

CALL FOR GRANT APPLICATIONS (AE2023-0458)

INESC TEC is now accepting grant applications to award 1 Research Grant (BI) within the scope of the ATE funded by IAPMEI with reference 56 Co-financed by Component 5 - Capitalization and Business Innovation, integrated in the Resilience Dimension of the Recovery and Resilience Plan within the scope of the Recovery and Resilience Mechanism (MRR) of the European Union (EU), framed in the Next Generation EU, for the period 2021 - 2026.

1. GRANT DESCRIPTION

Type of grant: Research Grant (BI)

General scientific area: COMPUTER SCIENCE

Scientific subarea: Computer Systems, Systems design

Area of Work: Distributed Systems

Grant duration: 12 months, starting on 2024-01-09, with the possibility of being renewed until the end of the project.

Scientific advisor: Fábio André Coelho

Workplace: INESC TEC, Braga, Portugal

Maintenance stipend: € 1199,64, [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:

This grant is provided in the scope of the project Aliança para a Transição Energética (Alliance for the Energy Transition) where a multi-tenant, cloud-based solution to enable an integrated set of cross-domain, interoperable digital services with data from several domains will be design, while allowing a simple instantiation for distinct stakeholders along the energy value-chain.

The grants focuses on the evolution of federated machine learning algorithms, considering the possibility to consider gossip-based mechanisms to propagate information and metadata between federated learning agents. It has the following specific objectives:

- Study and analysis of distributed federated learning mechanisms, their execution and scalability requirements. Moreover, the requirements and special needs of gossip-based mechanisms will be considered in terms of their scalability and fit towards their use in the scope of federated learning;
- Design and improve gossip-based mechanism that are used to disseminate data in scope of federated learning mechanism including their evaluation and scalability analyses;
- The work includes writing and submission of scientific papers to conferences and/or journals of impact in each area.

The results of this work will be included in the project platform.

3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

- Identification and study via surveying the state of the art of federated learning mechanisms;
- Identification and study via surveying the state of the art of gossip mechanisms;
- Design, implementation, and evaluation of the prototypes for gossip mechanism, relying on simulations tools, their components, or sub-components, namely the integration of federated machine learning mechanisms while using gossip-based data acquisition;
- Design, implementation, and evaluation of the prototypes for federated learning mechanism, their components, or sub-components;
- Writing and submission of scientific papers;
- Writing of doctoral dissertation.

4. REQUIRED PROFILE:

Admission requirements:

- Be enrolled in a doctoral program in computer science or Informatics Engineering.
- The awarding of the fellowship is dependent on the applicants' enrolment in study cycle or non-award courses of Higher Education Institutions.

Preference factors:

- Knowledge and experience in the use of gossip mechanisms;
- Knowledge with the following technologies/tools: Flower;
- Experience in carrying out distributed system's evaluation.

Minimum requirements:

- Knowledge and experience in using distributed, federated machine learning mechanisms;
- Knowledge and experience in Distributed Systems;
- Knowledge and experience with Python and Java;
- Experience with the following technologies/tools: Peersim, ZeroMQ, TensorFlow, Keras;
- Excellent spoken and written use of English language.

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, 60%), Scientific Publications (PC, 10%), 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 (80%) and EI (20%).

The Selection Jury is composed of the following members:

- President of the Jury: Fábio André Coelho
- Full member: José Orlando Pereira
- Full member: João Tiago Paulo
- Substitute member: João Marco

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. Proof of enrollment in a degree awarding study cycle or in a non degree awarding Higher Education program.
 - The proof of enrollment may be presented just during the grant hiring stage.
5. Signed declaration stating the infringement of the grant holder's duties (article 14, no. 4)
6. 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.
7. 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 2023-11-30 to 2023-12-15

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

