PROJECT PROPOSAL FORM

Making the Most of Masters aims to improve collaboration between employers and universities by providing opportunities for postgraduate students to undertake work based projects as an alternative to a traditional university dissertation. Projects should address a real need within the host organisation and be beneficial to both host and student.

The Marine Alliance for Science and Technology for Scotland (MASTS), pools the majority of Scotland's marine research capacity. MASTS members provide Masters courses in a range of marine related disciplines and many of their students are keen to undertake applied projects outside of academia.

Notes on Topic Selection

A relevant academic will work with your organisation to refine your proposed topic and ensure it meets both your needs and the academic requirements of the student. Projects should typically be achievable within a 12–16 week timeframe (including writing the final report).

Your proposed project could be:

- A specific project title or topic for the student to deliver;
- A general idea of a business need which requires further development;
- A core research theme to be developed by the student into a bespoke project;
- An intended outcome for the organisation.

The level of detail you provide will determine the extent to which further discussion may be required with the relevant programme director to ensure suitability.

desk-based/data studies that will easily facilitate remote working and remote supervision are welcome, as well as in person and/or experimental based projects where appropriate.

What's Next?

Please send your completed form to the MASTS Programme Coordinator & Deputy Dean of Grad School, Dr Emma Defew (masts@st-andrews.ac.uk) before the deadline.

Following submission of the form, it will be channeled to the leaders of the various Masters programmes that operate within the MASTS community and a representative from the most relevant programme or department will get in touch to discuss the project scope, delivery and the selection of an appropriate student. If more than one student expresses an interest in your project, you will need to ensure discussions take place to enable the most suitable student to be matched with your project. The projects themselves usually won't start until May or June.

MASTS - Making the Most of Masters – Project Proposal Form

Name and address of Organisation:

NatureScot
Great Glen House, Leachkin Road, Inverness, IV3 8NW.

Name of the key contact in Organisation:
Corallie Hunt

Contact e-mail and phone number:

Corallie.Hunt@nature.scot

Title of proposed project:

Assessing the impacts of changing Sporobolus extent on saltmarsh biodiversity at Caerlaverock

Project outline and intended outcomes:

Saltmarshes are critical coastal and estuarine ecosystems found in low-energy intertidal environments. They provide a range of essential ecosystem services such as water filtration, carbon storage, coastal flood defence, habitat for wintering wildfowl, and provision of fishery nursery grounds. Salt tolerant plants colonise soft intertidal sediments and form distinct lower, middle, and upper zones, which are influenced by the frequency and duration of tidal inundation which decreases with distance inland.

In Scotland, the pioneer zone, covered twice daily by the tide, is generally characterised by annual *Salicornia* and lower marsh *Puccinellia* grass, which make up the Annex I habitat H1310. However, *Sporobolus anglica* (previously known as *Spartina anglica*) appears to be increasing its extent in the pioneer zone. It is still debated whether this species is native or non-native in Scotland and while there is some historical evidence to suggest its arrival was solely due to planting, recent expansion may be via fragments or seed. It has been observed to sit lower in the tidal frame than native saltmarsh plants (Haynes, 2016) taking advantage of a niche and provides similar ecosystem services as native saltmarsh plants. However, as a C4 plant, *Sporobolus* has the potential to spread at the expense of other littoral plants under changing climatic conditions and could limit the area of sediment flats available to feeding waders and wildfowl species.

There has been a significant increase in the extent and distribution of *Sporobolus* on the Solway over the last decades. The scale of growth here may be beyond practical control, however understanding the impact of this change in extent on biodiversity can help to inform early management decisions at other Scottish sites where *Sporobolus* has only recently been observed. This is because control

methods may be more damaging to the environment than the impact of *Sporobolus* establishment (Angus, Internal Review).

This MSc Project aim is to assess the impact that changing *Sporobolus* extent has had on biodiversity at Caerlaverock NNR, Solway Firth. The Project has several objectives to achieve this aim:

1) To assess the feasibility of using aerial imagery to successfully map *Sporobolus* and providing recommendations for scaling up this method to other sites (if found to be feasible).
2) To map the current extent using aerial imagery and ground-truthing to create a detailed baseline of distribution and extent.
3) To analyse the spatial change of *Sporobolus* over time at Caerlaverock NNR using historic aerial imagery and expert knowledge of the site.
4) To identify suitable indicators to assess the change in biodiversity (flora and/or fauna) at the site because of the increasing extent of *Sporobolus.*
5) If the data are available, to use the above indicators to determine whether there has been an impact on biodiversity.
6) To develop predictions about future likely trends of *Sporobolus* in Scotland based on climatic projections.
7) To provide recommendations for future management of *Sporobolus.*

As part of an initial literature review, the student should provide an ecological overview of *Sporobolus* in the context of UK saltmarshes. The student may also investigate techniques for measuring spatial change of habitats using aerial images, as well as developing ideas about how to measure changes in biodiversity using specific indicators to inform fieldwork. Staff at the NNR can provide expertise and existing survey data for ornithological diversity and plant composition. Fieldwork will be expected (2-3 days) to ground-truth extent and distribution of *Sporobolus* on the site to inform the aerial imagery analysis to enable baseline mapping.

Any additional comments e.g. details of specific disciplines required, methods to be used, travel involved, where the work would take place (i.e. at the host site or at the University), whether you foresee any Intellectual Property or confidentiality issues (and if so, what form might these take?):

The student should have some knowledge of the coastal/marine environment and should be comfortable with carrying out a literature review to understand the ecology of saltmarshes and explore potential methodologies to undertake spatial analysis. The student should be familiar with managing datasets and should be able to perform some scientific data analysis.

Access to GIS software is required as are basic GIS skills, although some training may be available. The project may involve some statistical analysis, although this is at the student's discretion. The MSc is largely desk-based and can be carried out at the University, although some fieldwork will be required (i.e. to ground truth an aerial image) and previous fieldwork experience would be desirable.

We invite the student to visit a NatureScot office to meet with relevant colleagues. If fieldwork is being undertaken, this would be to the NatureScot Caerlaverock NNR. Travel and subsistence may be covered for this journey.