



POSTDOCTORAL FELLOWSHIP OFFER

Institut des sciences de la forêt tempérée/ Université du Québec en Outaouais

Title of the Project

Modeling the acoustic environment of marine mammals in the St. Lawrence Estuary in relation to marine navigation.

Description

The St. Lawrence Estuary (Quebec, Canada) is the location of many interactions between commercial shipping and recreational boating activities and marine mammals. The impact of this combined navigation on the acoustic environment of marine mammals is a source of concern, particularly with respect to the conservation of endangered species such as beluga, blue and fin whales in the region. Although standards on critical levels for underwater noise have yet to be established for species that frequent the St. Lawrence Estuary, mitigation of the potential impact of noise in the habitat of endangered species requires the prior characterization of the contribution of human activities to the cumulative soundscape. With this in mind, this project aims to model the propagation of noise emitted from human activities in the St. Lawrence Estuary, including the Saguenay-St. Lawrence Marine Park, with emphasis on navigation.

The fleet of vessels that navigate the region is diverse, exhibiting a variety of vessel sizes and types and frequent speed changes. In addition, the St. Lawrence Estuary is characterized by a complex abiotic environment (e.g. locally strong tidal currents, complex bathymetry, water column stratification, heterogeneous seabed composition). The acoustic model to be implemented should consider the variability of factors characterizing noise sources (emission) and the complexity of the physical environment (propagation) to reproduce the insonification patterns throughout the area. The acoustic model will be implemented within the spatiotemporal 3MTSim framework¹, a decision-support tool developed and used to manage boat-whale interactions in the Estuary.

Initially, the emphasis will be on quantifying the cumulative noise throughout the area and subsequently the sound frequencies that interfere with the communication space of marine mammals (masking effect); two dimensions characterizing the acoustic quality of wildlife habitats. Model results will be referenced to empirical data collected from hydrophones immersed in the study area.

These data consist of systematic recordings of sound levels in strategic locations as well as the tracking of various vessel types used to estimate their sound source levels, which are made available through the collaboration with researchers from Fisheries and Oceans, Canada .

The postdoctoral fellow will work with scientists from several disciplines and produce results with the potential to meet current needs for the sustainable management of navigation in the region. The researcher will have the opportunity to present his/her work to the working group on maritime transport and the protection of marine mammals in the St. Lawrence (G2T3M). This group brings together stakeholders from both the maritime transport and marine mammal protection sectors in the St. Lawrence Estuary. Research results will also be presented within the activities of the MEOPAR Network Centre of Excellence (Marine Environmental Observation, Prediction and Response Network) founding the project.

Required Competence

- Ph.D. in Physics or Engineering Physics
- Programming experience required, knowledge of Matlab and/or Java is an asset
- Self-reliant and autonomous
- Acoustic modeling experience is an asset
- Ability to communicate orally to experts and non-experts as well as producing literature review and writing scientific articles

Location

- Based in Montréal (Université du Québec à Montréal) and/or Ripon (Université du Québec en Outaouais) with occasional stays in Mont-Joli/Rimouski (Institut Maurice Lamontagne, Fisheries and Oceans Canada)

Remuneration

- 35 000\$

Duration

- 12 months (April 1st 2015 to March 31st 2016)

Contact

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1 <http://complexity.ok.ubc.ca/projects/3mtsim/>