

CALL FOR GRANT APPLICATIONS (AE2024-0234)

INESC TEC is now accepting grant applications to award 1 Post Doctoral Research Grant (BIPD) on the scope ORION with reference 101158432 funded by the European Commission under the Horizon Europe program for the period 2021-2027.

1. GRANT DESCRIPTION

Type of grant: Post Doctoral Research Grant (BIPD)

General scientific area: ENGINEERING, COMPUTER SCIENCE, MATHEMATICS

Scientific subarea: Electrical engineering

Area of Work: Engineering

Grant duration: 12 months, starting on 2024-10-01, with the possibility of being renewed for a maximum term of three years.

Scientific advisor: Tatiana Guedes

Workplace: INESC TEC, Porto, Portugal

Maintenance stipend: € 1801,00, [according to the table of monthly maintenance stipend for FCT grants](#), paid via bank transfer. Grant holders may be awarded potential supplements, according to a quarterly evaluation process (Articles 19, 21 and 22 of the [Regulations for Grants of INESC TEC](#) and Annex II), up to a maximum limit of 50% of the monthly maintenance stipend.

INESC TEC supports costs with registration, enrolment or tuition fees, during the grant duration, under the terms established in the internal document: "[Payment of Tuition fees to grant holders](#)".

The grant holder will benefit from health insurance, supported by INESC TEC.

2. OBJECTIVES:

The ORION will develop a modular toolbox of digital breakthrough components, by validating these components in the unique use cases of hydro, solar, and wave energy operations across four continents, and by integrating and presenting these novelties in a human-centric Digital Twin applications to enable a higher-degree of digitalisation of relevant operational and business processes, increase the renewables share in the electricity grid globally, and reduce fossil fuels consumption. Additionally, the developed digital components will help the stakeholders to tackle different limitations of the energy value chain with the goal to make energy more sustainable, affordable, and safer and, thus, solve pressing prioritised political, business, and societal problems. Top-level research and innovation entities from 8 countries will jointly contribute to developing globally applicable solutions.

The main objectives are:

- 1) To integrate knowledge in energy systems modelling, data analysis, and machine learning (ML) techniques for the development of Digital Twins (DT) of power generation plants.
- 2) To develop and test algorithms for the detection, localisation, and classification of faults in power generation plants using open-source tools, to reduce response times in fault resolution, recommend maintenance actions, and decrease Operation and Maintenance (O&M) costs.

3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

- 1) Model and validate Digital Twins (DT) of power generation plants for the creation of a fault database. The models will be based on the technical specifications of each plant and validated using SCADA system data.
- 2) Develop machine learning (ML) algorithms for fault diagnosis and malfunctions in power generation plants, using SCADA system data combined with synthetic data from Digital Twins (DT).
- 3) Develop a recommendation system that will support operation and maintenance (O&M) teams by providing strategic information on the current status of various equipment in the power generation plant.
- 4) Validate the developed methodologies with real data and different use cases focused on the energy transition.
- 5) Disseminate the work in international journals and/or conferences.

4. REQUIRED PROFILE:

Admission requirements:

PhD degree in: Electrical and Computer Engineering; Electrical Engineering; Energy, Applied Mathematics; Physics; Computer Science; Industrial Engineering or similar.

The PhD degree must have been obtained within the three years prior to the date of submission of the application and the research work leading to the award must have been carried out at a host entity other than INESC TEC.

Preference factors:

- Experience in the development of Digital Twins (DT)
- Experience in applying machine learning (ML) algorithms to engineering problems
- Knowledge or experience of energy systems problems

Minimum requirements:

- Past experience with system modelling (e.g., Modelica, MATLAB Simulink)
- Python programming skills
- Academic knowledge of energy systems and/or renewable energy
- A minimum of 2 publications in Q1 journals

5. EVALUATION OF APPLICATIONS AND SELECTION PROCESS:

Selection criteria and corresponding valuation: the first phase comprises the Academic Evaluation (AC), based on the criteria referred to in Article 12 of the [Regulations for Grants of INESC TEC](#), while the second phase comprehends the Individual Interview (EI). All factors are evaluated on a scale of 0 to 100, taking into account the applicants' merit, suitability and conformity with the preference factors.

The weight of the AC factors are as follows: Academic Qualifications (FA, 50%), Scientific Publications (PC, 20%), Experience (EX, 20%) and Motivation Letter (CM, 10%).

Candidates who score less than 50 points in the AC average will be considered excluded on absolute merit. The top five candidates approved on absolute merit will be qualified for the individual interview. The Final Grade (CF) is obtained by the weighted average of AC (70%) and EI (30%).

DISABILITY INCENTIVE

Candidates who present a degree of disability equal to or greater than 90% will benefit from an incentive (20) in the score of the CV Assessment.

Candidates who present a degree of disability equal to or greater than 60% and less than 90% will also benefit from an incentive (10) in the score of the CV Assessment.

Said score may, in these cases, exceed 100 points.

Candidates must demonstrate the degree of disability during the application, namely through the submission of the Multi-Purpose Medical Certificate of Disability, issued in accordance with Decree-Law no. 202/96, of October 23 - currently in effect.

Candidates must declare, in the application form, the type of disability used throughout the selection process, in order to proceed with the required adaptations.

The Selection Jury is composed of the following members:

President of the Jury: Ricardo Jorge Bessa
Full member: Rui Esteves Araujo
Full member: Justino Miguel Rodrigues
Substitute member: David Emanuel Rua

Release of results and prior hearing: the results of the selection process, as well as the terms and procedures for prior hearing, will be released to the applicants by email, under the terms referred to in Article 13 of the Regulations for Studentships and Fellowships of INESC TEC.

6. FORMALISATION OF APPLICATIONS:

Application Documents:

1. Motivation letter;
2. Curriculum Vitae (must include the list of previous fellowships, their type, beginning and end dates, funding entities and host institutions);
3. Certificate or diploma degree;
4. Documental evidence to support the country of residence, residence permit or other legally equivalent document, in cases where the applicant is a foreigner or non-resident in Portugal - valid until the beginning of the grant.
5. Other supporting documents relevant to the final assessment.

Failure to deliver the required documents within the 90-day period after the date of the notice of the conditional awarding of the grant implies its cancellation.

Application period: From 2024-06-27 to 2024-07-27

Submission of applications: the application will be formalised by submitting the form available in the *Work With Us* section of INESC TEC website.

7. BINDING LEGISLATION AND REGULATION

The hiring process shall comply with the current legislation regarding the Research Grant Holder Statute, approved by Law no. 40/2004 of August 18, in its current wording, as well as by the [Regulations for Grants of INESC TEC](#) and for [FCT Grants Regulation in force](#).

For more information, please check the [Regulations for Grants of INESC TEC](#) and relevant annexes at www.inesctec.pt/bolsas



Funded by the
European Union