

PhD Opportunity - Role of intertidal microbial biodiversity in sediment ecosystem functions

Profile Description

Funding: Horizon 2020 ERA-NET COFUND

Supervisors: Dr. Bruno Jesus (University of Nantes), Dr. Cédric Hubas (MNHN) and Prof. Laurent Barillé (University of Nantes)

Eligibility and funding amount: EU students are eligible to apply for full funding.

Application deadline: Monday 6th February, 2017.

Background Coastal tidal sediments are highly productive ecosystems at the land-sea interface. Their productivity is often dominated by microbial biofilms, highly diverse consortia of benthic micro-organisms, embedded in a complex matrix of biogenic extracellular polymers. These biofilms support multiple ecosystem functions and services: they fuel coastal food webs (including commercial fisheries and shellfish farming), they drive carbon fluxes across the sediment-water interface, and they stabilize sediments. In these sediments, primary production of benthic microalgae is rapidly respired in the sediment food web or is resuspended. Many unknowns however remain regarding the tidal flat carbon cycle, but most importantly, there is a striking lack of knowledge about tidal sediment microbial biodiversity, and how this biodiversity affects the ecosystem functioning of these systems (the BEF relation).

Tidal flat microbial biodiversity is structured by hydrodynamic disturbance that creates gradients in sediment composition (from sandy to silty), and by trophic and non-trophic interactions between organisms. The overarching objective of the BIO-Tide project is to identify and quantify the relation between microbial biodiversity and carbon cycle related ecosystem functions in contrasting tidal flat environments (sand vs silt) in the explicit context of biotic interactions. Focus will thus be on the carbon cycle and ecosystem functions which are directly implicated in (e.g. primary and secondary production, extracellular polymer substance production and degradation) or indirectly dependent on this cycle (sediment stability).

Objectives of the PhD thesis are:

(1) To identify and quantify the relation between microphytobenthos biodiversity, the carbon cycle and sediment stability in tidal flat sediments across multiple food web levels, in contrasting sediment types. (2) To determine and quantify the importance of bacterial and microphytobenthos biodiversity for EPS composition and dynamics, and sediment stability.

Research Training: The student will participate in the BIO-Tide project (Horizon 2020 ERA-NET COFUND) and will be trained in a variety of laboratory techniques and skills related to measuring microbial diversity, primary productivity and sediment cohesion. The work will involve a mixture of field and laboratory work and there is significant scope to work with project partners at the University of Ghent (Belgium), EPFL (Switzerland) and University of St. Andrews (Scotland). The student will be based at the University of Nantes but will be expected to travel and spent some time abroad carrying research within the scope of the research project. He or she will be a member of the VENAM doctoral school and will be affiliated to the MMS laboratory (U. Nantes) and BOREA (MNHN).

Required skills: An MSc degree in the biology/ecology domain; good English skills (written and spoken); fieldwork experience is favored.

Application Information Enquiries: contact Dr. Bruno Jesus (University of Nantes) (bruno.jesus@univ-nantes.fr) or Dr. Cédric Hubas (MNHN) (cedric.hubas@mnhn.fr).

Application Process: interested applicants should submit (1) a **cover letter** outlining their interest in the project and relevant skill-sets, (2) a full **CV**, and (3) **two references letters** from previous supervisors or professors well acquainted with the student. Please send the applications to Dr. Bruno Jesus (bruno.jesus@univ-nantes.fr) and Dr. Cédric Hubas (cedric.hubas@mnhn.fr), no later than 6th February, 2017.