NOTICE OF INTERNATIONAL CALL TO HIRE 1 PHD STUDENT RESEARCHER AT THE ISR-UNIVERSITY OF COIMBRA IN THE SCOPE OF THE PROJECT CAPTURE-DN | Refª MSCA-CAPTURE-ISR-DC9

Application period: 26-Nov-2026 to 10-Jan-2027

The Institute of Systems and Robotics (ISR) opens an international **call to hire one (1) PhD Student Researcher**, with the internal reference "MSCA-CAPTURE-ISR-DC9", under a Full Time Fixed-Term Employment Contract with uncertain duration (*Contrato de Trabalho a Tempo Inteiro a Termo Resolutivo Incerto*) to pursue PhD studies at the University of Coimbra and develop the PhD research at the ISR within the scope of the project "**CAPTURE: Improved Diagnosis, Monitoring and Treatment through European Doctoral Collaboration in Capsule Endoscopy**", funded by the European Union through the Marie Skłodowska-Curie Actions (MSCA) Doctoral Network Capture, grant agreement number **101311908**. The Doctoral Candidate will work specifically in the "DC 9: Localization of capsule and pathologies within gastrointestinal system".

1. About the recruiting institution

Employer: Institute of Systems and Robotics - University of Coimbra

Department: Department of Electrical and Computer Engineering at the University of Coimbra

Location: Department of Electrical and Computer Engineering, University of Coimbra - Polo 2, 3030-290 Coimbra, Portugal

Description: The Institute of Systems and Robotics is a private, non-profit research institution founded in 1992 and based at the University of Coimbra (ISR-UC). Its mission is to build a world-class multidisciplinary research team capable of conducting cutting-edge research in several important areas of science and technology. As in previous evaluation cycles, ISR-UC was awarded an EXCELLENT rating by the international evaluation panel of the Portuguese Foundation for Science and Technology (FCT) in 2025. The institute benefits from modern laboratories equipped with a wide range of state-of-the-art electronic components and advanced equipment, supporting innovative research and technological development.

2. About the position

Employment Type: Fixed-term full-time employment contract of uncertain duration (*Contrato de Trabalho a Tempo Inteiro a Termo Resolutivo Incerto*)

Project Reference: Marie Skłodowska-Curie Actions (MSCA) Doctoral Network Capture, grant agreement number 101311908

Expected Start Date: 1 August 2027

Expected Duration: 36 months

The doctoral candidate will be enrolled in a PhD programme leading to the award of a doctoral degree and it will participate in the network-wide training programme, including international conferences, workshops, transferable skills training, and secondments.

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3. About the CAPTURE project

The CAPTURE project is an EU-funded Marie Skłodowska-Curie Actions (MSCA) Doctoral Network dedicated to advancing wireless capsule endoscopy (WCE) through developments in computer vision and artificial intelligence. The project aims to improve image-based diagnosis, monitoring, and treatment by developing methods that reduce clinicians' workload, enhance imaging quality, and support more accurate and timely diagnoses.

CAPTURE combines research with a strong focus on doctoral training, preparing a new generation of researchers to work at the interface of technology and medicine. The consortium brings together expertise from academia, industry, and hospitals, ensuring that the research is both scientifically rigorous and clinically relevant.

The project focuses on inflammatory bowel disease (IBD), reflecting its growing prevalence in Europe. As many of the methods developed have broader applicability, the project will also consider other gastrointestinal diseases. These goals will be achieved through the recruitment and training of 15 doctoral candidates in an international and intersectoral environment, providing interdisciplinary expertise across the technical, clinical, and applied aspects of WCE.

4. About the Doctoral Candidate (DC 9) project

DC 9: Localization of capsule and pathologies within gastrointestinal system.

Objective: Track and localize capsule throughout gastrointestinal system to accurately localize and classify pathologies.

Expected Results:

- Apply 2D images to estimate capsules' trajectory.
- Refine and correct obtained trajectory through the capsules' electromagnetic radiation

Work Plan:

1. Develop SLAM-approach for trajectory estimation based on 2D images under non-rigid motion of intestines. For that purpose, a front-end tracking based on robust monocular visual odometry will be used. Next a non-rigid correction based on local deformations graphs will be applied. Then an intestine-specific depth and pose network will be trained on EndoSLAM/C3VD. Evaluation will be performed using (a) Trajectory: absolute trajectory error and relative pose error on the C3VD dataset (per-segment and whole-sequence). (b) Robustness: drift versus path length. (c) Coverage: percentage of mucosa covered (C3VD has coverage maps).
2. Develop method for robust electromagnetic tracking and localization, where a sensor array of 3-axis electromagnetic sensors will be distributed in 3D. Calibration and distortion compensation will be based on a calibration phantom. The 3D positions will be estimated based on an electromagnetic model augmented with regularization and prior constraints. The estimation itself will be performed using robust nonlinear solvers with outlier rejection.
3. Find correspondences between the methods and use one to refine the other.
4. Use knowledge of the topological structure of the gastrointestinal tract to perform localization based on semantic similarity of the images.
5. Use pathology recognition and type to constrain localization. Lesions will be considered as semantic landmarks with geometry/visibility priors. To ensure the technical robustness of the AI tools stress tests will be performed. Vision stress tests will include motion blur, specular bursts, low light and occlusion by fluids, bubbles, and debris. Electromagnetic sensors stress will include the effect of metallic object proximity, sensor dropout, and baseline drift. In order to make the AI solutions explainable we propose

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to develop a patient-facing summary, explaining what the system does, the data used and how privacy is protected. To evaluate the approach with patients, a cohort will be enrolled reflecting the population undergoing WCE/colonoscopy and exposes the system to meaningful anatomical/physiological variation.

5. Key responsibilities

- Complete the doctoral education until obtaining a doctorate.
- Carry out research of good quality within the framework described above.
- Academic publications and popular science dissemination.
- Participate in the ISR, UC and Coimbra research groups.
- Participate in the network's joint research and training activities, both online and in person across the CAPTURE partner institutions and contribute to CAPTURE project deliverables in accordance with the Description of Action and the project's governance procedures.
- Participate in international activities such as conferences and/or research stays at foreign educational institutions. Particularly, secondments of a few months' duration are foreseen to Norwegian University of Science and Technology (NTNU) and University of Thessaly (UTH).

6. Employment Conditions

The doctoral candidate will be employed by the Institute of Systems and Robotics, within the legal provisions of the Portuguese Labour Code, Law no. 7/2009, February 12, in its current wording and other applicable legislation and regulations.

The position is funded by the European Union under the Marie Skłodowska-Curie Actions Doctoral Networks programme.

The successful applicant must devote full working time to the project and the doctoral training programme.

The contractualization with the selected candidate will only occur when he or she provide to ISR a (i) proof of enrollment in a PhD program in Intelligent Systems and Electrical Engineering at the University of Coimbra, (ii) sign the declaration stating full time and exclusive dedication for the action and (iii) proof of not been working/living in Portugal for the last 12 of 36 months through diplomas, work certificates or even flight tickets, passport stamps, etc.

7. Salary and conditions

The gross monthly remuneration to be attributed corresponds to the amount of **€2347.26**, calculated based on the amount funded by the European Commission for the living allowance, on full time and working exclusively for the project, plus holiday and Christmas allowances, as well as the meal allowance (indexed to the amount applicable to employees with a public employment relationship).

In addition to the monthly remuneration, according to European Commission rules and the available budget, the following allowances will also be awarded:

- Mobility allowance: **€580.54** per month
- Family allowance: **€539.66** per month (subject to family situation)

"Family" means persons linked to the researcher by marriage (or a relationship with equivalent status to a marriage recognised by the country's legislation where this relationship was formalised) or dependent children who are actually being maintained by the researcher.

These amounts are gross amounts, subject to taxation according to Portuguese labour law. Consequently, the net salary/net allowances result from deducting compulsory employee social security contributions as well as direct taxes and any other applicable taxes/contributions.

The Doctoral Candidate benefits also from:

- Social security coverage.
- Personal Accidents insurance.
- Training and career development opportunities.
- International mobility and networking opportunities.

8. Required selection criteria

- National, foreign and stateless citizens holding a Master degree* in the scientific area of Electrical or Biomedical Engineering (or in scientific areas related to that for which the selection procedure is opened) may apply to this selection procedure, who are currently enrolled in, or will be enrolled in, by the date the contract is signed, a doctoral in Intelligent Systems and Electrical Engineering at the University of Coimbra.
- At the date of recruitment, you must NOT have been awarded a doctoral degree.
- Researchers who have successfully defended their doctoral thesis but have not yet formally been awarded the degree are also not eligible.
- You must meet the requirements for admission to the PhD program at the **University of Coimbra**.
- Excellent oral and written communication skills in English.
- You must comply with the MSCA mobility rule: you must not have resided or carried out your main activity (work, studies, etc.) in the country of the recruiting organisation for more than 12 months in the 36 months immediately before recruitment (short stays such as holidays are not taken into account).

*If the Master degree was awarded by a foreign higher education institution, it must be recognised by a Portuguese higher education institution under Article 25 of Decree-Law No. 66/2018 of 16 August, which approves the legal framework for the recognition of academic degrees and higher education diplomas awarded by foreign higher education institutions, and Article 4(2)(e) of Decree-Law No. 60/2018 of 3 August. Any formalities established therein must be completed by the date of contract signature.

9. Preferred selection criteria

Preference may be given to candidates with:

- Background in Electrical Engineering, Biomedical Engineering, Computer Engineering, Computer Science, Biophysical Engineering or closely related areas.
- Excellent analytical and communication skills.
- Ability to work in an international and interdisciplinary environment.

10. How to apply

10.1. The applications must be submitted by email to gustavo.bongiovi@isr.uc.pt and helder@isr.uc.pt specifying in the subject: **Refª MSCA-CAPTURE-ISR-DC9**

10.2. The **applications must be submitted** with the following documents in PDF:

a) Detailed and structured Curriculum Vitae in English - containing the candidate (i) full name, (ii) email address, (iii) description of the concluded degrees, (iv) list of scientific and technological production (publications, conference presentations, patents and others) and (v) List of previous R&D and professional experience.

b) Copy of academic qualification certificates. The selected candidate for the position who holds a Master's degree obtained abroad must submit recognition of their degree at the time the contract is signed, pursuant to Decree-Law No. 66/2018 of 16 August, under penalty of exclusion.
c) Preferably a complete list of the concluded courses/subjects/curricular units and their classifications.
d) Motivation letter.
e) Copies (one PDF file per work) of the works that the candidate considers most significant for the evaluation.
f) Any other documents that the candidate considers relevant to the assessment of merit (optional).
g) Signed Honor Declaration that the candidate is eligible for the position and eligible to enroll in the PhD program in Intelligent Systems and Electrical Engineering at the University of Coimbra – please use the template available at: https://docs.google.com/document/d/1ef10871LP7953dlEbV-W6Lgp2nnhutv8R-fe_7O5I1k

10.3. The applications must be submitted between **26-November-2026** and **10-January-2027**.

11. Evaluation process

11.1. Evaluation Jury

- President: Doctor Hélder Araújo, Full Professor at the University of Coimbra
- 1st Member: Doctor Catarina Barata, Assistant Professor at the University of Lisbon
- 2nd Member: Doctor Alexandre Bernardino, Associate Professor at the University of Lisbon
- Alternate Member: Doctor Nuno Gonçalves, Assistant Professor at the University of Coimbra

11.2. Evaluation criterias

A) Curriculum evaluation (70%)

Criterion A1. Academic Qualifications (30%)
Criterion A2. Academic, Professional and R&D experience related to the objectives and work plan of the position (40%)
Criterion A3. Experience related to section 9 and skills in tools and methods related to the position (30%)

B) Interview (30%)

Criterion B1. Motivation to pursue a PhD and to work on the topic (50%)
Criterion B2. Competence in the oral response to questions on the subjects presented by the jury during the interview. Appropriate spoken English skills will be valued (50%)

11.3. Evaluation procedure

The selection of the successful candidate will be carried out through the evaluation of the scientific and curricular achievements. The deliberations are held by roll call voting requiring the absolute majority of votes of the members of the Jury.

The evaluation will be structured in two parts. By the end of the application period, the Jury will analyze the applications and meet to discuss, check the eligibility of the candidates and rank them based on the **A) Curricular Evaluation** (0.3*A1 + 0.4*A2 + 0.3*A3) with a provisional valuation of 100%. The best four candidates, only with a provisional valuation score higher than 65%, will be invited for an interview with the evaluation Jury. After the interview, the Jury will again meet to discuss and rank the candidates, with the final valuation based on **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%. Only candidates who score 65% or higher in the final evaluation may be offered the position.

12. Final Decision and notification of the results
The list of admitted and excluded candidates and the final classification list will be publicised on the website of ISR (https://isr.uc.pt/opportunities), and all candidates will be notified by electronic mail.

13. Our commitment to inclusion
ISR is committed to equality, diversity and inclusion. Applications are welcomed regardless of gender, age, disability, ethnic origin, religion or belief, sexual orientation, or nationality. Candidates from underrepresented groups are particularly encouraged to apply.

14. Contact Information
For more information, please contact Gustavo Bongiovi through gustavo.bongiovi@isr.uc.pt

15. *Edital em Português disponível em*
https://isr.uc.pt/opportunities

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