

THREE MARINE ECOLOGY PHD STUDENT VACANCIES

The Royal Belgian Institute of Natural Sciences (RBINS, Brussels and Oostende, Belgium), Ghent University (UGent, Ghent, Belgium), the Royal Netherlands Institute for Marine Research (NIOZ, Yerseke, the Netherlands), the Liège University (ULg, Liège, Belgium) and the Research Institute for Agriculture and Fisheries (ILVO, Oostende, Belgium) are recruiting four PhD students closely working together, three of which are the subject of this vacancy. The PhD students will be engaged in the recently started project “Functional biodiversity in a Changing sedimentary Environment: Implications for biogeochemistry and food webs in a managerial setting, FaCE-It” (2015-2020), financed by the Belgian Science Policy.

CONTEXT

Sediments and the inhabiting macrofauna play an important role in the functioning of coastal marine environments. Human activities in the marine environment result in multiple pressures. Two of the most obvious pressures on the southern North Sea sediments are “hardening” and “fining”. “Hardening” mainly results from the installation of offshore wind farms, where foundations provide a hard substrate for a diverse underwater fauna. “Fining” of sediments can be considered an important integrated effect resulting from multiple human activities, mainly aggregate extraction, beam trawling, dumping, as well as the introduction of artificial hard substrates. Both pressures are expected to have important implications for biogeochemical cycling (e.g. N-cycling) and food web structure (e.g. secondary production).

The FaCE-It project aims at understanding the impact of “fining” and “hardening” on the benthic ecosystem functioning (*i.e.* biogeochemical cycling and food webs) at the local scale up to the larger scale of the southern North Sea. This knowledge will be translated into operational indicators, serving the implementation of the European Marine Strategy Framework Directive (MSFD).

The focus of the work of two PhD students (located at UGent, RBINS Oostende, ILVO Oostende) will be on experimental lab and field research and (statistic) processing of these data, while a third student (located at NIOZ) will primarily be involved in modelling the biogeochemical and food web processes. The students will be involved in the development of operational indicators for ecosystem quality. A fourth PhD student, located at Liege University, will use 3-D coupled models to scale up the results to the North Sea (this PhD position has already been allocated). This job vacancy announcement only refers to the first three PhD positions.

JOB CONTENT

PhD position 1 (Main promotor: Prof. Dr. Jan Vanaverbeke, RBINS, UGent)

The aim of this PhD project is to investigate the link between (functional) diversity, nutrient cycling and food-web typology in the Belgian Part of the North Sea. Focus will be on the benthic-pelagic coupling, and how this process is affected by the interplay between the physical environment (sediment, presence/absence of artificial hard substrates) and the structural and functional diversity of different components (benthic, pelagic, fouling communities) of the coastal ecosystem.

The research will include (1) detailed flux experiments and bio-irrigation experiments with entire communities and single-species, (2) basic biogeochemical modeling, (3) analyses of food-web

typologies (Bayesian techniques) based on stable isotope analyses, and (4) modeling the C-flow (Linear Inverse Modeling) through the different food webs of the Belgian part of the North Sea (shared with PhD position 2). Ultimately, the PhD study will lead to an integrated understanding of how the pressures “hardening” and “fining” will affect the soft bottom ecosystem functioning at the local scale.

The PhD student will mainly work at UGent, in close collaboration with RBINS and NIOZ. The PhD student will perform joint experiments and data analysis with the other PhD students hired for this project.

PhD position 2 (Main promotor: Prof. Dr. Steven Degraer, RBINS, UGent)

This PhD will focus on the C-flow and food web structure of artificial substrate associated fouling communities, as can be found on offshore wind mills and ship wrecks. Quantifying the filtering capacity of the fouling communities and its effects on the concentration of organic matter and alteration of the carbon flow near artificial hard substrates at the southern North Sea scale, will be at the heart of this PhD. Furthermore, this study will investigate the functional succession of fouling communities on artificial hard substrates, focused on trophic interactions and habitat provision, and will contribute to modeling the C-flow through the different food webs making use of Linear Inverse Modeling (shared with PhD position 1).

The work will consist of (1) sampling and analyzing artificial hard substrate fouling communities, (2) design and perform single-species and multi-species lab and field experiments and (3) biological traits analysis of existing data.

The PhD student will be affiliated to RBINS, but will mainly work at UGent and ILVO (Oostende). The PhD student will perform joint experiments and data analysis with the other PhD students hired for this project. Experience with scientific diving is considered an asset.

PhD position 3 (main promotor: Prof. Dr. Karline Soetaert, UGent, NIOZ)

The focus of this PhD project will be on the detailed mechanistic modeling of sediment-organism interactions, and on the food web in the Belgian Part of the North Sea. Research will focus on numerical modelling, but will also include field work and laboratory experiments. The work will link the experimental and field work performed by PhD students 1 and 2 to the detailed three-dimensional modelling performed by PhD student 4. To this end, the PhD student will develop and apply models that describe the effects of organism activity (bioturbation bioirrigation, biodeposition) on sediment biogeochemistry, and how this relates to physically-induced processes. Detailed food web modelling will allow to decipher the effect of bio-fouling communities on pelagic and benthic functioning in areas affected by “hardening” and “fining” (e.g. offshore wind farms).

The PhD student will be affiliated at UGent, but will mainly work at the NIOZ in Yerseke (the Netherlands) the main workplace of Prof. Dr. Karline Soetaert, the promotor. Yerseke is located at commuting distance of cities like Antwerpen, Breda and Middelburg.

The PhD-candidate should have a strong interest in numerical modelling.

PROFILE

- Master in Science (within the field of Biology, Biochemistry, Oceanography or equivalent)
- Strong interest in multidisciplinary research in relation to marine ecology
- Open, collaborative attitude
- Prepared to take initiative, but also to work in close collaboration with other team members
- Prepared participate in sampling campaigns at sea for several days
- Prepared to participate in (inter)national conferences and symposia

SKILLS

- Excellent organisational, communication (both oral and written) and social skills
- Capable of planning and organizing their own work and meet deadlines imposed by the project
- Good insights in analysing and interpreting data
- Knowledge of statistical processing of data
- A good knowledge of R is an asset
- Excellent knowledge of English (written and spoken)

WE OFFER

- A full-time 4-year position as a PhD-student at UGent or RBINS, depending on the subject
- A dynamic, challenging, varied and stimulating research environment
- Free public commuting and/or bike fee

START

- Spring 2016

CONTACT DETAILS

If interested, please send your motivation letter, CV and a copy of the Master Degree diploma, with reference “**FaCE-It**” before 14 February 2016 to Yolande Maes (y.maes@naturalsciences.be).

Please indicate if you have a specific interest for one or more of the above profiles.

For more information:

- Concerning the job content or working conditions: Dr. Ilse De Mesel (ilse.demesel@naturalsciences.be; +32 59 24 20 51)
- Concerning RBINS in general: <http://www.naturalsciences.be>
- Concerning UGent: <http://www.Ugent.be>
- Concerning NIOZ: <http://www.nioz.nl>
- Concerning ILVO: <http://www.ilvo.vlaanderen.be>

Interviews with pre-selected candidates will take place in Ghent on 25 February 2016.

Only applications that meet the profile and that are received in time will be taken into consideration.