UQÀM UQO GREMM

Fisheries and Oceans Canada | Pêches et Océans Canada

Master of Science (MSc)

Artificial intelligence and drone imaging for monitoring the health of St. Lawrence beluga whales

Context

Several species of cetaceans frequent the St. Lawrence Estuary and Saguenay Fjord. The resident population of the St. Lawrence Estuary beugas (SLEB) is endangered under Canada's Species at Risk Act. To understand the health status of the population, it is necessary to monitor the physical condition of the animals over time. Morphometric techniques combined with drone imaging provide valuable information on the temporal evolution of the animals' physical characteristics. For example, it is possible to estimate the mass of belugas and detect pregnant females. This information is crucial for monitoring the health status of individuals in an endangered population such as the SLEB over time to inform actions for their recovery.

The Project

Drone images are collected during beluga breathing sequences at the surface. Generally, a minimum of 3-5 images are required to accurately extract the morphometric indices of interest for an animal. Since belugas are a social species, the first step of the project is to develop an algorithm that can automatically re-identify individuals within a pod during the same breathing sequence using vertical drone images. The second step is to determine whether an image is of sufficient quality to infer the desired morphometric indices with significant accuracy. The third step involves taking body measurements from the images using MIPAR™ software. Finally, in order to track morphometric characteristics over time, the algorithm for re-identifying belugas from vertical drone images will be coupled with an existing re-identification algorithm developed on a very large number of oblique photo-identification images taken from boats. The matching will be done using drone images and oblique images taken simultaneously.

The student will work in the highly collaborative and inclusive environment of the Interdisciplinary Laboratory for Socio-Ecological Simulation (LISSÉ) at UQO alongside several research professionals and students. He/she will also interact with academic researchers (UQÀM), external partners from the federal government (Fisheries and Oceans Canada) and experts from environmental NGOs (GREMM) with expertise in areas related to the project.

Required skills

The student must demonstrate advanced proficiency in artificial intelligence and deep learning techniques, preferably in Python. Experience in learning algorithms applied to pattern recognition in biological objects or in privacy attacks and anonymization is an asset. He/she must demonstrate the ability to propose and implement artificial intelligence algorithms with rigour. He/she must be comfortable working in a team in an interdisciplinary research context, be able to review technical literature in English, and communicate scientifically (orally and in writing) in French and English. The person must also be available to participate in occasional field data collection during the summer season. Initiative, listening skills, intrinsic motivation and autonomy are key qualities for the successful completion of this project.

Practical details

Location: Labortatoire interdisciplinaire de simulation socio-écologique (LISSÉ), Université du Québec en Outaouais (UQO) in Gatineau (Hull sector).

Project start date: as soon as possible (e.g. May 2026)

Remuneration: 2-year scholarship @ £27,000/year. Numerous opportunities for additional scholarships.

Application: Send copies of transcripts from all postgraduate studies, a cover letter and CV to the following email addresses: clement.chion@uqo.ca and gambs.sebastien@uqam.ca.

Application deadline: January 12th, 2026 or until the position is filled.