PhD Opportunity at the Universitat de Girona - Shared Autonomy and Mission Planning for Underwater Robots (AI4SEA Project)

The University of Girona (UdG) is offering a PhD position within the research group **ViCOROB (Computer Vision and Robotics)**, a leading group with more than 30 graduated PhD students over the last decade. The successful candidate will join the **Underwater Robotics Research Center (CIRS)** and contribute to the **AI4SEA** national project, which focuses on intelligent autonomous underwater systems for ecological restoration.

This PhD topic addresses one of the project's most innovative challenges: enabling **shared autonomy** between autonomous underwater vehicles, large language models (LLMs), and human operators **under severe communication constraints**, such as those imposed by acoustic channels.

Research Topic

Shared Autonomy under Severe Communications Constraints

This PhD will focus on the design and implementation of a novel mission planning and execution framework for an Intervention-AUV (I-AUV), integrating:

- **Classical AI planning** using the *Planning Domain Definition Language (PDDL)*
- **State-of-the-art Large Language Models (LLMs)** for translating human goals into grounded mission specifications
- **On-board Light-weight multimodal LLMs (LLLMs)** for interpreting sensor data and supporting local replanning
- **Shared autonomy mechanisms** that allow efficient cooperation between the robot, a cloud LLM, and human operators through a digital twin interface

The system will handle:

- Goal translation from natural language
- Mission plan generation
- On-board execution monitoring
- Error handling and dynamic replanning
- Robust communication of compressed semantic information over acoustic channels

This research will play a key role in enabling reliable and explainable autonomy for underwater restoration missions.

Requirements

Applicants must have:

- A total of **300 ECTS** (including at least 60 at the master's level) in computer science, robotics, AI, mechatronics, or related fields
- Strong programming skills in **Python** and **C++**
- Good background in **machine learning**, **robotics**, or **AI planning**
- Fluency in **English**, written and spoken

Highly valued:

- Experience with **ROS2**, robotic systems, symbolic planning or behaviour trees
- Knowledge of **LLMs**, multimodal models, or fine-tuning techniques
- Familiarity with simulators such as **Gazebo**, **IsaacSim**, or other physics-based environments
- Experience working with underwater or field robotics is a plus

---

Conditions

- **Full-time contract** (37.5 h/week)
- **Duration:** 1 year, renewable up to **3 years** based on performance
- **Salary:** €18,180.48 (1st and 2nd years), €19,479.12 (3rd year), following UdG regulations
- **Workplace:** Onsite at the **CIRS facilities** in Girona (Spain)
- **Expected starting date: February 2026**

Application

Candidates must apply by completing the application form (LINK) and submitting the required documentation before **05/12/2025.**

The selection process may include:

- An online interview
- A knowledge test covering English, programming, and general concepts in AI, planning, machine learning and/or robotics.