

## **Assessing the impacts of sweater intrusion on the socioecological systems of the River Gambia (Africa)**

### **The role**

We offer a 4 years contract to do your PhD within the SALBIA project.

SALBIA is a multidisciplinary project aimed at assessing the ecological (i.e. biological communities and biogeochemical function) and social (i.e. benefits obtained from nature, social structure and well-being) impacts of freshwater salinization in the River Gambia. It combines multiple disciplines (mainly biology, chemistry, ecology, hydrology, and social sciences) and methodological approaches under the umbrella of the Planetary Health framework. The project is structured in five General Objectives (GOs) according to the three facets of salinization impacts that will be assessed and two transversal facets that, respectively, set up the socio-ecological context and the development of cross-disciplinary adaptation strategies. GO1 will use geographical information systems, high-frequency sensors, and multiparametric probes to characterize salinity dynamics in the River Gambia in order to identify the main drivers of salinization incorporating multiple-stressors. It will also explore the coupled resource-human system in the River Gambia through expert consultation and surveys. GO2 will rely on environmental DNA (e-DNA), literature surveys and expert consultation to assess the impacts of salinization on the aquatic biodiversity of the River Gambia. GO3 will use a combination of in-situ measurements and high-frequency sensors, remote sensing, experimental and modelling approaches to assess C cycling fluxes, pools, dynamics and to integrate the estimated fluxes in the NGHGI. GO4 will combine surveys with bibliographic analyses to assess the sociocultural impacts of freshwater salinization on local communities and define potential adaptation strategies. Finally, GO5 will synthesize the results from GOs 1-4 using structural equation modelling and build up an adaptation strategy based on the protocols designed with the local communities.

You will contribute to all the GOs, but the PhD will be focused on modelling, remote sensing and the assessment of social systems. Your main tasks will be:

- Assessing the effects of changes in land uses and climate, including mangrove presence and conservation status on the hydrological dynamics and salinization of the River Gambia.
- Characterizing the resource units, resource system, users, governance and interactions (ecosystem services) of the River Gambia social-ecological system.
- Mapping the main potential areas for C pool burial and inputs of the river Gambia based on mangrove status and satellite imagery of the water colour.
- Mapping the spatial inequalities on the social impacts of freshwater salinization of the Gambia river.
- Defining the interactions between users and the resource system using the IPBES Nature's Contributions to People framework, focusing on the services provided by the river and its catchment area and the most dependent livelihoods in the region.

## What do we look for?

- **Qualifications**

M.Sc. studies (completed or in course) in Earth Sciences, Environmental Sciences, Biology, or Social Sciences.

- **Professional experience**

Previous experience is not required but previous scientific work will be considered an asset

Participation in research projects will be valued.

Fieldwork and laboratory experience will be valued.

Experience in data analysis will be valued.

- **Competences**

Highly motivated person willing to learn and working in the intersection between earth sciences, ecology and social sciences (i.e. planetary science).

Knowledge of Geographical Information Systems (positively valued).

Knowledge on assessing ecosystem services and Nature's Contributions to People (positively valued).

Knowledge of hydrology (positively valued).

Knowledge of ecology (positively valued).

Knowledge of biogeochemistry (positively valued).

Knowledge of environmental DNA (positively valued).

Knowledge of statistical data analysis, preferably with R (positively valued).

Independent working methods, high organizational talent and strong team skills are required.

Experience conducting field work in remote locations under harsh environmental and/or social conditions will be highly valued.

Ability to read and communicate fluently in both English and Spanish.

Personal characteristics such as interpersonal skills, analytical and problem-solving skills, good communication skills, and the ability to work independently and as part of a team are required. Also, initiative, and independence.

Papers published in SCI-journals are not required but they will be positively valued.

## Working conditions

- **Contract duration: 4 years**

- Annual gross salary: according to the Spanish Government call "*Ayudas para contratos predoctorales para la formación de doctores 2022*" (approx. 16,640 € on the first year, progressing to approx. 22,290 € on the fourth year)

- Target start date: Around June-September 2024, following the official resolution of the Government call

## The group

The SALBIA project counts with a large number of researchers (8 from Spain, 8 from other European countries, 1 from Australia, 1 from USA and 8 from The Gambia) and institutions to ensure the feasibility of the project. The PIs of the proposal, who will co-supervise the candidate, cover the main topics of SALBIA. Núria Catalán is a biogeochemist focused on the study of carbon cycling in inland waters, with focus on the effect of anthropogenic pressures. Pablo Rodríguez-Lozano is an environmental scientist and ecologist focused on the human dimensions of river ecosystems through an interdisciplinary lens, combining his experience on river ecology with social sciences disciplines, i.e., environmental perception, environmental ethics, political ecology. Miguel Cañedo-Argüelles is an expert of freshwater salinization, leading several highly cited papers published on the topic, and he is trained in community ecology and biodiversity conservation. The candidate will also benefit from interacting with the

rest of SALBIA team members, who have a strong experience on a wide range of topics directly related to the project such as hydrology, carbon biogeochemistry, GHGs, biodiversity, environmental DNA, mangrove ecology and remote sensing, local people's perceptions and values, social-ecological systems, environmental management and environmental education. Moreover, SALBIA includes some of the key experts on the ecology and management of the River Gambia, with strong links to the local communities.

The candidate will work at the Institute of Environmental Assessment and Water Research (IDAEA) in Barcelona, to which M. Cañedo-Argüelles (IP1) and N. Catalán (IP2) belong, and the Universitat de les Illes Balears, to which P. Rodriguez-Lozano (IP3) belong.

IDAEA was founded in 2008 as a new multidisciplinary research institute, and it is the reference center on environmental science of the Spanish National Research Council (CSIC). IDAEA has cutting-edge infrastructure and technical equipment that will be available for the candidate, including a high capacity computing cluster. The Universitat de les Illes Balears is an historical public university (founded in 1978) leader in teaching and research. It includes 41 Bachelor studies, 33 Masters and 24 PhD programs and has over 15k students enrolled. Additionally, the candidate will benefit from the human, material and equipment resources available from the institutions to which the team members belong (Universidade de Vigo, Universitat Oberta de Catalunya, Universitat de Barcelona, University of Duisburg-Essen, University of Kaiserslautern-Landau, Michigan State University and the University of The Gambia). Finally, the candidate will benefit from the collaboration of institutions working in The Gambia, which can provide human, material and equipment resources in The Gambia.

## The institute

The **Institute of Environmental Assessment and Water Research (IDAEA)** is an environmental science institute devoted to the study of the human footprint on the biosphere. Much of the research work at this institute is centred on two of the great environmental challenges of our time: cleanliness and availability of water and quality of air. Founded in 2008 as a member of the **Spanish National Research Council (CSIC)**, the Institute brings together a wide range of expertise in environmental science. It is organized under two Departments (Environmental Chemistry and Geosciences), established with a strong record of publication in top scientific journals, leading international projects, membership on international committees, and adopting a high-profile contribution to the identification and remediation of environmental problems.

IDAEA has demonstrated strengths in the analysis of organic pollutants and their impact on ecosystems, the study and management of water resources, the development of multivariate resolution algorithms in chemometrics, and in the study of inhalable particulate matter and toxic gases.

IDAEA has been recently awarded with the distinctive **Centre of Excellence "Severo Ochoa"** (2020-2023), distinction that indicates the high-quality scientific leadership and global impact of the work developed at the centre.

We offer a diverse and inclusive environment where no discrimination against disability, gender, nationality, religion or sexual orientation will occur during the selection process.

## How to apply?

Those interested may email their **CV** and **motivation letter** to [nuria.catalan@idaea.csic.es](mailto:nuria.catalan@idaea.csic.es), [pablo.rodriguez@uib.es](mailto:pablo.rodriguez@uib.es) and [miguel.canedo@idaea.csic.es](mailto:miguel.canedo@idaea.csic.es), adding **SALBIA FPI** to the email subject.

**Deadline: 4<sup>th</sup> December 2023**