Predoctoral Research Position – IberianCAMELS Project

Development of an environmental flows decision support system based on large-sample hydrology and machine learning techniques (IberianCAMELS)

About the project

IberianCAMELS is a 3-year research project aimed at developing a **decision support system (DSS)** for evaluating ecological flow regime scenarios across the Iberian Peninsula. The project integrates **large-sample hydrology (LSH)** datasets, **deep learning rainfall-runoff models**, and **hydrological alteration analyses**, with the ultimate goal of improving the identification and management of ecological flows in highly regulated river systems of Spain and Portugal.

A key component of the project is the creation of **CAMELS-IB**, the first comprehensive hydrometeorological database for the entire Iberian Peninsula, including information on reservoirs, catchment attributes, and long-term hydrological series. The project investigates the performance of **deep learning approaches (e.g., LSTMs)** relative to conceptual hydrological models and assesses how improved natural flow simulations can support environmental flow regime (EFR) planning.

The work will be carried out in collaboration with an experienced and multidisciplinary team spanning hydrology, machine learning, ecological flows, and water resources management.

Job description

The selected candidate will join the IberianCAMELS research team as a **Predoctoral Researcher**, contributing to the development of the CAMELS-IB dataset, hydrological modelling experiments, and the environmental flows DSS. The position will enable the candidate to pursue a **PhD thesis** aligned with the objectives of the project and within a doctoral programme in engineering, hydrology, environmental sciences or related fields.

The work will include data processing, programming, model implementation, statistical analysis, preparation of scientific papers, and participation in meetings, conferences and dissemination activities.

CARRETERA DE MONCADA A NÁQUERA
KM 4,5.
46113 MONCADA (VALENCIA)
TEL: 96 342 41 62
http://www.uv.es/cide/

Key responsibilities

- Contribute to the construction, documentation and validation of the **CAMELS-IB hydrological database**.
- Implement and test **conceptual hydrological models** at large spatial scales.
- Apply and benchmark **deep learning rainfall-runoff models** (LSTMs and related architectures).
- Support the analysis of **hydrological alteration**, ecological flow regimes, and generation of EFR scenarios.
- Assist in developing the **decision support system** for ecological flow evaluation.
- Prepare internal reports, contribute to scientific publications, and present results at national and international conferences.
- Participate in team meetings and collaborate closely with all project partners.

Main requirements

Required

- Bachelor's and master's degree in **Civil Engineering, Environmental Engineering, Forestry Engineering, Hydrology, Geosciences, Environmental Sciences, Computer Science**, or related fields.
- Strong programming skills, preferably in **Python**.
- Solid knowledge of **hydrology**, water resources, or environmental modelling.
- Good spoken and written communication skills in English.
- Ability to work independently and within a multidisciplinary team.

Desirable

- Previous experience with **hydrological modelling** (conceptual or physically based).
- Familiarity with **machine learning techniques**, particularly LSTMs or other deep learning architectures.
- Experience with large datasets, geospatial analysis, or database development.
- Knowledge of ecological flows, river basin planning, or hydrological alteration assessment.
- Experience with open-source scientific workflows (GitHub, Zenodo, etc.).

CARRETERA DE MONCADA A NÁQUERA
KM 4,5.
46113 MONCADA (VALENCIA)
TEL: 96 342 41 62
http://www.uv.es/cide/

Benefits and work environment

- Full-time **predoctoral contract** aligned with national regulations for training of research staff.
- Integration into an active, multidisciplinary research team with strong collaboration networks in Spain, Portugal, USA and Europe.
- Access to computational facilities, open-source modelling frameworks, training opportunities, and participation in international conferences.
- Support for scientific publications and PhD supervision by experienced researchers.
- Dynamic and collaborative working environment committed to equality, professional development and open science.

Term of contract

The contract will follow the duration and conditions of the national predoctoral grant scheme associated with research projects (up to **four years**, aligned with the FPI framework). Renewal will depend on satisfactory progress and annual evaluation.

Salary

The salary will follow the official rates established by the corresponding national predoctoral funding programme (FPI or equivalent), including annual increases and full social security coverage.

Location

The research activities will be carried out primarily at the **Desertification Research Centre (CIDE)**, a joint research institute of CSIC, Universitat de València and Generalitat Valenciana, located in **Valencia (Spain)**.

CARRETERA DE MONCADA A NÁQUERA
KM 4,5.
46113 MONCADA (VALENCIA)
TEL: 96 342 41 62
http://www.uv.es/cide/

CIDE offers a vibrant scientific environment specialized in hydrology, ecological processes, climate impacts and land degradation, with access to dedicated laboratory spaces, meeting rooms and computational resources.

Short research stays at partner institutions within the IberianCAMELS consortium (e.g., UCAM, ULPGC, UPM, and international collaborators) may be encouraged and supported.

Application procedure

Interested candidates should send the following documents in a single PDF file:

1. **Motivation letter** describing interest in the position and relevant experience.
2. **Curriculum vitae** (max. 3–4 pages).
3. **Academic transcripts** of Bachelor's and Master's studies.
4. Contact details of **one or two references**.

Applications should be submitted via email with the subject **"Predoctoral Position – IberianCAMELS"** to: ✉ **javier.senent@csic.es**

Deadline

06/01/2025

Applications will be reviewed as they are received. Shortlisted candidates will be invited for an online interview.

Informal inquiries

For informal questions about the position or the project, please contact: ✉javier.senent@csic.es
We encourage candidates to get in touch before submitting their application if they have any doubts about suitability or project scope.

CARRETERA DE MONCADA A NÁQUERA
KM 4,5.
46113 MONCADA (VALENCIA)
TEL: 96 342 41 62
http://www.uv.es/cide/