

PUBLIC NOTICE FOR A RESEARCH SCHOLARSHIP

Reference i2A/COMPETE-MATEL/2024

CONTEST CODE – PRBI/6/2025

IPC/ i2A is now accepting applications to award one (1) **Research Scholarship (BI)** within the scope of the project “MATEL – High Efficiency extrusion Dies”, reference **COMPETE2030-FEDER-00587200**, funded by PORTUGAL 2030 through Program COMPETE 2030, as follows:

Scientific area: Mechanical Engineering.

Requirements:

- A. Holders of a Bachelor’s degree in the field of Mechanical Engineering;
- B. If the candidate holds a higher education degree obtained abroad, he/she must have the respective recognition of the degree, if applicable;
- C. Enrolment in a master's degree or advanced studies in the area of Mechanical Engineering, or in a non-academic degree course in Mechanical Engineering or related field;
- D. Knowledge about sustainable agricultural production processes;
- E. Oral and written fluency in Portuguese and English.

Work Plan achievements:

The development of high-efficiency aluminium extrusion dies can be achieved with a new manufacturing process that leverages advanced manufacturing/surface treatment techniques, particularly additive manufacturing technologies, such as Powder-Bed Fusion, and Cold Spraying deposition. The use of these techniques, along with a comparison of the improvements achieved, will endow the dies with thermal properties and wear resistance that differentiate them from current conventional solutions. The aim is also to develop a new design methodology for high-thermal-efficiency aluminium dies that will fully exploit the new capabilities introduced by the new manufacturing processes, allowing for the creation of new dies for a wide range and complexity of profiles. The new dies produced using this methodology will enable the adoption of cooling methods that offer better performance than the currently most practiced and widespread gas cooling, such as liquid cooling, which will allow for more effective temperature control. Better control of the cooling fluid's flow resistance will further reduce the energy requirements associated with the extrusion process through the dies and improve local control of heat transfer, and consequently temperature, during the process. The work plan is framed within the main activities of the project and aims to contribute to the study of the extrusion die cooling system, including the following main tasks:

- 1. Literature review on aluminium extrusion die cooling systems;
- 2. Exploration of numerical simulation tools for heat transfer and fluid dynamics phenomena;
- 3. Numerical simulation of the thermal behaviour of the die and its cooling system;
- 4. Participation in instrumentation and experimental testing of extrusion tools for monitoring structural integrity and operating conditions;
- 5. Delivery of oral presentations, writing of technical report(s) and scientific article(s) for submission to international peer-reviewed journal(s);

6. Collaboration in project management activities, as well as organizing training, communication, and dissemination activities.

Scholarship Length:

The scholarship, on an exclusive basis, has a duration of 12 months, possibly renewable till the end of the project, within the limits established in the Regulation of the Fellow of the PIC, approved by Order no.5963/2020, published in the 2nd series of the Diário da República of 1 June, and Regulation no. 950/2019 of 16 December (Regulation of Research Grants of the Foundation for Science and Technology), scheduled to start on april 2025.

Monthly Maintenance Allowance:

1040,98 euros, according to the table of scholarships amounts awarded by FCT to positions held in Portugal (www.fct.pt/apoios/bolsas/valores). The payment will be made by bank transfer monthly, to the account to be designated by the Fellow. To this amount is added the voluntary social insurance corresponding to the first tier, and a workplace accident insurance contract.

Workplace:

The work will be carried out at the Institute of Engineering of Coimbra of the Polytechnic Institute of Coimbra, under the scientific guidance of Prof. Doutor Gilberto Cordeiro Vaz e da do Prof. Doutora Raquel Almeida de Azevedo Faria.

Selection Criteria:

Applications will be assessed on a scale of 0 to 20 using the following weights:

- a) Curriculum evaluation (50%), with a value of 50% for academic qualifications and 50% for the degree of fulfilment of the requirements relating to competences;
- b) Interview (50%), to be carried out only with the candidates placed at least in the first three positions with a minimum grade of 14 out of 20, according to the order resulting from the previous criterion.

Jury of Selection:

President: Prof. Luis Filipe Pires Borrego, PhD
Members: Prof. Gilberto Cordeiro Vaz, PhD
Prof. Raquel Almeida de Azevedo Faria, PhD
Substitutes: Prof. Anabela Duarte de Carvalho, PhD
Prof. Fernando António Gaspar Simões, PhD

Mandatory documents:

- a) - Duly completed application form, available on the website dedicated to this competition procedure - https://www.ipc.pt/bupc/concursos/form/concursos_bolseiros ;
- b) Motivation letter, in which the candidate must explain his/her motivation to carry out this multidisciplinary work plan, as well as mention if he/she is available to start the scholarship on schedule date;
- c) Document(s) proving that the candidate holds the academic degree and/or diploma(s) required in the competition, preferably indicating the final average and the marks obtained per curricular unit.
Applicants with foreign qualifications must provide proof of their foreign degree and diploma in accordance with Decree-Law no. 66/2018, of 16th August;

- d) Document proving enrolment and registration in the master's or doctoral degree or non-degree course, which may be made at a later date than the application, provided that it is prior to the contractualization of the scholarship;
- e) Updated *Curriculum Vitae* of the candidate, with a description of the qualifications;
- f) Supporting document(s) for other assessment parameter(s) indicated in the application notice;
- g) Declaration, under oath, regarding the scholarship(s) of the same type that the candidate have carried out and its duration;
- h) Other certifications and/or other documents considered relevant by the candidate.

Deadline of Application Submission:

The application period will be of 10 working days, starting on **04/03/2025** and ending on **17/03/2025**.

Candidates must access and register on the website https://www.ipc.pt/bupc/concursos/form/concursos_bolseiros to submit the application, selecting the procedure for which they intend to apply.

Applications must be delivered exclusively in digital format, in portable document format (pdf), except for documents whose delivery is scheduled in other digital formats.

Application instructions are completed by filling in the sections available at the aforementioned email address.

When formalizing the application, if it contains a classified document that reveals commercial or industrial secrets, or secrets relating to literary, artistic or scientific property, the candidate must expressly indicate such reservation, under penalty of the work in question being freely accessed by any one of the other candidates, in consultation with the process.

When submitting the application, the candidate must provide only the necessary data, according to this notice, and must hide personal data present in the documentation, as these data may be freely accessed by other candidates during the process consultation.

Legislation and applicable Regulation:

The award of this scholarship is based in the Law 40/2004, of the 18th of August (Statute of the Scientific Research Fellow), changed and republished by the Decree-Law 202/2012, of the 27th of August, updated by: Decree-Law 233/2012, Law 12/2013, Decree-Law 89/2013 and Decree-Law 123/2019; the Regulation of the research scholarships from the Fundação para a Ciência e a Tecnologia, I. P. and the Regulation of the Research Scholarships from Coimbra Polytechnic no. 12709/2016, published on the DR, 2nd serie, of 21/10/2016.

The model of the scholarship contract, as well as that of the final reports to be prepared by the scholarship holder and the scientific supervisor, are those set out in the annexes to the above-mentioned Statute for Scientific Research Scholarship Holders.

Information of Results:

The results of the evaluation will be published within 90 working days from the deadline for submission of applications, by sending a communication to the candidates, via email. After the results have been published, candidates will be notified to, if they wish, give their opinion in a prior hearing within a maximum of 10 working days after that date. After this deadline, the selected candidates will have to declare their acceptance in writing. Unless a justifiable reason is provided, failure to make the declaration within the deadline will be considered as a waiver of the scholarship. In case of resignation or withdrawal of the selected candidate, the immediately best ranked candidate will be notified.

For further information please contact:

Luís Filipe Borrego (borrego@isec.pt).