

## ANNOUNCEMENT FOR THE AWARD OF A RESEARCH FELLOWSHIP

**Title:** Research Fellowship; 1 vacancy

**Reference:** CALG\_AMALIA\_2025\_25 (1)

A call for applications is now open for the attribution of 1 research grant within the scope of the I&D project AMALIA - Creation of the Large-Scale Language Model of the Portuguese Language of Portugal (Automatic Multimodal Language Assistant with Artificial Intelligence), reference AMALIA, inserted in measure RE-C05-i08 of the Recovery and Resilience Program, through the Foundation for Science and Technology - FCT, under the following conditions:

**Scientific Area:** Computer Engineering, Biomedical Engineering (Medical Informatics), or related areas.

**Recipient category:** Masters, enrolled in the course:

- a) **Degree courses:** enrolled in doctorate;
- b) **Non-degree conferrers:** enrolled in non-degree courses.

**Requirement for granting the fellowship:**

- The applicants may apply without prior registration in the course for which the fellowship is open. The requirement to enroll in a degree course or non-academic degree course will be verified on the date of contracting the fellowship;
- Only fellowships whose selected applicants present a valid proof of enrollment in a degree course or non-academic degree course will be contracted, according to the type of the fellowship, issued by a Higher Education Institution, indicating, respectively, the academic year or its duration (star and term).

**Applicants' eligibility:** Candidates who meet the conditions set out in Article 9 of the Research Grant Regulations, No. 950/2019, of 16-12-2019, of FCT I.P. are eligible.

Nationals or citizens of other European Union member states, third-country nationals, stateless persons, and citizens with political refugee status are eligible to apply for this competition.

**Candidate eligibility requirements:**

- Candidates must have, at the time of application, a master's degree in Computer Engineering, Biomedical Engineering, Information Systems, Computer Science, Artificial Intelligence or related areas that demonstrate a solid computational base;
- Candidates enrolled in a non-degree course: Candidates who exceed, with the conclusion of the grant contract in question, including the renewals provided for in the notice, an accumulated period of two years in this type of grant, consecutive or interpolated, cannot benefit from the grant in the competition;
- Candidates enrolled in a degree course: Enrollment in a PhD in the area of Informatics or Biomedical;
- Proof of academic qualifications completed by the deadline for applications is required, in the contracting phase, including those resulting from academic degree recognition processes.
- Preferred factors:
  - In-depth knowledge of Deep Learning and Large Language Models (LLMs): practical knowledge with Deep Learning architectures, and in particular, with LLMs. Knowledge of both advanced prompt engineering techniques (e.g., few-shot learning, chain-of-thought prompting) and fine-tuning and adaptation of models (e.g., LoRA, PEFT) for specific tasks is valued;
  - Relevant knowledge: Understanding and/or proven knowledge in areas such as Education and Technology (EdTech), Human-Computer Interaction (HCI), Natural Language Processing (NLP), or Applied Artificial Intelligence. Demonstrable projects (e.g., GitHub repositories, publications, prototypes) that show the ability to apply this knowledge in practice will be highly valued;
  - Research and Innovation Skills: Demonstration of intellectual curiosity, proactivity in solving complex problems and the ability to work independently and in a team in an R&D environment;
  - Communication Skills: Good oral and written communication skills, essential for the preparation of technical reports, scientific articles and presentations.

### Workplan and objectives to be achieved:

The scientific work to be developed consists of:

1. RAG Orchestration and Tuned Models
  - a. Implement information retrieval pipelines to base LLMs' responses on curated pedagogical knowledge bases (books, curricula, papers), mitigating hallucinations.
  - b. Design an architecture where an "Orchestrator Model" (Router) decides when to invoke a memory module (RAG) or when to trigger a specialized model via Fine-Tuning.
  - c. Evaluate the trade-off between Knowledge Injection via Fine-Tuning versus Context Injection via RAG for different types of educational content.
2. Model Specialization via Efficient Fine-Tuning (PEFT)
  - a. To investigate the application of Low-Rank Adaptation (LoRA) and QLoRA to adapt large foundational models to specific pedagogical tasks with low computational cost.
  - b. Perform Supervised Fine-Tuning (SFT) focused on "Chain-of-Thought" datasets, training the model to autonomously decompose complex problems into scaffolding steps.
  - c. Develop a library of interchangeable (plug-and-play) LoRA Adapters. For example, an adapter for "Higher Education Mathematics" and another for "Motivational Pedagogical Tone", which can be dynamically loaded on the base model.
3. Computational Efficiency, Ethics and Validation
  - a. Verify that the use of PEFT/LoRA allows mass customization (one adapter per discipline or institution) without the need to re-train or host multiple giant models, favoring scalability.
  - b. To evaluate whether the joint use of RAG (for facts) and Fine-Tuning (for behavior/tone) reduces the incidence of biases and incorrect answers compared to the use of prompt engineering alone.
  - c. Implement evaluation metrics that consider both the accuracy of the recovery (RAG retrieval score) and the pedagogical quality of the generation (adherence to the Fine-Tuning performed).
4. Documentation and Scientific Dissemination
  - a. Document the RAG-fusion architectures and the optimal hyperparameters found for LoRA training in educational contexts.
  - b. Prepare high-level scientific and technical reports, systematizing methodologies, architectures and results.

**Applicable legislation and regulations:** Research Fellow Statute (EBI), approved by Law n.º 40/2004 of August 18, in its current wording and FCT Research Fellowship Regulation, approved by Regulation n.º 950/2019, published in the Diário da República, 2nd series, of December 16, 2019, in its current wording, and Scientific Research Fellowship Regulation (RBIC) of the University of Minho, approved by order n.º 4998/2025, published in the Diário da República, 2nd series, n.º 81, of April 28, 2025 Amended and republished through amendment statement no. 634/2025/2, published in the Official Gazette, 2nd series, no. 132, of July 11.

**Host/Contracting institution and scientific supervision:** The work plan will be developed in the ISLab laboratory (Synthetic Intelligence Laboratory), Department of Informatics, Algoritmi Centre, School of Engineering of the University of Minho, located at the Gualtar Campus, under the scientific supervision and coordination of Paulo Jorge Freitas de Oliveira Novais, Full Professor of the Department of Informatics of the School of Engineering of the University of Minho.

**Fellowship duration:** The grant will take place for a period of **4 months**, with a provisional starting date on **February of 2026**. The fellowship grant may, eventually, be renewed up to the maximum limit allowed by the project and/or applicable legislation.

**Amount of the research grant:** The amount of the grant corresponds to 1309,64 €/month, according to the table of values of the Research scholarship of the University of Minho, updated annually, as decided by the Management Board. Payment is made on the 23rd of each month, through bank transfer to the Bank Identification Number of the fellow identified in the contractualization process.

**Other benefits:** Reimbursement of Voluntary Social Insurance, if the candidate chooses to receive it, corresponding to the 1st level of discounts (for research grants with a total duration 6 months or higher) and personal accident insurance.

**Exclusivity regime:** The grantee will perform the activities under exclusivity, as foreseen in article 5° of the Research Fellow Statutes and applicable regulations.

**Selection panel:**

**President:** Paulo Jorge Freitas de Oliveira Novais, Full Professor of the Department of Informatics of the School of Engineering of the University of Minho.

**Effective members:** Dalila Alves Durães, Assistant Professor at the Department of Informatics of the School of Engineering of the University of Minho and Francisco Supino Marcondes, Assistant Professor at the Department of Informatics of the School of Engineering of the University of Minho.

**Alternate Members:** José Alberto Lencastre Freitas Borges de Araújo, Professor Associado do Departamento de Estudos Curriculares e Tecnologia Educativa do Instituto de Educação da Universidade do Minho e Manuel Fernando Silva Rodrigues, Investigador Auxiliar da Escola de Engenharia da Universidade do Minho, Centro Algoritmi.

The first effective member will substitute the President of the selection panel in case of impediment, being nominate the first substitute member in the place of the first effective member.

**Criteria and procedures for applications assessment and selection:** The applications assessment will focus on the candidate's Merit, following evaluation criteria, valued on a scale of 0 to 20 values:

**A.** Applicant Merit - AM (100%)

**A.1:** Academic path, which reflects the area of training of the course and the grades of the academic degrees (using tables A.1.1. and A.1.2. defined in the minutes of criteria), with a weighting of **50%**;

**A.1.1:** Area of training of the course, with a weighting of 50%;

**A.1.2:** Grades of academic degrees, with a weighting of 50%;

**A.2:** Personal curriculum (which reflects the scientific and professional background), with a weighting of **40%**;

**A.3:** Motivation letter, with a weighting of **10%**.

The final classification of the applicant's merit with the achieved through the following formula:

$$AM = (A.1 \times 0,5) + (A.2 \times 0,4) + (A.3 \times 0,1)$$

$$\text{Since } A.1 = (A.1.1 \times 0.5) + (A.1.2 \times 0.5)$$

If the jury does not consider itself able to decide using the method indicated in A (AM), it may choose to conduct an Interview. In this case, AM will have a weighting of 70% and the candidates classified in the first 3 positions, who obtain the minimum classification of 12 in the AM, will be admitted to the Interview phase, with the Jury evaluating the following sub-criteria:

**B.** Interview, ENT (30%):

**B.1:** Interpersonal skills: **30%**;

**B.2:** Demonstrated knowledge in the area in the competition **40%**;

**B.3:** Motivation **20%**;

**B.4:** Language skills **10%**.

The Interview classification (ENT) will be obtained by applying the following formula:

$$ENT = (B.1. \times 0.3) + (B.2. \times 0.4) + (B.3. \times 0.2) + (B.4. \times 0.1)$$

The final classification (CF) of the Candidate's Merit (MC) and Interview (ENT) will be obtained by applying the following formula:

$$CF = (MC \times 0.7) + (ENT \times 0.3)$$

Candidates who obtain a final classification of less than 12 points will be excluded from the competition.

In the event that none of the candidates in the competition meets the appropriate profile to carry out the work plan, the Jury reserves the right to close the competition without any recruitment.

**Note:** Applicants with degrees obtained abroad must present proof of recognition of qualifications in Portugal and conversion of the final classification obtained in them to the Portuguese classification scale or declaration under the terms indicated in the previous point. Candidates who do not comply with one of these provisions, the selection panel will assign “0” in the grade of the graduation and/or master course. Candidates will be evaluated on the remaining parameters.

**Application deadline and submission:** The call for applications is open from **29/12/2025** till **14/01/2026**.

Applications must be submitted by email to **recrutamento@algoritmi.uminho.pt**, indicating the reference number of the competition in the subject line. Only applications submitted within the established deadline and accompanied by the following documents will be accepted:

- Candidate's updated *curriculum vitae*;
- Certificates of the academic degrees obtained or, if applicable, the candidate's declaration of honor that he/she has completed the degrees required in the notice by the application deadline (not applicable to research initiation grants).
- For degrees obtained abroad, the record of recognition of the academic degrees and record of the conversion of the respective final classification to the Portuguese classification scale must be presented, or, alternatively, a declaration of honor from the candidate (this declaration must attest to facts that occurred prior to the application. In the event of a discrepancy between the information contained in the declaration and the documentation submitted for the purposes of contracting the scholarship, only the information contained in the latter will be considered. If it is found that the documents proving the academic degree and diploma, or their recognition under the terms of Decree-Law n. ° 66/2018, of August 16, do not correspond to the classifications awarded in the assessment of the academic career and may consequently alter the candidate's ranking, the scholarship will not be contracted);

**Form of publication/notification of results:** The results of the evaluation are published in a single list, posted in a visible and public place in the host unit, as well as by email to all candidates, attaching, for this purpose, the minutes of the jury's deliberations, within a maximum period of 90 working days from the deadline for submission of applications.

Candidates are informed, at a preliminary hearing, in accordance with Articles 121 and 122 of the Administrative Procedure Code, of the likely outcome of the final decision, and may comment within 10 working days of this notification.

An appeal may be lodged against the final decision within 15 working days, or an appeal may be lodged with the highest executive body of the funding entity within 30 days, both after the respective notification (Article 12(n°6) of the FCT Research Grant Regulations).

Within 10 working days of notification of the grant award, the applicant must declare their acceptance in writing. In case of non-acceptance, the next highest ranked applicant will be notified immediately.

**Constitution of a selection reserve list:** The applicants ranked in the next positions on the ordered list will be included in a selection reserve list, which can be used until **15/03/2026**.

**Fellowship contractualization:** The scholarship is awarded through the signing of a contract between the University of Minho and the scholarship recipient, in accordance with point 2.4 of the Rules for the Award and Management of Scholarships [https://www.fct.pt/wpcontent/uploads/2022/03/Normas\\_de\\_Atribuicao\\_de\\_Bolsas\\_2021.pdf](https://www.fct.pt/wpcontent/uploads/2022/03/Normas_de_Atribuicao_de_Bolsas_2021.pdf) and the draft contract in Annex II of the University of Minho's Scientific Research Scholarship Regulations.

The contract can only be signed after receipt of all the documentation required for the type of scholarship, which must occur within a maximum period of 6 months, including proof of academic degrees or diplomas, as well as enrollment in non-degree study cycles or courses, as applicable.

Once all the documentation has been received, the contracting entity has 60 working days to sign the scholarship contract. Once received by the scholarship holder, the contract must be returned, duly signed, within 15 working days.

**Term and cancellation of fellowship contracts:** Without prejudice to the other grounds laid down in the University of Minho's Scientific Research Scholarship Regulation and in the Research Fellow Statute, the scholarship will cease on completion of the contracted work plan, as well as on expiry of the period for which it was granted or renewed.

**The final report** must be submitted to the scientific advisor, in accordance with the defined objectives and evaluation criteria, no later than 60 working days after the end of the scholarship and must be drawn up in accordance with Annex I of the Regulations of the University of Minho.

**Non-discrimination and equal access policy:** Universidade do Minho actively promotes a policy of non-discrimination and equal access, so that no candidate may be privileged, benefited, harmed or deprived of any right or exempt from any duty due, namely, to ancestry, age, sex, sexual orientation, marital status, family status, economic situation, education, social origin or condition, genetic heritage, reduced working capacity, disability, chronic illness, nationality, ethnic origin or race, territory of origin, language, religion, political or ideological convictions and trade union membership.

**Declaration of Honor**  
**Academic qualifications**

I, (full name), candidate for the vacancy for the award of a (type of scholarship), within the scope of the project (name or reference of the project), published on the Euraxess portal, with the reference (ref. notice), declare on my honor that I have completed the academic degree of (academic degree), qualifying for the type of scholarship in the competition, namely the course (designation), by the (University conferring the degree), on the date XX/XX/XXXX, with a final average of XXXXX values on the YY scale.

As it is not possible for me to present proof of qualifications until the end of the competition, I declare that I undertake to present the aforementioned certificate at the conclusion of the scholarship contract, in the event that I am selected for the vacancy in the competition.

As this is true, I hereby date and sign this declaration.

(Place), (date).

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(full name)

NOTE: The declaration may only attest to facts that occurred prior to the application.

In the event of a discrepancy between the information contained in the declaration and the documentation submitted for the purpose of contracting the scholarship, only the information contained in the latter will be taken into account.

### Declaration of Honor

I, (full name), bearer of identification document number (XXXX), candidate for a research grant (type of grant), within the scope of the project (name or reference of the project), published on the Euraxess portal, with the reference (ref. call for proposals), declare on my honor that (I have not received any research grants to date / I have received the following research grants) under the Research Grant Holder Statute.

University	Financing Entity	Project	Type of Grant	Duration	Start	Term

As this is true, I hereby date and sign this declaration.

(Place), (date).

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(full name)