

## Thesis – Dissertations – Reports

### Are you looking for writing a thesis project in Marine Science?

The Bottlenose Dolphin Research Institute (hereafter BDRI) offers a limited number of independent studies to advanced undergraduate and graduate students (bachelor and master students). We do not confer degrees but rather provide a research environment including a fully equipped and staffed laboratory, accommodation, and training in the field under the mentorship of experienced marine scientists.

The BDRI invites applications for thesis projects in a dynamic, international, and competitive research environment (*i.e. we use the term “thesis” synonymously with “dissertation” and “report”*). The main research topics of the BDRI include **marine mammal ecology, ethology, ecological modelling and bioacoustics** (on dolphins, porpoises, baleen whales and otters in Atlantic waters), with focus on bottlenose dolphins (*Tursiops truncatus*) in different parts of the world (Mediterranean and Atlantic waters), as well as **marine bird ecology**. Highly motivated bachelor and master students in the fields of zoology, marine biology, veterinary and related disciplines are invited to apply for a thesis project at the BDRI.

To carry out a project with the BDRI means that our interns will concentrate on and analyse specific data from our already-existing long-term research dataset. Interns will participate in the data collection of our on-going marine mammal and marine bird research program in the Ría de Arousa (Galicia, Spain) and will receive supervision from Bruno Díaz López, PhD (Director and Chief Biologist) and Séverine Methion, MSc (Principal Investigator and Marine Ecologist).

**Below you can see a list of the project topics that will be offered in 2019 at BDRI’s headquarters in O Grove, Spain:**

**CETACEAN ECOLOGY.** These projects include spatial analysis and creation of models from distribution data recorded in Atlantic waters (Galicia, Spain) from 2014 to 2018 (bottlenose dolphin, common dolphin, and harbour porpoises). Outcomes of these studies will provide more information on the distribution of cetacean species in Galicia, and about the impact of human activities on cetacean distribution. The Galician firths (known as Rías) on the North-western coast of Spain have been identified as an area of year-round presence of bottlenose dolphins and harbour porpoises and are thus a suitable area for exploring the location of possible special areas of conservations (SACs) under the EU Habitats Directive. Applicants should have a strong interest in GIS or modelling.

**CETACEAN BEHAVIOUR.** These projects include analysis of behavioural data (bottlenose dolphin, common dolphin and harbour porpoise) recorded in Atlantic waters (Galicia, Spain) from 2014 to 2018. Outcomes of these studies will provide important information on individual and group behaviour of these species, as well as information on the impact of human activities on dolphin behaviour. Applicants should have a strong interest in ethology.

**BOTTLENOSE DOLPHIN COMMUNICATION.** These projects include analysis of bio-acoustical and behavioural data recorded from a study area characterized by different levels of anthropogenic impact (Atlantic waters, from 2014 to 2018). These projects will explore the use of social vocalizations in different contexts (feeding, socialising, travelling) looking for geographic and contextual similarities in social sound use. Outcomes of these studies will provide more information on the function of specific social vocalisations and influence of the environment and, in some cases anthropogenic activities. Applicants should have a strong interest in bioacoustics.

**BOTTLENOSE DOLPHIN SOCIETY and MARK-RECAPTURE.** These projects include analysis of mark-recapture data recorded in Atlantic waters (Galicia, Spain) from 2014 to 2018. Outcomes of these studies will provide more information about bottlenose dolphin society and, in some cases the impact caused by human activities. Applicants should have a strong interest in photo-identification and social studies.

**DOLPHIN SKIN PIGMENTATION AND BODY MARKS.** These projects include analysis of photographic data recorded in Atlantic waters (Galicia, Spain) from 2014 to 2018 (bottlenose dolphin and common dolphins). Outcomes of these studies will provide more information about cetacean external body conditions, taking into account intra- and inter-specific interactions, infections, diseases and in some cases the impact caused by human activities. Applicants should have a strong interest in photographic analysis.

**MARINE BIRD ECOLOGY.** These projects include spatial analysis and creation of models from data recorded in Atlantic waters (Galicia, Spain) from 2014 to 2018. Outcomes of these studies will provide more information about marine bird distribution (seagulls, cormorant, shag, waders, auks and more) and the impact caused by human activities. Applicants should have a strong interest in GIS or modelling.

**OTTER DIET.** This project include data recorded in Atlantic waters in 2018. Outcomes of these studies will provide more information about European otter (*Lutra lutra*) feeding ecology by studying the spraints. Applicants should have a strong interest in laboratory analysis.

Many other projects can also be developed such as impact of human activities on marine environment, dolphins' society, ecological modelling and more. Consult with the BDRI to explore the possibilities ([info@thebdri.com](mailto:info@thebdri.com)).

## Research season and internship duration

The research season starts each year in January and ends in December. Start and end dates of internships are flexible but the position generally requires a minimum of 90 days (Masters) or 30 days (Bachelors) continuous commitment sometime between January and December. If the student intends to receive academic credit, he/she will be responsible for making all arrangements with their educational institutions.

## Working place

The BDRI office is located in a pleasant research centre located in O Grove, Galicia (Spain). The institute and research vessel are equipped with the state-of-the-art technology, and the study area has especially good conditions for bottlenose dolphin research due to the existence of a resident population. The BDRI is a very international environment, and the everyday working language is English.

## Time management and data collection

Interns writing a thesis project will be undertaking normal intern activities (6 working hours per day / 5 days per week). Any project analysis and thesis writing will be done on their own personal time (lunch time, afternoons, and week-ends). All thesis projects will contribute to one of the ongoing BDRI research projects being carried out by the institute. This allows for simultaneous use of equipment and better supervision and guidance. The BDRI provides all the material, research equipment and supervision when a student comes to write a thesis. The design of data collection is already done and specific topics are proposed to students depending on their background and preferences.

To warrant a good amount and quality of data for the elaboration of the thesis project, the BDRI provides interns with data collected during the previous research season. *For example, if a student joins the BDRI in summer 2019, he/she will participate in the current field data collection, but will use data collected during the previous research season (i.e. summer 2018) in order to be able to analyse data and start writing the thesis from the beginning of the internship.*

Data collection methods are the same over the years. All BDRI interns participate in data collection in the field in order to understand the data collection process. All BDRI project interns participate in every step of the research from collecting data in the field to analysing the data for their project.

## How will the research be undertaken?

The BDRI is working to provide baseline data on marine mammal and bird species present in coastal and pelagic waters of Galicia. The BDRI collects information about the ecology of free-ranging cetaceans, mostly common bottlenose dolphins, from both boat based and land based platforms. We collect information on marine bird distribution, and European otter presence and diet as well.

Boat based surveys with photo-identification sampling are complemented with land based surveys. During data collection in the field, the BDRI collects both environmental (sea state, wind, swell, depth, tides, slope, water temperature etc.) and anthropogenic (marine traffic, fisheries, etc.) variables.

The research equipment used by the BDRI includes: two research vessels (fully equipped for navigation, with sonar, GPS, cartographic plotter), binoculars, scoping views, anemometer, Secchi disc, plankton net, microscopes, thermometer, compasses, cameras, clipboards and

datasheets, and an office with computers equipped with relevant software (Office package, GIS, photo-ID, bioacoustics, statistical programs...), bibliographical material and digital library for scientific articles, WiFi and other facilities.

Every intern should bring their own personal computer to write their thesis and to conduct the data analysis.

## Elaboration of a proposal

When applying to write a thesis with the BDRI, students will need to do some research on the subject and the study area and write a short proposal (literature review and objectives of the project). In general, a proposal needs to describe the data collection, what students are going to do with the data, how it will be processed and analysed and most importantly – the objectives of the thesis. These points must be accurate and detailed, not only for us to understand what students would like to do, but also for students to accurately plan and organise the work that they want to perform. A proposal will thereafter be reviewed and students will be informed about the possibility and adequacy of performing the specified work with us.

The BDRI already has a set methodology for data collection in the field. The BDRI collect different types of environmental and anthropogenic variables that are used to answer questions regarding the studied animals and their surroundings. However, students may find other variables that could be of interest to collect for their project. In this case, students will need to clearly specify these and the method that would have to be applied in order to collect this data.

## Expectations for writing a thesis at BDRI

It is very important to understand that it is ultimately the intern's responsibility for making adequate progress toward completion of his/her thesis and for producing high quality work. The thesis project should be the result of work that is independently conducted. The BDRI understands the importance of giving the interns the responsibilities and experience that they might have in a future job in the field of marine science. Hence, interns will be expected to think for themselves and work hard in order to apply the theory they have learnt at university, but also to learn new knowledge through the process of performing their work. The role of the BDRI supervisor is to guide interns during their thoughts and work, helping to shape, refine and direct them in their choices and different steps of their thesis.

A thesis should demonstrate the following:

- ✓ Awareness and understanding of important current work in the field
- ✓ Ability to plan a research activity
- ✓ Knowledge and motivation to carry out the planned research activity
- ✓ Ability to analyse the results of the research
- ✓ Ability to draw reasonable conclusions from the research
- ✓ Ability to complete a written description of the work in the form of a well-written, properly organised thesis

## Study area

The study area of the BDRI is the North Western coast of the Iberian Peninsula (Galician coastal waters in NW of Spain), more specifically the waters of the Ría de Arousa (firth of Arousa) which is a part of the Rías Baixas (the Baixas firths) and surrounding waters. The region has a relatively narrow continental shelf with a total surface area of approximately 15,000 km<sup>2</sup>. The Galician continental shelf and the Galician rías (coastal fjords) lie at the northern edge of one of the major upwelling areas in the world, the eastern boundary system off NW Africa and SW Europe. The frequent upwelling of cold and dense North Atlantic Central Water results in nutrient enrichment and as a result, this area is among the most productive oceanic regions in the world. This coast is characterized by high biodiversity, productive fisheries and important aquaculture activities, all supported by the nutrient input due to upwelling. Galicia is the main fishing region of Spain and one of the most important in the world, with 87 fishing ports used by more than 6000 fishing boats along 1195 km of coastline. More than 20 species of cetaceans have been recorded in Galician waters, the most abundant in the coastal rías are bottlenose dolphins (*Tursiops truncatus*), harbour porpoises (*Phocoena phocoena*) and short-beaked common dolphins (*Delphinus delphis*). Other species present in the area includes Risso's dolphins (*Grampus griseus*), striped dolphins (*Stenella coeruleoalba*), long-finned pilot whale (*Globicephala melas*), killer whales (*Orcinus orca*), sperm whales (*Physeter macrocephalus*), beaked whales (3 species), humpback whales (*Megaptera novaeangliae*), minke whales (*Balaenoptera acutorostrata*), sei whales (*Balaenoptera borealis*), fin whales (*Balaenoptera physalus*), and blue whales (*Balaenoptera musculus*). We also find Eurasian otters (*Lutra lutra*) in rivers and along the shoreline of Galician rías. Galicia is home to hundreds of species of birds, either permanently or seasonally and include several species of seagulls, cormorants, shags, gannets, auks, shearwaters, petrels, skuas, terns, herons, loons, waders, wildfowl and many more.

## Context

A variety of conservation issues affect marine wildlife in Galician waters, many of which are related to human activity. They include interactions with fisheries, which are a significant cause of mortality, overfishing, aquaculture activities, oil spills, pollution and the effects of noise from shipping, oil and gas exploration, military activity and tourism. The degree of impact of any human activity, varies considerably between different species and depending on their ecology, distribution and abundance. All cetacean species are listed on Annex IV of the European Union's Habitats Directive (92/43/EEC) as in need of strict protection. It requires regular assessments of the conservation status of all species that cover abundance, distribution and the pressures and threats experienced. In addition, bottlenose dolphin and harbour porpoise are listed on the Directive's Annex II as species whose conservation requires the designation of Special Areas of Conservation (SACs). Therefore, understanding the structure of any bottlenose dolphins and harbour porpoises' population and their relationships with other populations should be a pre-requisite to establishing appropriate management units and define future Special Areas of Conservation as required by the EU Habitats Directive (92/43/CEE). Cetaceans are protected by the Spanish government (regulation 1727/2007). It is forbidden to approach cetaceans within a 60 meter's radius and it is forbidden to swim with cetaceans. The BDRI has

a research permit delivered by the Spanish government in order to approach and study cetaceans.

## Participation fee

The BDRI is a private and self-funded centre, hence, there is an internship fee including the accommodation, tuition, all associated field costs during the internship period (training, insurances, use of equipment, field trips, use of research vessel, electricity, gas, Spanish taxes) and a project fee. This fee covers added supervision and guidance, the paperwork associated, as well as the use of BDRI resources. Students carrying out these projects are encouraged to try for extramural or university funding to offset these costs. There is no compensation for these internships positions and successful applicants will be responsible for their own transportation expenses to and from the research station (O Grove, Spain) and for providing and cooking their own food during their stay. For more information, please download and read the **Internship Information Package**:

<http://www.thebdri.com/resources/downloads/internships.pdf>

## Insurance for project intern

All independent project interns are required to carry accident and health insurance. The BDRI will not be liable for insuring the intern or covering any medical payments, including repatriation, should an accident occur. The BDRI will not assume liability for the intern other than the usual and ordinary liability around the station's property or while on our vessels. All interns, volunteers and staff must sign a legally-binding waiver of insurance. This must be made clear to the intern's mentor and university or institutional representatives.

## Applying for a project

If you are interested in undertaking an thesis project, please complete the normal internship [application form](#) and email it to [info@thebdri.com](mailto:info@thebdri.com) with your interest and your ideas.

Once accepted as an intern, we can discuss potential projects and you will be expected to produce a suitable project proposal prior to your arrival.

We look forward to your participation and a successful research experience at the BDRI and we thank you for your interest.

## Terms and conditions

The BDRI has developed policies to govern the use of data as a result of BDRI activities.

If you wish to write your thesis with the BDRI, the final manuscript must be presented and approved by BDRI's Director in writing before presentation to the University. A copy of the final thesis must be sent to the BDRI by email (pdf copy).

At the beginning of the thesis, the following statement should appear:

*"This thesis has been conducted in collaboration with the Bottlenose Dolphin Research Institute BDRI (represented by Bruno Díaz López) that has officially authorized me to use the data to elaborate this thesis. This is an unpublished thesis and is not prepared for further distribution. The author and the BDRI give the permission to use this thesis for consultation and to copy parts of it for personal use. Every other use is subject to the copyright laws; more specifically the source must be extensively specified when using results from this thesis."*

In the acknowledgment section, the following statement should appear:

*"Funding for this research came from the Bottlenose Dolphin Research Institute BDRI. This study would not have been possible without the supervision of Bruno Díaz López and Séverine Methion, and the cooperation all BDRI members and volunteers who gave generously of their time to help with field work. Data collection complies with the current laws of the country in which it was performed, Spain."*

All data originating from the work done by participants in collaboration with BDRI are entirely the property of BDRI. All scientific data, pictures, videos and all reports, sketches and plans relating to work carried out in the course of a collaboration with the BDRI will, together with all other documents and papers of confidential nature provided by the BDRI, are property of the BDRI at all times. The equipment on which data and results are recorded – notebooks, tapes, computer hard-drives and other memory media – are the property of the BDRI. Participants will not retain copies of such records, data, pictures, videos, reports, plans or sketches neither use the data without the prior written approval of Bruno Díaz López (BDRI director). Any discovery, idea or process made or discovered by participants whilst collaboration with the BDRI and relating to the study of marine mammals will be the property of the BDRI and must be disclosed to BDRI director, Bruno Díaz López. Participants are not authorized at any time either during the subsistence of their collaboration or after its termination make use of or communicate to any unauthorised, any of the scientific data, or confidential information of the BDRI which they may have obtained while in the service of the BDRI. At the end of the collaboration with the BDRI, participants forthwith deliver to the BDRI, without prior request, all documents, pictures, and videos in your possession or control relating in any way to the research of the BDRI.

The BDRI is the owner of all work products developed and research data collected by interns while participating in the program. Interns may incorporate them in their thesis only with written permission of the BDRI Director. The grant of permission to use data in their thesis does not give interns the right to use the data for other purposes without permission. All data used for a thesis writing are only for the thesis work and not for other purpose. It is strictly forbidden to give or share the data used for the thesis to any other person (i.e. intern, student, professor etc). The use of these data by interns for undisclosed and unapproved personal benefit or commercial application, financially or professionally or in any other way is not permitted. Insertions of pictures of BDRI properties (including but not limited to equipment, material, boat), and wildlife require prior written authorization from BDRI's director. In case of publication of all or part of the data, or in case of a presentation of the data during a scientific conference or in any other public context, authorship (including main author and co-authors) is entirely the BDRI director's decision. "Personal communication", "BDRI unpublished data", and similar ways of presenting data collected and analysed by others are acceptable only if the persons involved have approved such citations. Written authorization may be required from the BDRI Director.