

Postgraduate Scholarship Information Sheet (Advert)

Scholarship Project Title	<i>Aeroelastic Fatigue Load Analysis of Large Offshore Wind Turbine Blades with Leading Edge Erosion</i>
Advert Reference number	CW_2023_18_WSCH_2
Supervisor(s)	<i>Dr Pedram Khaneh Masjedi (SETU, Carlow)</i> <i>Dr Edmond Tobin (SETU, Carlow)</i> <i>Dr Sinéad O'Halloran (SETU, Waterford)</i> <i>Dr Philip Cardiff (UCD)</i>
Research Group	<i>EngCORE</i> <i>Convergent Technologies Research Group (CTRG)</i>
Department /School/Faculty	<i>Department of Aerospace and Mechanical Engineering, Faculty of Engineering</i>
Duration	48 Months
Status: Full-time / part-time	Full Time
Funding information	SETU PhD Scholarship Programme 2023
Value of the scholarship per year	Stipend: €18,500 Fees, up to a maximum of €5,750 Research costs- €2,000
Closing date and time	Wednesday 18th October 2023@ 4PM Irish Time.
Interview date	<i>TBC</i>
PhD commencement date	January 2023

Project Key Words: (enter 3 to help advertise on online platforms) *Aeroelasticity, Fluid Structure Interaction, Wind Turbine Blades*

Post summary

The harsh marine environment, and the recent trend in employing larger wind turbines, make offshore wind turbines prone to structural damage, particularly blade leading-edge erosion under the impact of rain, hail, and small air-borne debris. Leading-edge erosion can significantly change the blade's unsteady aerodynamic characteristics and aeroelastic fatigue loads. This PhD project offers an exciting opportunity to address these challenges by developing a cutting-edge numerical framework. The aim is to investigate the aeroelastic fatigue loads experienced by large offshore wind turbine blades with leading-edge erosion. To achieve this, this project will develop a novel coupled aero-hydro-elastic simulation tool, integrating the advanced capabilities of the OpenFOAM toolbox and OpenFAST software. By employing this state-of-the-art simulation approach, the PhD researcher will have the opportunity to gain invaluable knowledge in the complex interaction between aerodynamics, hydrodynamics, and structural dynamics in offshore wind turbines.

This PhD project is a 4-year full time structured PhD funded by the SETU PhD Scholarship Programme. The project will be based in the Faculty of Engineering, Kilkenny Road Campus, Carlow. Successful PhD candidate will work under the supervision of a team of accomplished researchers, gaining valuable expertise in aeroelasticity, computational fluid dynamics and wind energy engineering.

Person specification

We are seeking a strong, self-motivated, and enthusiastic candidate with a background in aerospace and mechanical engineering or a closely related field and prior experience in computational modelling of Fluid-Structure-Interaction (FSI) problems and/or aeroelasticity. A solid understanding of computational methods in fluid and structural dynamics and proficiency in programming and manipulating these methods using languages such as Python, Julia, MATLAB, Fortran, or C/C++ are highly desirable. Demonstrated ability to conduct independent research and contribute to scientific knowledge in relevant fields and a track record of publishing research findings in peer-reviewed journals would be advantageous. In addition, the ideal candidates should possess exceptional interpersonal skills, demonstrating a strong ability to collaborate effectively within a multidisciplinary research team.

Qualifications

Essential

- Honours Degree (minimum 2:1) in Aeronautical/Aerospace Engineering, Mechanical Engineering or closely related fields.

Desirable

- Research Masters Degree (MSc or MEng, minimum 2:1) in Aeronautical/Aerospace Engineering, Mechanical Engineering or closely related fields.

Knowledge & Experience

Essential

- Good knowledge in fluid dynamics and vibration fundamentals.
- Knowledge and experience in programming languages commonly used in engineering computing (e.g., Python, Julia, MATLAB, Fortran, or C/C++)

Desirable

- In-depth knowledge of computational methods in fluid dynamics (CFD) and structural dynamics (CSD), aeroelasticity and/or fluid-structure-interaction (FSI) problems
- Prior experience in utilizing OpenFOAM toolbox and OpenFAST for aeroelastic simulations is highly desirable
- A track record of publishing in peer-reviewed journals

Skills & Competencies

Essential

- Applicants whose first language is not English must demonstrate on application that they meet SETU's English language requirements and provide all necessary documentation. See Page 7 of the [Code of Practice](#)
- In order to be **shortlisted for interview**, you must meet the SETU English speaking requirements so please provide evidence in your application.
- Excellent problem-solving skills and the ability to think critically to propose innovative solutions.

Desirable

- Excellent interpersonal and teamwork skills
- The ability to communicate research concepts and outcomes clearly and concisely, both verbally and in writing

Further information

For any informal queries, please contact Dr Pedram Khaneh Masjedi on email Pedram.Masjedi@setu.ie

For queries relating to the application and admission process, please contact the Postgraduate Admissions Office researchadmissions@setu.ie or telephone +353 (0)51 302883.

For queries relating to the funding programme, please email scholarships2023@setu.ie

University Website <https://www.setu.ie/>

Application procedure

Download the [Research Postgraduate Application Form from here](#) and return the completed application to researchadmissions@setu.ie quoting **advert reference code from the above table** in the email subject line.

Please note that paper submissions will not be accepted.

The University may decide to interview only those applicants who appear from the information they provided, to be the most suitable in terms of experience, qualifications and other requirements of the post.

The University will short-list and interview those applicants who provide the most suitable information in terms of experience, qualifications and other requirements relevant to the post.

SOUTH EAST TECHNOLOGICAL UNIVERSITY (SETU) IS AN EQUAL OPPORTUNITIES EMPLOYER



HR EXCELLENCE IN RESEARCH