leading edge. It has been estimated that the loss in annual energy production is between ~5% (small amounts of erosion) and ~25% (moderate-to-heavy erosion). Additionally, operators incur maintenance costs and loss of productivity during repair shutdowns. Proprietary leading-edge protection (LEP) tapes and coatings have been developed in recent years. However, replacing these tapes or repairing LEP coatings is problematic, and operators seek alternatives. Blade manufacturers are also pursuing more durable permanent solutions. The damage mechanism is a complex process, involving time-dependent interactions between the impinging water droplet, the surface topography and the blade material properties. In the SPOTBlade project, state-of-the-art test facilities will be employed to study the mechanisms responsible for damage initiation and erosion propagation. LEP systems (commercially available and several under development) and repair schemes will be evaluated using two rain erosion testing approaches. A related problem concerns biofouling and contamination of blades – commercially-available coating systems will be modified and experimentally evaluated. Material characterisations will be undertaken to generate new data for damage modelling and to correlate to rain erosion tests. In parallel, modelling, using a novel hybrid approach, of the impact of climatic parameters and material coatings on blade erosion will be undertaken.

A Research Assistant is required to plan and execute the blade repair experiments, testing for various repair systems applied in simulated offshore conditions and complete testing in the DIEM (Droplet Impact Erosion Mill). Additional tasks will include material characterisation testing and numerical modelling. The Research Assistant will complete a number of research activities involving both experimental and numerical studies which will be conducted at SETU.

The purpose of this role is to conduct a specified programme of research under the supervision of a Principal Investigator. The work will be performed in accordance with the university's research integrity policy and all other relevant policies.

There will be dual goals in terms of the research project and career development. The training and development relevant to this position will be completed within the period of the contract in which time the successful candidate will continue to develop skills and competencies with respect to the role and their future career options.

Principal duties and responsibilities:		
<p>The primary focus of the Research Assistant will be to conduct a specified programme of research under the supervision and direction of a Post-Doctoral Researcher and a Principal Investigator including:</p> <ul style="list-style-type: none"> • Apply research expertise to challenges in the areas wind turbine leading erosion mechanisms and repair techniques. • Plan and execute the blade repair experiments, testing for various repair system applied in simulated offshore conditions and complete testing in the DIEM (Droplet Impact Erosion Mill). Additional tasks will include material characterisation testing and numerical modelling. • Operate a broad range of engineering R&D measurement & test equipment and computer software/systems to collect, record and synthesise data • Engage in appropriate training and professional development opportunities as required by the Principal Investigators, Faculty or Departments in order to develop research skills and competencies • Carry out additional duties and responsibilities associated with the role that may arise from time to time 		
Person specification – Qualifications, Knowledge, Experience & Skills:	Essential	Desirable
<p>Qualifications</p> <ul style="list-style-type: none"> • A Level 8 Honours degree in Mechanical, Aerospace or Materials Engineering or a related technical/scientific discipline. • A Level 9 qualification in in Mechanical, Aerospace or Materials Engineering or a related technical/scientific discipline. <p>Knowledge</p> <ul style="list-style-type: none"> • An understanding of rain erosion of materials or related discipline. • Familiarity with numerical modelling techniques. • Capability in the operation of R&D test and analysis technologies. • Knowledge in the use of statistical analysis including software and processes to evaluate data. <p>Experience</p> <ul style="list-style-type: none"> • Experience in an industry or academic R&D lab environment. • Ability to write technical reports based on finding from experimental analysis. • Knowledge and understanding of the policy, practices and procedures that are relevant to the role including Research Ethics & Integrity. • Liaising successfully with industrial and non-academic partners. <p>Skills</p> <ul style="list-style-type: none"> • Excellent interpersonal, communication, organisational and analytical skills. 	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
Hours of Work:	The appointee will be required to work 35 hours per week together with such additional hours as may be required from time to time for the proper discharge of their duties.	
Salary:	IUA Research Assistant Salary Scale €31,962 - €41,943	
Annual Leave:	Annual Leave will be in accordance with arrangements authorised by the Minister for Further and Higher Education, Research, Innovation and Science from time to time.	