

## Postgraduate Scholarship Information Sheet (Advert)

<b>Scholarship Project Title</b>	<i>Characterisation of fretting wear and fatigue in helically wound cables used in offshore renewable energy production</i>
<b>Advert Reference number</b>	<b>WD_2023_48_WSCH_2</b>
<b>Supervisor(s)</b>	<i>Dr Sinéad O'Halloran(SETU Waterford) Dr Edmond Tobin(SETU Carlow)</i>
<b>Research Group</b>	Engineering Technology and engCORE
<b>Department /School/Faculty</b>	<i>Engineering Technology, School of Engineering</i>
<b>Duration</b>	4 Years (48 Months)
<b>Status: Full-time / part-time</b>	Full Time
<b>Funding information</b>	SETU PhD Scholarship Programme 2023
<b>Value of the scholarship per year for four years</b>	Stipend: €18,500 Fees, up to a maximum of €5,750 Research costs- €3,000
<b>Closing date and time</b>	<b>17/07/2024 at 4pm Irish Time</b>
<b>Interview date</b>	<i>date in late-July TBC</i>
<b>PhD commencement date</b>	<b>No later than 01/09/2024</b>

**Project Key Words:** *Material failure analysis, Mechanics of materials, Offshore engineering applications*

### Post summary

Applications are invited for a 4-year full time PhD funded by the SETU PhD Scholarship Programme. The project will be based in the Department of Engineering Technology, Waterford Campus and will have strong collaborative links with engCORE, Carlow Campus, SETU.

The project incorporates a society-informed computational-experimental research programme to characterise the fretting wear and fatigue of mooring structures in the context of the Irish coastline.

### Project summary

Offshore structures associated with renewable energy production must be sufficiently designed to withstand the sea-state conditions, which are likely to become more extreme in the future with the increase in sea level and more extreme weather conditions. This project focuses on helically-wound wires in steel rope mooring lines for offshore renewable energy production. Due to the geometry of these contacting wires combined with the sea-induced relative slip between these wires, fretting damage can occur. This surface damage can be either the development of fatigue cracks, resulting in failure of the wire, or wear, resulting in reduced load carrying capacity. The design of these wires is not trivial, owing to the complex contact geometry evolution due to wear. This project will seek to computationally and experimentally characterise the fretting wear and fatigue of helically wound cables, including stochastic loading conditions representative of sea-state conditions. This will be a significant step forward, as traditionally large safety factors are used in the fatigue design of these components due to uncertainties associated with fretting wear and fatigue damage. This project will develop more accurate design tools, increasing the certainty of the fatigue life predictions of these components.

This project aims to develop an experimentally validated computational methodology for the prediction for fretting fatigue life of helically wound wires used for mooring of offshore renewable energy infrastructure.

### Person specification

This is a Structured PhD project, in which training will be provided through modules at the University, other specific training will be provided via internal and external courses and supervision from a diverse supervisory team. This training will be tailored to the successful candidate.

Please outline in your Personal Statement why you are interested in undertaking this research project and programme at SETU, including your interests and experience that make you the ideal candidate for this project.

#### Essential

- Must be available to commence PhD programme on or before 1<sup>st</sup> September 2024, in accordance with funding terms and conditions.

#### Qualifications

##### Essential

- Honours degree (minimum 2:1) in Mechanical Engineering, Civil Engineering, Structural Engineering or equivalent degree in a related field.

##### Desirable

- First class honours degree (1:1) in Mechanical Engineering, Civil Engineering, Structural Engineering or equivalent degree in a related field.

### Knowledge & Experience

#### Essential

- Knowledge of experimental and computational techniques for analysing materials and structures.
- Experience of conducting research, for example as part of an undergraduate or postgraduate course.

#### Desirable

- Experience of using finite element analysis for structural analysis.
- Working knowledge of programming languages used in engineering, such as Python, MatLab and/or C/C++.
- Hands-on experience in the use of experimental equipment and interoperate of results.

### 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.
- Proven problem-solving skills with an ability to show initiative and work independently.
- Excellent communication skills, both verbal and written, including experience of technical writing.
- Good interpersonal skills, including an ability to work as part of a team.

#### Desirable

- An ability to learn and become proficient in the use of new software, computer programmes and laboratory equipment.
- Experience in dissemination of research output to the general public as well as industry.

**Further information**

For any informal queries, please contact Dr Sinéad O'Halloran on email at: [Sinead.OHalloran@setu.ie](mailto:Sinead.OHalloran@setu.ie)

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

For queries relating to the funding programme, please email [scholarships2024@setu.ie](mailto:scholarships2024@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](mailto:researchadmissions@setu.ie) quoting advert reference code **WD\_2023\_48\_WSCH\_2** 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.**

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