

(BL97/2021-IST-ID)

Scientific Initiation Studentships

Applications are open for three (3) Scientific Initiation Studentships, within the framework of the R&D project DEEPCOOL (PTDC/ECI-EGC/29083/2017), financed by national funds through FCT/MCTES (PIDDAC), under the following conditions:

Scientific Area: Structural mechanics & structures / Geotechnics / Energy & Environment

Admission Requirements:

- a) *To be enrolled at a professional higher technical course, at a bachelor degree, at an integrated master or master degree, or to have a bachelor degree and be enrolled at a course that does not award an academic degree and it is integrated in the educational project of a higher education institution, performed in association or cooperation with one or several R&D units;*
- b) *not to exceed with this contract, including the possible renovations, an accumulated period of one year in this type of studentship, continuously or with interruptions;*
- c) *not to have held any other fellowship directly or indirectly funded by FCT.*

Workplan: three areas of investigation are available to choose from, the applicants should rank their preferred options in their motivation letter. The topics will be assigned based on the needs of the project, assessment of the candidate's application (CV and motivation letter) and their preferences.

1. ***Small-scale model testing of cyclically axially loaded piles:*** review and create a database of existing cyclic axial load tests on pile foundations, both mechanical and thermal; undertake geotechnical classification and element testing of the test soil; familiarise themselves with DAQ & control software, finalise equipment development, calibration and methodology; undertake static mechanical load tests to confirm pile resistance (as a function of initial soil state); plan and undertake a test program to generate the cyclic stability framework for the model pile-soil system under mechanical loading; execute some preliminary cyclic thermal tests for comparison.
2. ***Numerical analysis of the thermal performance of energy diaphragm walls:*** reviewing SGE applications in general and the use of energy geostructures in particular to gain a broad overview of the technology and its application; reviewing recent publications relating to the performance of energy walls and developing a detailed map of key (geometry, material, boundary conditions, etc.) parametric effects; familiarisation with software and back-analyses a suitable case study; undertake an extensive numerical parametric study to systematically examine the effect of key parameters from within mapped group (and outside), on the heat exchange performance of energy walls; analyse the results from the thermal analyses (data mining / regression analysis) and propose functions that link key geometrical and thermal parameters to heat exchange potential.
3. ***Laboratory measurement of heat transfer resistance between structures and the ground:*** reviewing SGE applications in general and the use of energy geostructures in particular; modifying and using recently developed geo-CTR testing equipment to measure the contact thermal resistance between concrete/grout and soil mixes (sand/silt/clay); geotechnical characterisation of the test soils; carryout independent thermal conductivity measurements of the concrete and soil(s) used; undertake numerical back-analysis of the tests to evaluate the geo-CTR; collate this information with that already obtained to formulate a framework that describes the geo-CTR effect.

Legislation and Regulations: Statute of Scientific Research Fellow, approved by Law nr. 40/2004, of August 18, as worded by Decree-Law nr. 123/2019, of August 28; FCT Regulation for Research Studentships and Fellowships,

available on <https://www.fct.pt/apoios/bolsas/docs/RegulamentoBolsasFCT2019.pdf> and <https://dre.pt/application/file/a/127230968>.

Workplace: The work will be developed at CERIS / IST-ID do Instituto Superior Técnico, under the scientific supervision of Prof. Peter John Bourne-Webb, Prof. Jaime Alberto dos Santos and/or Prof^a. Teresa Maria Bodas Freitas.

Duration: The research fellowship(s) will have the duration of 6 months. It is expected to begin in July 2021, and is not renewable.

Monthly maintenance allowance: According to the values for Research Fellowships awarded by FCT in Portugal (<http://www.fct.pt/apoios/bolsas/valores>), the amount of the monthly maintenance allowance is €446,12, being the payment method an option of the Fellow by Wire Transfer/Check.

Selection methods: The selection methods will be evaluation of curriculum vitae and individual interview, with a respective weighting of 50%/50%.

Composition of the selection Jury: Prof. Luís Manuel Coelho Guerreiro, Prof. Peter John Bourne-Webb, Prof^a Teresa Maria Bodas Freitas

Announcement/ notification of the results: The final evaluation results will be communicated to all applicants by email.

Deadlines and procedures of complaint and appeal. A complaint may be lodged from the final decision within 15 working days, or an appeal to the Executive Board of IST-ID within 30 working days, both counted from the respective notification

Application deadline and formalization: The call is open from 23 June until 6 July 2021.

It is mandatory to formalize applications with the submission of the following documents: i) B1 Form – Fellowship application (<https://ist-id.pt/concursos/bolsas/>); ii) *Curriculum Vitae*; iii) academic degree certificate, where applicable; iv) proof of enrollment at an academic degree course or at a course that does not award an academic degree; v) motivation letter; vi) declaration on honour that the applicant does not exceed with this contract, including the possible renovations, an accumulated period of one year in this type of studentship, continuously or with interruptions, and has not held any other fellowship directly or indirectly funded by FCT.

Applications must be submitted to the email: peter.bourne-webb@tecnico.ulisboa.pt