PhD in Zooplankton Diversity

Rimouski, le 3 June 2019

Professors Gesche Winkler (Biological Oceanography and Population Genetics – ISMER-UQAR) and Piero Calosi (Marine Ecological and Evolutionary Physiology – UQAR) are looking for a talented postgraduate candidate for the development of an exciting PhD project on **the characterisation of « Biodiversity of coastal zooplankton of an ecologically and biologically important zone of the St. Lawrence estuary ».**

Within the framework of the Department of Fisheries and Oceans (DFO) *Ocean Protection Plan Canada*, **the principal aim of our project is that to study the biodiversity and ecological significance of zooplankton in coastal zones of the St. Lawrence estuary within the context of the global ocean change**. Estuarine shallow littoral and coastal zones (< 50 m) are long-recognized being important as nursery and refuge zones for crustaceans and fish. These zones provide a wide variety of ecosystem services and societal benefits, and are among the first ecosystems to be affected by anthropogenic local and global drivers. These will ultimately alter estuarine ecosystems' structure and functioning. However, in the absence of near-shore survey time series in the lower St. Lawrence Estuary, much less information is available than for offshore pelagic zones of the Estuary and the Gulf of St. Lawrence, where changes in the pelagic food web structure and fish dynamics have been recently reported. Little is known about zooplankton's diversity, distribution, production and functional roles in the shallow littoral and coastal zones of the lower St. Lawrence Estuary at < 50 m depth. In other shallow estuarine and coastal ecosystems worldwide the functional role of marine forage species such as *Calanus* spp. and euphausiids is replaced by small copepod species (e.g. *Eurytemora, Acartia, Pseudocalanus*) and mysid shrimps, respectively. Theses groups play a fundamental role in transferring energy to higher trophic levels, including crustaceans and fish of commercial importance founding in estuaries their natural nursery areas. In order to better understand the biological and ecological significance of these shallow coastal areas, it is important to increase our baseline knowledge on the biodiversity of lower trophic species in these habitats, by creating baselines for all components of these ecosystems. This will be also fundamental in order to create a basis on which to build time series to be used as future references to detect changes in the biological structure and functioning of estuarine communities and ecosystems.

The main objective of the project is to determine spatial and temporal distribution pattern of biodiversity of zooplankton controlled by spatial and temporal environmental heterogeneity. Results will reveal "hot" and "cold" spots of diversity at different levels of biological organisation: specific, genetic, physiological and ecological (i.e. habitat usage). For example, since the St. Lawrence acts as a secondary contact zone of ancestral lineages for several sibling species (e.g. *Eurytemora*, *Neomysis, Osmerus*), the determination of their ecological and physiological preferences is of uttermost importance to determine their specific ecological role within the ecosystem, and their ability to adjust and adapt to further future anthropogenically-originated environmental challenges. Finally, the characterization of physiological responses to environmental drivers among different species and populations will complement our study in the lower St. Lawrence Estuary.

The PhD candidate will be given the opportunity to develop an exciting, original and innovative research project within the *Doctoral Oceanography program at ISMER-UQAR*, over a three to four-year period. This project is part of a multi-institutional collaborative project among ISMER (Institut des Sciences de la Mer de Rimouski – Université du Québec à Rimouski), the Department of Biology Chemistry and Geography (UQAR) and the Maurice Lamontagne Institut (IML) DFO (Mont-Joli, Canada). The PhD student will be supervised primarily by Gesche Winkler (ISMER-UQAR), and co-supervised by Piero Calosi (UQAR) in collaboration with the research cluster [Québec-Océan].

Requirements:
• **Master's degree** in biology, oceanography, or equivalent; with solid bases in marine ecology, taxonomy, genetics and/or ecophysiology;
• **Interests** in marine ecology and physiology, field and boat-work, laboratory experimentations and analyses;
• **Academic achievement**: minimum cumulative grade point average (CGPA) is 3.4 over 4.3 or equivalent;
• **Achievement of minimum requirements** for admission to the PhD programme in oceanography at ISMER, UQAR;
• **Proficiency in oral and written French and English**: existing good skills in oral and written communication in English are required; the same levels of proficiency in French is preferable as the primary language at UQAR and in the region is French.

Financial support: stipend for three years, with option of a fourth year, for a full time PhD available. Details to be discussed following candidate selection.

Start of the PhD project: September 2019

Application: includes a motivation letter (max 1 page), an exhaustive CV (max 3 pages), university transcripts, coordinates of at least two referees for potential recommendation letters. All documents should be submitted as one single pdf file. The closing date for receipt of applications is until the position is filled.

For all additional information and submission, please contact Gesche Winkler ([gesche_winkler@uqar.ca]).