CALL FOR GRANT APPLICATIONS

(AE2026-0234)

INESC TEC is now accepting grant applications to award 1 Research Initiation Grant (BII) Multiannual Funding of R&D Units 2025-2029, with the reference UID/50014/2025, Funded by national funds through the Portuguese Foundation for Science and Technology (FCT), I.P.

1. GRANT DESCRIPTION

Type of grant: Research Initiation Grant (BII)

General scientific area: COMPUTER SCIENCE

Scientific subarea: Programming,Informatics

Area of Work: Computer Science

Grant duration: 3 months, starting on 2026-10-01, with the possibility of being renewed for a maximum term of one year.

Scientific advisor: Pedro Manuel Ribeiro

Workplace: INESC TEC, Porto, Portugal

Maintenance stipend: € 701.12, **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:

- Study the main exact subgraph counting algorithms identified in the survey (e.g., ESU/FANMOD, Kavosh, GTrie, FaSE, ORCA, PGD, ESCAPE, ACC-MOTIF), with special attention to publicly available implementations;

- Install, configure, and validate these implementations, ensuring that they produce correct and mutually comparable results;

- Build a benchmark dataset of real and synthetic networks of varying dimensions and densities;

- Conduct a systematic experimental comparison of the selected algorithms, evaluating runtime, memory usage, and scalability (as a function of network size and the size k of the subgraphs);

- Research the most recent developments (post-2019/2021) in the field to identify any new algorithms or relevant implementations not covered in the original survey;

- Document the entire process (scripts, configuration, results) in a reproducible manner in a public repository;

- Prepare a final report presenting the results obtained and a comparative discussion of the algorithms studied.

3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

Subgraph counting is a fundamental task in network analysis, serving as the basis for widely used methodologies such as network motifs and graphlets, which are applied in fields as diverse as biology, social networks, and transportation networks. It is, however, a computationally very demanding problem. Over the past two decades, numerous exact algorithms have been proposed to solve it, each with different strategies, limitations, and performance characteristics.

This work will take as its starting point the survey “A Survey on Subgraph Counting: Concepts, Algorithms, and Applications to Network Motifs and Graphlets” (Ribeiro et al., ACM Computing Surveys, 2021), which provides a structured taxonomy of exact, approximate, and parallel algorithms, indicating which ones have publicly available implementations.

4. REQUIRED PROFILE:

Admission requirements:

Undergraduate or graduate students in computer science, informatics, or related fields.
The awarding of the fellowship is dependent on the applicants' enrolment in study cycle or non-award courses of Higher Education Institutions.

Preference factors:
- Previous experience with C/C++ programming (many of the implementations to be compared are written in these languages);

- Knowledge of graph theory and/or complex network analysis;

- Experience with scripting for automating experiments (e.g., Bash, Python) and data analysis/visualization (e.g., Pandas, Matplotlib);

- Experience with Git/GitHub for code management and reproducible documentation;

Minimum requirements:
- Strong programming skills (C/C++, Python, or similar);
- Basic knowledge of data structures and algorithms, particularly graph theory;
- Ability to independently install and configure software (compilation, dependency management, Linux environments);
- Strong organizational skills and written communication skills.

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, 5%), Experience (EX, 35%) 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 (60%) and EI (40%).

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: Pedro Manuel Ribeiro
Full member: Álvaro Figueira
Full member: João Paulo Vilela
Substitute member: Fernando Silva

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 not having benefited from any other research fellowship (Article 5, no. 5)
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 2026-07-30 to 2026-08-12

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