# FEDTWIN Vacancy at RBINS/ULB

In the framework of the collaborative FED-tWIN research programme between Belgian federal institutes and universities by the Belgian Federal Science Policy Office (BELSPO), the Project SO-BOMP (Southern Ocean Biodiversity Observations, Models and Policy) is recruiting a post-doctoral candidate (for a period of minimum 10 years).

The researcher will be employed half-time at the Université Libre de Bruxelles (ULB) and half-time at the Royal Belgian Institute of Natural Sciences (RBINS). He / she will be a member of the Directorate Natural Environment (OD Nature) at the RBINS and of the Marine Biology Laboratory at the ULB and will work under the co-supervision of Prof Isa Schön (RBINS) and Prof Bruno Danis (ULB). The appointment will be made for a senior scientist (scientific staff, grade SW2) part-time (50%) for the RBINS and as a contractual researcher (scientific staff, scale 530) part-time (50%) for ULB.

## Project Background:

The Southern Ocean (SO) covers 10% of the world's oceans and plays a pivotal role in global oceanic and biogeographic processes. While our understanding of Southern Ocean ecosystems and processes has improved considerably in recent years, our knowledge of the region's biodiversity in comparison to other oceans remains very patchy. Such knowledge gaps hinder our capacity to predict the response of Antarctic marine ecosystems to complex combinations of environmental pressures such as climate change, fisheries and tourism, and to develop and apply suitable conservation policies.

This project aims to increase our knowledge of the Southern Ocean biodiversity in order to develop an adaptive ecosystem-based management framework in an area that is extremely challenging to sample. Improving and sharing our understanding of SO (benthic and pelagic) ecosystems structure, function and variability at different spatio-temporal scales is a pre-requisite to reach this objective.

## The Position:

We are seeking a Research Fellow to work on 'Southern Ocean Biodiversity Observations, Models and Policy'(SO-BOMP). The FED-tWIN researcher will focus on studying Southern Ocean (SO) ecosystems and provide state-of-the-art expertise for environmental management committees in an international setup. Expertise will focus on two research fields: **biodiversity informatics**, and **modelling** of ecosystem dynamics. These insights will be used to develop and evaluate future proposals for **ecosystem-based management** of the SO.

The candidate will have a proven record in Antarctic research and conservation management, and experience with managing complex projects and supervising a group of collaborators in a multicultural, international setting.

The FED-tWIN researcher will have a broad understanding of the importance of spatial and temporal scales to observations, (predictive) modelling and management of SO ecosystems. This approach will allow to document the possible effect of combined stressors such as climate change, fisheries and ocean acidification on contemporary and future ecosystem structure functioning and variability at various relevant spatial and temporal resolutions. All of these are required to develop and adapt a resilient, ecosystem-based management strategy for the SO at the international level. Special attention will be devoted to the critical monitoring of emerging modelling techniques (such as climate-smart approaches for the designation of Marine Protected Areas -MPAs), and especially their caveats in terms of robustness and sensitivity, to avoid communicating misleading information to the science-policy interface.

The researcher must be familiar with Open Data principles as applied to the SO (Antarctic Treaty, and associated Data Policies) and in a global context (FAIR data principles). The researcher needs to have extensive expertise in the standardisation and exchange of primary biodiversity data within the context of regional (Southern Ocean Observation System - SOOS) and global biodiversity information systems such as the Global Biodiversity Information Facility (GBIF) and/or the Ocean Biogeographic Information System (OBIS). Furthermore, the researcher should have a strong background in SO conservation biogeography and a general understanding of recent advances in SO ecological modelling approaches.

Finally, and critically, the researcher will have hands-on experience with relevant international institutions, organisations and conventions, and especially with the Scientific Committee on Antarctic Research (SCAR), the Southern Ocean Observing System (SOOS), the Antarctic treaty System (ATS) and the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR).

The position at the Belgian Institute of Natural Sciences and at the Université Libre de Bruxelles revolves around two main research axes (biodiversity informatics, ecological modelling) to be developed over 10 years, including science-policy aspects, with an initial program of short-term objectives after 2 years.

# Short-term objectives (2 years):

## Biodiversity informatics

- Launch an inventory of relevant data to complete the information gathered under the biodiversity.aq initiative.
- Develop an inventory of biological data collected by recent Belgian research projects on Antarctic marine biology
- Create a dedicated data inventory to integrate biological and environmental data at different scales suitable for application in CCAMLR domains

## Ecological Modelling

- Follow-up and supervise the development of Dynamic Energy Budget (DEB) models

- Follow-up and supervise the development of correlative Species Distribution Models (c-SDM)
- Follow-up and supervise the development of Mechanistic and Hybrid Species Distribution Models (H-SDM)
- Follow-up and supervise the exploration of model-coupling (mechanistic/correlative/movement-based)

# Long term objectives (10 years) :

## General/Science-Policy

- Secure own position with external funding
- Contribute to CCAMLR (papers, meetings, etc…)
- Develop an MPA proposal in the Dronning Maud Land (DML) region (in collaboration with international partners)
- Evaluate the transposability of Belgian knowledge from Terre Adélie, West Antarctic Peninsula (studied during the Belspo RECTO/vERSO projects), to the DML region
- Promote biogeographic knowledge of Antarctic organisms and systems to a range of stakeholders (science community, policy-makers, general public)

## Biodiversity Informatics

- Improve biodiversity dataflows, standardization and interoperability within the Antarctic research community in a collaborative fashion
- Link existing public primary biodiversity data to relevant habitual, biometric and sampling data
- Feed trait data for different SO taxa and functional groups in the World Register of Marine Species (WoRMS)
- Develop and deploy innovative and cost-effective high-resolution sampling standards, for example applied to habitat mapping, in the spirit of the Census of Antarctic Marine Life (CAML)
- Identify eEOVs (ecosystem Essential Ocean Variable) and provide advice on collecting observations.
- Develop an inventory of biological and environmental data relevant to the DML area
- Develop an ecosystem model for the DML region (in collaboration with international partners)

## Ecological modelling

- Create "end-to-end" ecosystem models based on size spectra theory
- Sustain the exploration of emerging modelling approaches based on available data (physical, glaciological, meteorological, biogeochemical, biological and ecological dynamics), in coordination with other SCAR researchers
- Develop a conceptual framework to improve the assessment of the impact of environmental stressors on physiological responses in key species
- Mobilize the model framework to identify critical environmental factors, sentinel species and ecosystem tipping points

- Understand / document and improve predictions of the responses of SO ecosystems to complex combinations of environmental stressors

# Your Profile:

You have between 7 and 12 years of professional experience and have a PhD in a field matching this vacancy. You obtained your PhD a maximum of 12 years before the closing date (30/09/2020). *This 12-year period is extended by one year for each maternity, parental & adoption leave of the candidate & for each long-term sick leave of the candidate or his/her immediate family*.

You work in a multidisciplinary fashion, have proven expertise in the management and online publication of raw biodiversity data as well as complementary expertise in complex ecological analyses.

You have expertise in Open Data principles applied to the SO (Antarctic Treaty and associated data policies) and in a global context (FAIR data principles).

You have in-depth expertise in the standardization and exchange of primary biodiversity data in the context of regional (Southern Ocean Observation System, SOOS) and global information systems (Global Biodiversity Information Facility, GBIF and / or the Ocean Biogeographic Information System, OBIS).

You have a strong background in conservation biogeography of the SO and general expertise in ecological modelling approaches of SO, including its strengths and caveats.

You are familiar with relevant international institutions, organizations, communities and conventions, and in particular with the Scientific Committee for Antarctic Research (SCAR, and Expert Groups), the Southern Ocean Observing System (SOOS), the Antarctic Treaty System (ATS) and the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR).

You have the ability to take initiatives, adapt and work both independently and in a team.

You are creative and have the ability to solve problems with innovative approaches independently.

You have a professional background attesting your ability to publish in high profile international journals and to communicate the results of your research at international congresses as well as to a broader audience.

You have an excellent level of English (oral, written) and knowledge of other languages is an asset.

You are willing to supervise students and junior scientists (master's, PhD) in an academic environment and to contribute on an ad-hoc basis to the service missions of the RBINS (management of the biodiversity.aq information system, policy support) and of the ULB (supervision, teaching).

# The Work Environment:

The project will combine the research strength of the BIOMAR group at ULB and the transversal Antarctic research at the OD Nature at the RBINS, both located in Brussels, Belgium, at the heart of Europe.

The BIOMAR Marine Biology Lab at ULB carries out its research on the bioecology of marine benthic invertebrates, with a special focus on echinoderms. BIOMAR has accumulated over 40 years of experience in echinoderms biology. [Prof. Bruno Danis](#) is one of the permanent academics of the Lab. He has acquired experience in a broad range of research fields: his expertise blends experimental work in ecotoxicology, field work and expeditions including in polar regions, management and exploration of large biodiversity datasets, and mobilization of this information in a global change overarching context. Prof Danis has built strong collaborative networks and plays an important role in various international initiatives, such as the Scientific Committee on Antarctic Research (SCAR), notably as the Chief-Officer for the Expert Group on Antarctic Biodiversity Informatics between 2012-2020. He has also acquired a broad expertise in managing large, international projects. In the framework of the RECTO project, Bruno Danis has led the Belgica 121 expedition ("B121", www.belgica121.be), which ventured to explore the marine biodiversity of the West Antarctic Peninsula (WAP) and to test the concept of using a nimble sampling platform, the R/V Australis, fully rigged motor sailor. Since 2012, BIOMAR has gathered a considerable experience in state-of-the-art modelling aspects, directly relevant to this project. BIOMAR has also developed in-house specimens collections management systems (notably for Antarctic sea stars), as well as biodiversity informatics tools and contents including live specimens macro- photography, interactive identification keys, as well as underwater and aerial videos using Remotely Operated Vehicles (ROVs) and drones. Prof Danis is meanwhile also the president of the Scientific Council of the RBINS.

At the RBINS, polar research is a transversal activity, conducted by several research teams, mainly of the OD Nature. There is a strong expertise in management of marine (EMODnet, ODIP, OBIS) and polar (Census of Antarctic Marine Life; International Polar Year) data, with a focus on aggregation, curation and publication of raw data on Antarctic biodiversity (SCAR-MarBIN and now the SCAR Antarctic Biodiversity Portal) and the development of an Antarctic and Southern Ocean Virtual research environment (VRE) as part of EU-Lifewatch. RBINS is also actively involved in the Standing Committee of Antarctic Data Managers (SCAR-SCADM), and the Southern Ocean Observation System (SOOS). RBINS has a longstanding connection with Belgian Antarctic exploration and research in the Southern Ocean curating biological samples collected during the first Belgica expedition in the 19th century and during BELARE expeditions in the 20th and 21rst century. Prof Isa Schön (https://www.researchgate.net/profile/Isa_Schoen) is the polar liaison for the RBINS, stimulating novel research in the Antarctic and Arctic and networking with RBINS researchers from different disciplines. For 25 years, Prof. Isa Schön has been applying molecular tools to ecological and evolutionary research questions in aquatic environments, including freshwater, the deep sea and the Southern Ocean. She has led or been involved in numerous studies on biodiversity, connectivity and phylogeography using genetic and genomic methods. Isa has developed extensive collaborative networks and is very experienced in managing large, (inter=) national projects. She currently coordinates two

international Antarctic research projects, RECTO (2016-2021) and COPE (2019-2024), she supervises students and young researchers being involved in Antarctic research, and she has organized the participation of Belgian researchers in the Peruvian Antarctic campaign 2019-2020.


**Applications should be sent by email** to bdanis@ulb.ac.be and ischoen@naturalsciences.be (subject FEDTWIN.SO-BOMP) and should include **a cover letter specifying the motivation to apply for the position** and **a short CV, including a list of relevant publications.**
The **deadline for application is 30th September 2020**. For informal enquiries please contact Prof. Bruno Danis or Prof. Isa Schön.

# Required skills and competences of the FED-tWIN researcher PhD scientific discipline(s):

## Experience(s):

1. Science
   a. Biodiversity data valorisation
   b. Antarctic biogeography
   c. Antarctic ecology
   d. Information science
2. Information Technologies:
   a. Biodiversity data management
   b. Development of biological databases
   c. Curation of biological databases
   d. Biodiversity standards (TDWG)
   e. Darwin Core-Archive and extensions
3. Modelling
   a. Programming languages: R, python
   b. Correlative and mechanistic model development
   c. Model validation and coupling
4. Ecosystem Based Management
   a. Marine spatial planning in the Southern Ocean
   b. Science-Policy interface
   c. Antarctic Treaty System and the Convention for the conservation of Antarctic Marine Living resources.

## Generic skills:

1. Project management
   a. Grant application
   b. Financial management
   c. Time management of tasks and deliverables
2. Supervision
   a. Students (from Bachelor to Post-doc levels)
   b. Administrative and Technical personnel
3. Other generic skills
   a. Presentation skills
   b. Team leading
   c. Decision making
   d. Problem-Solving
   e. Delegation
   f. Goal setting
   g. Report writing
   h. Communication skills
   i. Scientific networking