

Title: **Enhancing Control and Capacity of Automatic Sub-Surface Geotechnical Investigation**

Type of award **PhD Research Studentship**

Departments **Civil Engineering and Mechanical Engineering
Earthquake and Geotechnical Engineering Research Group**

Scholarship Details **Minimum £17,668 p.a. in 2022/23 (plus an industrial top-up of £3,000 p.a.)
subject to eligibility and award**

Duration **3.5 years**

Eligibility **Home/EU (UK settled status) with permanent UK residency**

Start Date **Sept 2023**

PhD Topic Background/Description

Offshore windfarm developments are typically fast track developments. However, undertaking conventional geotechnical borehole drilling at each proposed wind turbine location is often not viable from an economic and scheduling perspective. Alternatively, the so-called seabed Cone Penetration Test (CPT) technology, whereby an instrumented probe is pushed directly from seabed into ground, is an attractive and often employed solution by the offshore industry. The problem is that conventional seabed CPT equipment has fixed limits to its push capacity, limiting the underground depth and soil type applicability. These limits are further exacerbated by the reduced thrust available for offshore seafloor CPT equipment. It follows that the CPT equipment is invariably pushed to its limits leading to two main operational problems:

- excessive deformation and bending of the equipment, resulting in damage/breaking of the pushing rod system.
- premature termination of the sounding before reaching the desired depth, meaning that a return visit to the location may be required using expensive and time-consuming drilling equipment.

The aim of this PhD project is to optimise and stretch the potential range of applicability of the CPT, in order to improve economic viability of offshore wind developments, by:

- 1) developing new methods to improve the real-time control and detection of the damage limits of CPT systems, through automatised and intelligent software system.
- 2) using the latest advancement in robotics, mechatronic and any other relevant field to define and design innovative mechanical (or other) solutions to increase the depth and soil range which can be investigated through seabed CPT soundings.

The project will combine theoretical and development/experimental work to meet the two main objectives, while being further supported by data from real case studies. The project will be co-supervised by academics

in Geotechnical and Robotic Engineering, as well as being supported by industrial experts from Geoquip Marine.

Candidate Requirements

Applicants must hold/achieve a minimum of a master's degree (or international equivalent) in mechanical or civil engineering discipline. Applicants without a master's qualification may be considered on an exceptional basis, provided they hold a first-class undergraduate degree. Please note, acceptance will also depend on evidence of readiness to pursue a research degree.

If English is not your first language, you need to meet this profile level:

Profile E

Further information about [English language requirements and profile levels](#).

Basic skills and knowledge required

Good knowledge of general mechanics. Applicants are expected to have either mechanical or geotechnical (civil) engineering background or a mixture of the two disciplines with expertise in Data Science/Machine Learning.

Scholarship Details

The scholarship covers tuition fees at home rate, tax free stipend of £20,668 p.a. (includes industrial sponsorship) and a travel/consumables budget for 3.5 years.

For eligibility and residence requirements please check the [UKRI UK Research and Innovation](#) website.

Enquiries

General enquiries, please email came-pgr-admissions@bristol.ac.uk

Informal enquiries, please email Dr Andrea Diambra (Andrea.Diambra@bristol.ac.uk), Dr Tingfa Liu (tingfa.liu@bristol.ac.uk) or Dr Andrew Conn (A.Conn@bristol.ac.uk).

Application Details

Applicants are encouraged to contact the supervision team (noted above) prior to application.

To apply for this studentship, submit a PhD application using our [online application system](#) [www.bristol.ac.uk/pg-howtoapply]

Please ensure that in the Funding section you tick "I would like to be considered for a funding award from the **Civil Engineering** or **Mechanical Engineering** Department" and specify the title of the scholarship in the "other" box below with the names of the supervisors.

Interested candidates should apply as soon as possible.