

PhD Scholarship

Combined effects of underwater vessel noise reduction actions, on exposition of marine life to noise, greenhouse gas emissions, and the maritime supply chain

Summary

The marine acoustics research team from *Institut des sciences de la mer* (ISMER) of the *Université du Québec à Rimouski* (UQAR) offers a **scholarship for a PhD degree in oceanography**. The successful candidate will take part to multidisciplinary projects related to measuring, modeling, and reducing the underwater noise generated by shipping activities. They will focus on the combined effects of underwater vessel noise reductions actions on the exposition of marine life to noise, on the emissions of greenhouse gases, and on the maritime supply chain (costs, delays ...).

Project proposal

The St. Lawrence Estuary is a major seaway, linking the Atlantic Ocean to North America through the Great Lakes, and a terrific marine biodiversity hotspot providing critical habitats to 13 marine mammal species, four of them endangered: North Atlantic right whale, Beluga, Fin whale and Blue whale. Underwater noise radiated by ships is one of the main sources of impact of maritime traffic on marine life (Erbe et al. 2019), interfering with the useful acoustic signals used by marine mammals to sense their surroundings, communicate and forage. Assessment and control of noise pollution generated by maritime traffic is therefore critical to the successful coexistence of an intense maritime shipping activity and a healthy marine biodiversity. In this context, underwater noise reduction initiatives suggest a modification of the vessel's behaviour, including a speed reduction or a modification of the trajectory (MacGillivray et al. 2019; Findlay et al. 2023).

The successful candidate will join a multidisciplinary team dedicated to measuring, understanding, modeling, and reducing underwater noise radiated by traffic and mitigate their effects on the marine life. They will investigate the efficiency of underwater noise reduction actions and assess their combined effects on greenhouse gas emissions and vessel operating costs.

Relying on the acoustic database collected by the MARS project (www.projet-mars.ca/en), and data from the literature, we will establish the baseline of the St. Lawrence fleet. The variations in sound exposure levels, greenhouse gas emissions and travel time and costs will be assessed under different noise reduction scenario , including speed reduction and route modification in the vicinity of identified marine life critical habitats.

References

- Erbe, Christine, Sarah A. Marley, Renée P. Schoeman, Joshua N. Smith, Leah E. Trigg, and Clare Beth Embling. 2019. "The Effects of Ship Noise on Marine Mammals—A Review." *Frontiers in Marine Science* 6 (October). <https://doi.org/10.3389/fmars.2019.00606>.
- Findlay, Charlotte R., Laia Rojano-Doñate, Jakob Tougaard, Mark P. Johnson, and Peter Teglbjerg Madsen. 2023. "Small Reductions in Cargo Vessel Speed Substantially Reduce Noise Impacts to Marine Mammals." *Science Advances* 9 (25): eadf2987. <https://doi.org/10.1126/sciadv.adf2987>.
- MacGillivray, Alexander O., Zizheng Li, David E. Hannay, Krista B. Trounce, and Orla M. Robinson. 2019. "Slowing Deep-Sea Commercial Vessels Reduces Underwater Radiated Noise." *The Journal of the Acoustical Society of America* 146 (1): 340–51. <https://doi.org/10.1121/1.5116140>.

Eligibility criteria

- MSc or equivalent in physics, mathematics, acoustics, engineering, biology or a related discipline;
- Skills in data processing;
- Be able to start the PhD program in oceanography in the summer or fall 2024 trimester;
- Meet the basic requirements for admission to the PhD program in oceanography at UQAR.

Application

Interested candidates must submit in electronic format (a single pdf file less than 10 Mb including all the documents) to Pierre Cauchy (pierre_cauchy@uqar.ca):

- A complete CV (including scientific communications, scholarships, distinctions, experience at sea, etc.);
- A cover letter explaining the candidate's background and how this path fits with the proposed project;
- All university transcripts ;
- Contact details of three (3) referent persons who could be asked for reference letters.

Only complete files that meet the eligibility criteria will be evaluated.

We support an equal access program and our community promotes the values of equity, diversity and inclusion and puts in place accommodation measures as needed. We strongly encourage women, people with disabilities, members of visible and ethnic minorities and Indigenous peoples to apply.

Deadline

Applications will be reviewed from 1st March 2024, and the process will continue until the scholarship is awarded.

Foreign students

Tuition

The successful candidate will be eligible for an [exemption from foreign student differential tuition fees](#) (website information in French only). If this exemption is granted, students will pay the same tuition fees as Quebec students.

See also :

- [Tuition simulation \(French only\)](#)
- [Subsistence charges and budget \(French only\)](#)

Application

- [Application form \(French only\)](#)
- [Study permit in Canada \(French only\)](#)
- [Arrival in Canada \(French only\)](#)