INSTITUTO DE SISTEMAS E ROBÓTICA
UNIVERSIDADE DE COIMBRA

CALL FOR 1 RESEARCH GRANT FOR A MASTER | Refª ISR-UC-BIM-1

Application period: 21-Set-2026 to 02-Oct-2026

The Institute of Systems and Robotics of the University of Coimbra (ISR-UC) opens a call for applications for one (1) Research Grant for a Master (BIM) **enrolled in a PhD or a non-degree course**, funded by ISR own institutional funds, in the following conditions:

Type of Grant: Research Grant for a Master (*Bolsa de Investigação para Mestre*), in accordance with article 4 of the ISR Regulation for Research Fellowships, approved by the Foundation for Science and Technology (FCT), I.P.

Number of positions: 1

Scientific Area: Electrical and Computer Engineering, Robotics, Computer Science, or a related area.

Admission requirements: The candidate must hold a Master degree and must be a student enrolled in a PhD or in a non-degree course (*curso não conferente de grau*).

"Courses not conferring an academic degree" must be related to the research fellowship's activity type. "Courses not conferring an academic degree" are the courses referred to in article 4, paragraph 3, letter e) of Decree-Law no. 74/2006, of 24 March, in the current wording, provided that they are developed in association or cooperation between the higher education institution and one or more R&D units, in accordance with the provisions of article 3, paragraph e) of the FCT Regulation for Research Fellowships.

Work plan: The selected candidate will develop an iOS application using the Swift programming language, designed to run on an iPhone and exploit the capabilities of the smartphone's sensor suite, including LiDAR, accelerometer, camera, and GPS sensors, for forest-environment mapping.

The candidate will be responsible for:

- Developing an iOS application for the acquisition, processing, visualization, and storage of data from the iPhone's LiDAR, camera, accelerometer, and GPS sensors;
- Designing and implementing the conversion of iPhone sensor data into ROS-compatible messages for transmission via WiFi to a computer;
- Implementing mechanisms for locally recording acquired sensor data in ROS-compatible bag format, such as rosbag, for subsequent offline processing and experimentation;
- Developing a seamless integration between the iPhone and the Robot Operating System (ROS), enabling the use of the acquired data with existing robotics and mapping frameworks;

- Integrating the iPhone-based sensing system with mapping and visualization tools, supporting the execution of mapping algorithms and the visualization of the constructed forest map;
- Performing field tests and experimental campaigns in real forest environments;
- Evaluating the performance, robustness, accuracy, and computational requirements of the developed system under realistic outdoor conditions;
- Investigating the use of multiple odometry sources and multimodal sensor fusion techniques, including, but not limited to, Extended Kalman Filters (EKF) and Factor Graph Optimization (FGO);
- Testing and comparing different Simultaneous Localization and Mapping (SLAM) methods suitable for forest environments and smartphone-based sensing;
- Investigating depth-completion techniques to densify the iPhone LiDAR measurements and improve the quality and spatial coverage of the reconstructed environment;
- Studying the potential of the proposed system for real-time mapping using the iPhone's onboard sensors and wireless communication capabilities;
- Assessing the accuracy and scalability of the resulting maps for large-scale forest mapping and forest digitization;
- Preparing datasets, experimental documentation, and reproducible software components whenever applicable;
- Writing and documenting the results in the form of a scientific article for submission to an international conference or journal;
- Supporting the scientific dissemination of the work through technical reports, software documentation, presentations, and other relevant outputs.

The overall objective is to develop and validate a comprehensive system demonstrating the practical use of smartphone sensors for environmental mapping and forest digitization, providing a valuable tool for researchers, conservationists, and other users working in natural environments.

Regulation: This call process shall comply with the applicable national legislation and regulations governing research grants, namely the Research Fellowship Holder Statute (*Estatuto do Bolseiro de Investigação*), approved by Law no. 40/2004 of 18 August, in its current wording, and the Regulation of Research Fellowships of the FCT (*Regulamento de Bolsas de Investigação*) in force whenever the grant is directly or indirectly funded by FCT, or, when applicable, the ISR Regulation of Research Fellowships approved by FCT.

Regime: The attribution of the fellowship does not generate or entitle a relation of a legal-labour nature, and the fellowship is undertaken in an exclusive dedication regime. The fellowship holder is awarded the Fellowship Statute of the ISR, in its current wording, according to the Research Fellowship Holder Statute, and according to the Regulation for Research Fellowships applicable.

Location: The activities will take place at the *Instituto de Sistemas e Robótica – Universidade de Coimbra*.

Duration: 3 months**.**

Scientific orientation: Professor David Portugal.

Financial conditions: The amount of the fellowship is **€ 1359.64**, in accordance with the table of values of the scholarships awarded directly or indirectly by FCT in Portugal (https://www.fct.pt/wp-content/uploads/2026/03/Tabela-de-Valores-SMM-2026.pdf), to be paid by bank transfer.

Selection and attribution criteria: The selection methods to be used will be **a) Curricular Evaluation** (0.3*a1 + 0.4*a2 + 0.3*a3) with a valuation of **100%**. If the Jury deems it necessary, an interview may be carried out with the candidates placed in the first positions according to the ranking resulting from the above criteria. In this case, the final score will include the **a) Curricular Evaluation** (0.3*a1 + 0.4*a2 + 0.3*a3) with a valuation of 70% and the **b) Interview** (0.5*b1 + 0.5*b2) with a valuation of 30%.

a) Curricular Evaluation

Criterion a1. Absolute merit of the candidate, considering his/her performance in the master and bachelor degree, or integrated master degree. (**30%**);

Criterion a2. Knowledge of tools and methodologies related to mobile robotics, 3D perception, sensor fusion, localization, mapping, and environmental digitization. Experience demonstrated through coursework, research, or participation in R&D projects involving robotics, computer vision, SLAM, LiDAR processing, mobile sensing, sensor calibration, odometry estimation, point-cloud processing, outdoor mapping, forest mapping, or related areas will be valued. Specific knowledge or experience with iOS development, Swift programming, smartphone sensor APIs, LiDAR sensing, RGB imagery, inertial sensing, GPS/GNSS, ROS, ROS-compatible data formats, multimodal sensor fusion, EKF, FGO, SLAM, depth completion, and real-time mapping will be particularly valued. (**40%**);

Criterion a3. Technical and programming skills. Strong proficiency in Swift and/or C++, Python, and software development for robotics or mobile sensing applications. Familiarity with iOS development, Linux-based development, ROS, sensor integration, real-time data processing, point-cloud processing, 3D reconstruction, computer vision, and mapping frameworks will be valued. Knowledge of scientific experimentation, field testing, data analysis, software documentation, and scientific writing will also be considered an asset. (**30%**).

b) Interview (should it occur)

Criterion b1. Motivation to work on the project. (**50%**);

Criterion b2. Competence in the oral response to questions on the selection criteria subjects. Appropriate spoken English skills will be valued. (**50%**).

Jury responsible for selection:
- President: Professor Doctor David Bina Siassipour Portugal;
- 1st Member: Professor Doctor Paulo José Monteiro Peixoto;
- 2nd Member: Professor Doctor João Luís Ruivo Carvalho Paulo.

Formalization of application: Applications must be formalized by sending the following elements:
(1) Letter of motivation **— mandatory**;
(2) Curriculum Vitae (CV) **— mandatory**;
(3) Copy of the Certificate of Qualifications (Master degree) with the final average **— mandatory**;
(4) Proof of enrollment in a PhD or non-degree course of a Portuguese higher education institution, or a Declaration on the Honor by the candidate that he/she will enroll in the course until the date of contract signature **— mandatory**;
(5) A declaration under honour by the candidate listing any fellowships received, their type and duration **— mandatory if the candidate has received any fellowships in Portugal**.

Applicants with academic degrees obtained abroad will be required to present a Certificate of Recognition in accordance with applicable law. This document is mandatory only in the contractualization phase.

Application submission: The applications shall be sent by email to gustavo.bongiovi@isr.uc.pt with CC: davidbsp@isr.uc.pt, specifying in the subject: **Refª ISR-UC-BIM-1**.

Submission of applications: The application process is open from **21-September-2026 until 02-October-2026.**

Form of publicity / notification of the results: The results of the evaluation will be publicized at the ISR-UC website through a list ordered by the final grade obtained, with the candidates being notified by email. After the dissemination of the results through email, the candidates must consider themselves, from the outset, notified to, if they wish, express themselves in a prior hearing within a maximum period of 10 working days after that date. At the end of this period, the selected candidate must consider himself summoned to start the grant.

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