**Postdoctoral position in marine food web structure and functioning**

**Topic**: Combining stomach contents, stable isotopes and modelling to estimate the structure and dynamics of marine trophic networks

**Starting date**: between April and August 2015

**Duration**: 24 months

**Net salary**: 2140 € per month (Gross salary, which includes social services and health insurance, is ca. 2675 € per month)

The **Laboratory of Oceanology and Geosciences** (UMR CNRS 8187, University of Lille 1, ULCO, Wimereux, France) and **the Fisheries Laboratory of Ifremer Boulogne-sur-mer** are jointly offering a two-year postdoctoral position to study marine food webs in the English channel with a specific focus on fish. The position is funded by the Regional Council of Nord Pas de Calais.

Applicants must hold a Ph-D in ecology and be less than 35 years old. Upon starting the postdoctoral position, applicants must have a research experience of at least 18 months after their Ph-D and French applicants must have spent at least 18 months outside France.

**Required skills**: applicants should have a strong background in ecology and data analysis and/or dynamical modelling. Knowledge in trophic ecology and associated skills such as stable isotope and stomach content data analyses or bioenergetics and food web modelling would be greatly appreciated.

Supervisors:

* Prof. Sébastien Lefebvre (University of Lille1, LOG laboratory, Wimereux, France). Food webs, primary production, and modelling. (<https://www.researchgate.net/profile/Sebastien_Lefebvre/>).
* Dr. Bruno Ernande (Ifremer, Laboratoire Ressources Halieutiques, Unité Halieutique Manche mer du Nord, Boulogne sur mer, France). Fish ecology, population and community dynamics, food webs. Statistical and dynamical modelling. (<https://www.researchgate.net/profile/Bruno_Ernande>).

Contact for applications: Applications should include a CV, a statement of research interests and the names and contact details (email and phone number) of at least two referees. Applications should be sent to sebastien.lefebvre@univ-lille1.fr and bruno.ernande@ifremer.fr.

**Closing date**: The offer will remain open until February 28th 2015.

**Context and objectives**

The quantitative description of food webs aims at determining how population/community structure and trophic interactions influence ecosystem functioning. A better understanding of trophic networks is also necessary to better predict the response of ecosystems to global change. Since environmental gradients structure food webs, studies at large spatial scales are necessary but remain rare. In marine food webs for example, the strength of the pelagic-benthic coupling has been shown to vary with depth from local to regional scales (Kopp et al., 2015). Different approaches can be used to describe tropic relationships: stomach content analysis gives a qualitative and quantitative snapshot of food items ingested by an individual at a given time; in contrast, stable isotope composition integrates an individual’s diet during a longer period. The joint use of stomach content and stable isotope analysis can provide a more detailed representation of a species’ diet and can be merged into mixing models such as the Bayesian isotope mixing model Isoweb (Kadoya et al., 2012). The interpretation of stable isotopic ratios lies in the assumption that a consumer’s isotopic composition reflects that of its diet after accounting for isotopic discrimination (Middelburg, 2013). Because different tissues incorporate diet’s isotopic signal at different rates, isotopic ratios of different organs provide the opportunity to back-calculate food webs’ structure at different time scales (weeks to months). Isotopic discrimination and incorporation rates may vary according to species and environmental conditions (food level, temperature, body size...) and, ideally, should be estimated experimentally. Alternatively, bioenergetics modelling such as Dynamic Isotope Budget (DIB) models (based on the framework of Dynamic Energy Budget, DEB; Pecquerie et al., 2010, Emmery et al., 2011) can help estimating incorporation rates and isotopic discrimination using life-history traits.

Since 2009, the LOG and Ifremer laboratories have been jointly studying the English Channel trophic network in the context of European InterReg projects (e.g. Charm 3, http://www.charm-project.org/en/) and regional projects (e.g. CPER Marco). Research vessels for sampling, laboratory facilities for trophic analyses, a stomach content and isotope database, and computer facilities are available for the project.

The recruited candidate will be in charge of studying variations in the structure of the Western and Eastern English Channel trophic networks along environmental gradients (e.g. depth, salinity, phytoplankton biomass ...) and through time (years, seasons) and of evaluating the role of the pelagic-benthic coupling in the structuring processes. The candidate is expected to:

1. Participate in field campaigns for sampling as well as in stomach content and stable isotope analysis of the samples;
2. Investigate, based on an earlier database and new collected data, the structure of the Western and Eastern English Channel food webs along environmental gradients using the Bayesian isotope mixing models Isoweb in order to couple stomach content information providing the topology of the network with stable isotope ratios to quantify trophic interactions;
3. Explore the dynamics of isotopic incorporation rates and discrimination in several functional groups using DIB models and then evaluate the range of uncertainty in the conclusions drawn in 2.