Marie Sklodowska-Curie Doctoral Network, RAICAM – Robotics & AI for Critical Asset Monitoring

We are currently recruiting PhD candidates for

TITLE

PhD Position in Advanced Manipulation Using Flapping-Wing Aerial Robots at the Universidad de Seville, Spain

OFFER DESCRIPTION

Flapping-wing robots are a very promising technology to perform safe, robust and energy saving aerial flights, increasing the reach of these systems, and opening the possibility to perform manipulation in inaccessible locations. The absence of propellers makes them quieter and safer, enabling them to fly close to humans and collaborate with them. However, this technology is not mature yet, since it suffers from a hard limitation in size and weight. This fact impulses the development of very lightweight manipulators with sensing capabilities. It is crucial that the manipulator is composed of ultralight structures, sensors, and actuators to reduce the weight of the system.

This research will also investigate the development of grasping tools composed of flexible and soft materials to make a soft interaction with the environment. Advanced control algorithms will be developed to deal with the physical interaction with unknown environments and perform dexterous manipulation. Moreover, new sensor systems and algorithms will be developed to estimate parameters of the environment and result in a better interaction with the environment.

Host: Universidad de Seville, Spain

The GRVC (Grupo de Robótica, Visión y Control) is an internationally leading research group in robotics that belongs to the University of Seville. It includes ten academics, seven postdoctoral researchers, 16 PhD students and 30 research assistants. It has participated in 41 international projects, being the leader of 7 European projects, 30 national projects and 90 projects with companies. Currently, GRVC is participating in 12 H2020 projects including leading the H2020 AERIAL-CORE. The principal investigator of GRVC has the European Project GRIFFIN ERC Advanced Grant 2017.

The PhD project will be hosted at the GRVC Robotics Lab in the Engineering School of the University of Seville, and the doctoral student will be supervised by Prof. Begoña Arrue and Prof. Anibal Ollero. The research will have access at GRVC Robotics Lab to all the equipment necessary to perform the sought investigation, including robots, sensors, labs and indoor/outdoor facilities. Besides working on their project, the successful candidate will participate in network-wide training events like summer schools and retreats. Moreover, the PhD student will conduct secondments at other network partners.

The successful candidate will receive an employment full time contract and a competitive gross salary. The expected start date for the position is September 2023.

Supervisor(s): Prof Anibal Ollero and Prof Begoña C. Arrue

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement 101072634

Overview:

The RAICAM Doctoral Network will train the next generation of robotic systems engineers who will develop creative and innovative multi-disciplinary skills, enhancing their inter-sectoral mobility.

The central scientific goal of RAICAM is to conduct research into the underlying technologies in Robotics and AI that will unlock the capability for a fleet of robots to conduct coordinated sampling campaigns in industrial facilities with varying levels of autonomy.

This will be achieved by having a highly integrated, impact-driven training and research programme with strongly linked interdependencies between the individual research projects. There are three fundamental technology work packages (WPs): Environmental Interaction, Perception and Cognition, and Human-Robot Interaction (HRI). Many of the individual projects have elements relating to other WPs, ensuring that there is collaboration between them.

This project will investigate how to undertake robotic sampling using a multi-disciplinary approach that will fuse fundamental research with systems-level engineering. In order to realise this vision, researchers will investigate a number of fundamental technological challenges:

- What levels of perception and cognition are required for a robot to undertake autonomous missions in complex environments?
- How can a robot take repeatable samples from arbitrary surfaces that may be inaccessible to humans?
- How can fleets of heterogeneous robots conduct coordinated sampling campaigns in complex environments?
- How can human operators effectively and efficiently interact with fleets of heterogenous robots with varying levels of autonomy?

This inherently multi-disciplinary challenge will require a new generation of highly skilled robotic systems engineers who understand the complex interactions between the fundamental technologies. For example, the ability of a robot to detect an object is meaningless without understanding why it needs to be detected, what detection of the object means to the mission plan, and how the robot will interact with it. These questions can only be answered when the researcher has a systems level understanding.

References

- At the recruitment date (between January and September 2023), be in the first four years of your research careers and have not been awarded a doctoral degree.
- Not have resided or carried out your main activity (work, studies, etc.) in the country of the recruiting institution for more than 12 months in the 3 years immediately prior to the recruitment date (between January and September 2023).
- University curricula.
- Skills and academic background matching with the research project, and academic records (including transcripts) at masters level or equivalent degree level.
- Creative and innovation potential, ability to think out of the box.
- Motivation of the candidate for inter-disciplinary research.

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Skills and qualifications required:

Essential Skills & Qualifications

- *An MSc qualification in Robotics, Electrical & Electronic Engineering, Mechatronic Engineering, Aerospace Engineering, Mechanical Engineering or other equivalent discipline*
- *An MSc dissertation on a robotic topic*
- *Evidence of strong mathematical background*
- *Evidence of practical experimental work in robotics*
- *Evidence of solid knowledge in manipulator modelling and control*

Desirable Skills & Qualifications

- *Evidence of using ROS/ROS2*
- *Knowledge/experience relating to force/impedance/whole-body motion control*
- Knowledge/experience relating soft material and bio inspired systems.

All interested applicants meeting the eligibility requirements, irrespective of age, gender, race, disability, religion or ethnic background are encouraged to apply.

Website for additional job details: https://www.raicam.eu.

University of Seville

Founded in 1.505, the University of Seville is the second largest in Spain in terms of number of students (over 70.000), and the first in Andalusia. At the centre of gravity of the city's social and cultural life, the university owns an extensive historic-artistic collection amounting to thousands of pieces. Today, the University of Seville is well known for its vital research in Technology and Science, which not only aids the development of science as a whole but enriches and develops the culture of Seville and Andalusia. Seville, capital city of Andalusia, located in the South of Spain, has some 800.000 inhabitants. The city is known worldwide for its security, its nice weather (warm winters and hot summers, which gets people active outdoors), its warm and festive atmosphere, its kind people, a reasonable cost of living, as well as its traditions and village festivals. Seville is, additionally, a multicultural, open and welcoming city, where many cultures have existed together in the past and still do this day. All of this makes Seville an ideal city to study in. For more information on the University and living in Seville please visit:

https://www.youtube.com/watch?v=zdBV-8zcbtI
https://internacional.us.es/download-zone
https://www.visitasevilla.es/en

Interested?

We look forward to receiving your online application with the following documents:

- An up-to-date CV.
- A cover letter describing your motivation for applying for the position and the relation to your prior experience.

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- A project proposal for the position (max 2 pages). Proposals can include a research statement, a short plan related to the position, a plan for publications and research risk management.
- A list of Degrees and grade transcripts.

The position for which you are applying is part of a call for 10 candidates within the RAICAM project. If you have applied or are planning to apply for any of the other positions, please provide a statement containing all the positions you applied for and rank them according to your preferences.

Optional:

- A list of scientific and technical publications, awards and certifications that are relevant for the vacancy.
- Up to 3 relevant publications in related scientific fields.
- Up to 3 reference letters.

Candidates will be selected based on their merits in the fields related to the ESR area of expertise. The board of the network will evaluate all applications, and the top-ranked candidates will be invited for interviews. Note that your data will be made available to the RAICAM partners for the purpose of conducting the assessment of all candidates.

Applications including all the requested documents must be submitted by email to: **raicam@us.es**, specifying at the beginning of the subject "DC3…". The application and all the accompanying documents (or official transcripts) must be written in English and attached in pdf format.

Closing date: Applications must be submitted before **July 31st, 2023**. Applications via postal services will not be considered.

After the closing date, the institution will make a first analysis to determine that the candidates meet the eligibility criteria of the call. The institution will publish within a maximum period of 15 working days of the closing date the list of candidates admitted in the selection process. Non-eligible candidates can claim objections to the preselection process during the 3 next working days after the announcement of the list. Final list of the admitted candidates will be announced within a maximum period of 10 working days. The lists will be published in the official webpage https://investigacion.us.es/investigacion/contratos-personal and in this Euraxess announcement (https://euraxess.ec.europa.eu/jobs/868126).

For further information please contact Prof. Begoña Arrue at raicam@us.es.

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