ANNOUNCEMENT FOR THE AWARD OF A RESEARCH FELLOWSHIP

Title: Research Fellowship; 1 vacancy

Reference: CALG_ATE_BI_2025_4(1)

A call for applications is now open for the attribution of 1 research Fellowship for Masters within the scope of the I&D project, OF Centro ALGORITMI ATE - Aliança para a Transição Energética (Candidatura C644914747-00000023/56), financed by Plano de Recuperação e Resiliência (PRR), by Agência para a Competitividade e Inovação – IAPMEI, I.P., under the following conditions:

Scientific Area: Power and Energy Electronic Engineering

Recipient category: Masters, enrolled in the course:

a) **Degree courses:** enrolled in doctorate.
b) **Non-conferring degrees courses:** 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 Industrial and Computer Electronics Engineering;
- Candidates enrolled in a non-degree course: Candidates who exceed, with the conclusion of the scholarship contract in question, including the renewals provided for in the notice, an accumulated period of two years in this type of scholarship, consecutive or interpolated, cannot benefit from the scholarship in competition; In research grants for graduates or masters enrolled in non-degree courses - not to benefit from a non-degree research grant for an accumulated period of 2 consecutive or interpolated years;
- Candidates enrolled in a degree-granting course: Enrollment in the doctorate in Power and Energy Electronic Engineering;
- 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:

1. **Proven expertise in the development and implementation of advanced power electronics solutions, in the context of electric mobility and/or energy storage systems, including:**
   (a) Design of isolated and non-isolated power converters, of medium or high power, intended for electric vehicle charging systems and grid interface (bidirectional AC/DC, DC/DC, and DC/AC converters);
   (b) Implementation of digital control algorithms (vector control, closed-loop current control, PWM and SPWM modulation strategies, predictive control, etc.) aimed at efficient battery charging and grid compliance.

   2. Proficiency in power system simulation and modeling tools, with demonstrated experience in:

(a) Simulation of power converters and control strategies using software such as PSIM, PLECS, or MATLAB/Simulink;
(b) Modeling of hybrid AC/DC systems integrating renewable sources, batteries, and vehicular loads, including assessment of bidirectional power flow;
(c) Performance analysis of conversion and energy storage systems.

3. Experience in hardware development for power systems, including:

(a) PCB design using platforms such as Altium Designer, KiCAD, or PADS;
(b) Programming of digital signal controllers (DSPs, FPGAs, or microcontrollers) applied to bidirectional power converters;
(c) Experimental testing of power electronic converters, using advanced laboratory instrumentation (oscilloscopes, power analyzers, data acquisition systems, etc.).

4. In-depth knowledge of interface and conversion topologies and techniques, including:

(a) Isolated topologies (multiple active bridge, LLC, etc.) and corresponding modulation strategies (phase-shift, etc.) applied in electric mobility contexts;
(b) Non-isolated topologies (bidirectional buck-boost, interleaved, etc.) and corresponding modulation strategies applied in electric mobility contexts;
(c) Emerging applications such as solid-state transformers, bidirectional fast chargers, and high-power-density interface systems.

5. Research and innovation skills, namely:

(a) Participation in R&D projects, scientific publications, or presentations at international conferences in the field of power electronics;
(b) Technical and scientific writing skills, with a track record of published or submitted articles in indexed journals or relevant international conferences;
(c) Ability to develop new architectures, control strategies, or experimental methods;
(d) Autonomy and critical thinking in the analysis of results and formulation of research hypotheses.

Workplan and objectives to be achieved:

- Development and optimization of simulation models for power converters (isolated and non-isolated) applied to electric vehicle charging systems, using tools such as PSIM, PLECS, and/or MATLAB/Simulink. The objective is to evaluate the most suitable current and voltage control strategies for bidirectional energy management, prioritizing efficiency, dynamic stability, and grid interaction under different operating modes (charging and discharging).
- Implementation and programming of DSPs for real-time control and operation of power converters, including the integration of modulation and control algorithms previously developed in simulation environments.
- Design and development of power and control hardware, including:

(a) Sizing and PCB design for power electronic converters and signal acquisition circuits (analog and digital);
(b) Implementation of drive, signal conditioning, and monitoring circuits in AC and DC systems;
(c) Integration and bench testing of prototypes, representative of real electric vehicle charging scenarios.

- Experimental validation of the developed prototypes, including performance measurements and comparison between experimental and simulation results.
- Scientific dissemination of results through the submission of papers to international conferences and journals in the field of power electronics and electric mobility, as well as through the preparation of technical and scientific documentation related to the work carried out.

Applicable legislation and regulations: Research Fellow Statute (EBI), approved by Law nº. 40/2004 of August 18, in its current wording and FCT Research Fellowship Regulation, approved by Regulation nº 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 nº 4998/2025, published

in the Diário da República, 2nd series, nº 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 workplan will be carried out in Centro ALGORITMI of Escola de Engenharia *of the Universidade do Minho,* located in the *Campus de Azurém - Guimarães*, under the scientific supervision of the Professor Doctor Vítor Duarte Monteiro and the coordination of Professor Paula Fernanda Varandas Ferreira, Director of the ALGORITMI Center.

Fellowship duration: The grant will take place for a period of **3 months**, with a provisional starting date on January **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 contratualization 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 5º of the Research Fellow Statutes and applicable regulations.

President: Doctor Paula Fernanda Varandas Ferreira (Associate Professor with Habilitation, Department of Production and Systems, School of Engineering, University of Minho)
Effective members: Doctor Manuel João Sepúlveda Mesquita Freitas (Assistant Professor, Department of Industrial Electronics, School of Engineering, University of Minho) and Doctor Paulo Sérgio Lima Pereira Afonso (Assistant Professor, Department of Production and Systems, School of Engineering, University of Minho)
Alternate Members: Doctor José Gabriel Oliveira Pinto (Assistant Professor, Department of Industrial Electronics, School of Engineering, University of Minho) and Doctor Francisco Carrusca Pimenta Brito (Assistant Professor, Department of Mechanical Engineering, School of Engineering, University of Minho)
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 5 values:

A. Applicant Merit - AM (100%)

A.1: Academic background, reflecting the course's field of study and the grades obtained in academic degrees (according to Tables A.1.1 and A.1.2 defined in the criteria minutes), with a weighting of 50%;

A.1.1: Field of study of the course, weighting 50%;

A.1.2: Academic degree grades, weighting 50%;

A.2: Personal curriculum, related to knowledge and experience in power electronics, specifically for electric vehicle charging systems, with a weighting of 40%;

A.2.1: Development and implementation of simulation models in PSIM, PLECS, and/or MATLAB/Simulink applied to power conversion systems for electric mobility, focusing on the analysis and optimization of control strategies and bidirectional energy management – 15%;

A.2.2: Implementation of digital control algorithms (current, voltage, power theories, etc.) on DSP, FPGA, or microcontroller platforms – 15%;

A.2.3: Design and implementation of power hardware, including PCB design in Altium, KiCAD, or PADS for the integration of drive circuits, signal conditioning, signal acquisition, and monitoring – 15%;

A.2.4: Experimental validation of power electronics prototypes, including acquisition, processing, and analysis of laboratory results in bidirectional charging systems and AC/DC grid interface – 15%;

A.2.5: Knowledge of topologies applied to electric mobility and bidirectional charging (AC/DC, DC/DC, DC/AC, isolated and non-isolated) – 10%;

A.2.6: Participation in R&D projects, as well as scientific publications in journals or conferences in the field of power electronics – 15%;

A.2.7: Demonstrated knowledge of innovative power electronics solutions, with potential for practical or scientific application relevant to the development of new architectures, control strategies, or topologies oriented toward electric vehicle charging – 10%;

A.2.8: Knowledge in the design of power electronics prototypes aimed at high power density and sustainability, prioritizing resource optimization, compactness, and functional integration – 5%;

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

The final candidate merit score will be calculated using the following formula:

AM = (A.1 x 0,5) +(A.2 x 0,4) +(A.3 x 0,1)

Where A.1 = (A.1.1 × 0,5) + (A.1.2 × 0,5)

Where A.2 = (A.2.1 × 0,15) + (A.2.2 × 0,15) + (A.2.3 × 0,15) + (A.2.4 × 0,15) + (A.2.5 × 0,1) + (A.2.6 × 0,15) + (A.2.7 × 0,1) + (A.2.8 × 0,05)

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 **21/11/2025** till **05/12/2025** or is open for a period of 10 working days from the date of publication on the Euraxess portal.

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. º 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 order or by final score obtained, 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(nº6) 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.

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 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).

_____

(full name)

PRR Plano de Recuperação e Resiliência
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