UNIVERSITÀ DI PAVIA
**Corso di Dottorato in Scienze della Terra
e dell'Ambiente**

FORM PER PROGETTI BANDO DOTTORATO

1. Project title

Monitoring and characterization of marine soundscapes using machine learning techniques.

2. Proposer

Surname	Marchini
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3. Research Unit

Surname	**Name**	**Institution**
Fossati	Claudio	Environmental Consultant
Manghi	Michele	NAUTA SrL

4. Keywords
(Max. 5 – at least 2)

Marine Ecoacoustics – Soundscape Analysis – Machine Learning – Marine mammals – Fish Bioacoustics

5. Abstract
(Max.1.500 characters with spaces)

The study of marine soundscapes, especially regarding the impacts of noise coming from human activities has become a subject of great importance globally. The use of hydrophones has helped researchers gather information about the soundscape of marine ecosystems, however, as the quantity of data continues to increase, the process of analyzing the characteristics of soundscapes has become increasingly time-consuming and slow. Using machine learning techniques has greatly helped researchers extract the different acoustic features of soundscapes (sound classification, temporal patterns). Acoustic indices have also been used to describe and summarize several characteristics of marine soundscapes, however, currently, their use has received mixed results in the marine environment. The current project aims to explore methods of analysis of marine soundscapes using machine learning algorithms that could detect, and classify several acoustic events (e.g. dolphin vocalizations, or ship noise) and provide automated or semi-automated analysis of marine soundscapes using also ecoacoustic indices or source levels. The analysis will involve the comparison between different marine soundscapes and investigate the long-terms temporal trends in some of the stations, a measure that is needed in several legislations at national and international level.