Robocademy – The Maritime Robotics Research and Training Network

The Robocademy ITN will establish a European training and research network to develop key skills and enabling technologies in underwater robotics for the scientific and economic exploration of the oceans (e.g. offshore oilfield of the future). Through the close collaboration of leading research institutes, academia, industry, and SMEs in robotics, marine technology, marine science, and offshore industry, Robocademy will provide first-class training and research opportunities for ESRs. In well-defined and well-tutored PhD research projects, the Robocademy fellows will push the state-of-the-art in the area of robust, reliable and autonomous underwater robots.

Specialized scientific training modules will enable the fellows to obtain both a sound basis in robotics and an introduction to topics that are specific to their research areas. This will be complemented by a high quality soft-skills training programme for and the opportunity to gain extensive on-site hands-on experience through secondments to maritime industry and oceanographic research institutes. Thus Robocademy will foster the formation of young professionals that are able to meet the urgent demand for highly qualified researchers and engineers in the growing field of underwater systems and robotics.

For the European industry and scientific community, such specialists are crucial gain ground against competitors from North America and Asia. For the ESRs, the Robocademy training will open up excellent career opportunities in both academia and industry.

For more information, please visit: www.robocademy.eu or email contact@robocademy.eu

Job Posting Reference: Robocademy ESR-6

Post Type: Early Stage Researcher (ESR)

Start Date: October 2014

End Date: October 2017

Host Institution: University of Girona

Host Institution Description:

The Computer Vision and Robotics Research Group (VICOROB) of the University of Girona (UdG) is devoted to the research related to the areas of computer vision, image analysis and underwater robotics. Our team focuses its efforts in the study and further development of new algorithms, methods and techniques of image processing needed for mapping the seafloor.

Background and Motivations

More than 70% of our planet's surface is covered by water. Our oceans provide critical energy and food resources, and drive the patterns of our weather across the globe. However, we know less about the ocean floor than about the surface of other planets of the solar system such as Mars. For this reason, underwater robotics is of great importance to explore and understand the oceans, as well as for monitoring the human impact in the energy and food resources that the oceans offer us. The Deep Water Horizon disaster in the Gulf of Mexico in 2010 underpins the oil industry's desire to install, operate and decommission its infrastructure particularly in deep water as well as the environmental risks associated with subsea operations. Unmanned robots perform inspection, repair and maintenance tasks in a cost effective, safe and timely manner.

As worldwide concern grows over global warming and pollution, autonomous underwater robots play an increasingly important role in making the essential measurements that develop our understanding and monitoring of key scientific phenomena. And as global threats to our national security grow, unmanned subsea robots are now routinely deployed to investigate potential threats in economically critical ports and harbours, and for humanitarian demining along our coastlines. Unmanned Underwater Vehicles (UUVs) do not only have to be sturdy and well-engineered. More importantly, they have to be equipped with advanced cognitive and reasoning capabilities to perceive and understand their environment and to act accordingly.

The underwater environment presents key challenges to the UUVs' sensory capabilities, especially when inspecting submerged structures in a dynamic environment such as an anchor chain on an oil platform (FPSO). Although the underwater medium presents limited optical visibility, optical sensors present the advantage of higher resolution and data rate with respect to acoustics when inspections are to be carried out at short range.

Aims and Objectives
- Develop new algorithms for image enhancement to compensate the effects of the medium (absorption and scattering)
- Develop new algorithms for optical mapping in a dynamic environment.

Expected Outcomes

- New algorithms and approaches for optical mapping of submerged structures validated in real scenarios using UdG underwater robots.

Tasks and Responsibilities
- Main research tasks:
    - Development of new solutions for:
        - Image enhancement
        - Mapping in dynamic environments in which some of the mapped objects may change their position

    Responsibilities:
    - The main responsibility of the PhD candidate will be to carry out the above described research
    - Participation in training events and meetings within the network and at international conferences outside the network
    - Participation in organization of the Local Training Workshop

Deliverables
- PhD thesis by the end of the project
- Publication of peer review scientific papers.

Secondments and Internships
Two secondments are planned: The first one (4 months) at NERC to learn about optical mapping algorithms developed by the National Oceanographic Centre, Southampton, and the second one (3 months) at CMRE to work with ESR8

Person Specifications

Educational and/or Professional Qualifications	A successful candidate must hold a Masters degree in Physics, Computer Science, Planetary Science, Mathematics or related fields.
Experience and Training	Previous research experience is a plus.
Skills	A candidate should have good oral and written communication skills in English. Good programming skills are required.
Personal Attributes	We are looking forward for a talented and highly motivated candidate. He/she should have an independent and well-structured working style, but has to be able to work in teams as well.

Early-Stage Researchers (ESR) must, at the time of recruitment, be in the first of four years (of full-time equivalent research experience) of their research careers and have not yet been awarded a doctoral degree. The post of Early-Stage Researcher is for 36 months, and my be done in conjunction with a doctoral degree.

For all available positions, at the time of recruitment, applicants must not have resided or carried out the main activity (work, studies, etc) in the country of the host institution (defined as the research institution or company cited in the job posting) for more than 12 months in the 3 years immediately prior to the reference date. Compulsory national service and/or short stays such as holidays are not taken into account. The applicant must not have spent more than 12 months in the 3 years immediately prior to their recruitment at the host organization.

Person Specifications

Applicants must send: a curriculum vitae (CV) and a cover letter to vicorob@eia.udg.edu stating clearly your qualifications for the post, the job posting reference number and title, host institution and research stream. They should also include two letters of reference from your referees. Any applications and general emails not meeting these requirements will not be considered.

Applicants can apply for a maximum of 2 different posts, with each post ranked in terms of preference. If you are applying for multiple job postings, please also indicate the order of preference.

If is not possible to send the documents by email, applications may also be sent by post to: University of Girona, Att. Dr. Rafael Garcia, Av. Lluis Santalo, Edifici P4, 17003 Girona, Spain.

The deadline for the submission of applications is **30. July 2014**

For more information about the research or host institution, please contact prof. Rafael Garcia (Rafael.garcia@udg.edu)