



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:

Development of a robust GIS mapping protocol for *Spartina anglica* for change detection and geomorphological interpretation

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 lower saltmarsh 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 H1330](#). However, *Spartina anglica*, appears to be increasing its extent within this zone, as individual stands, by expanding into creeks and pans, and creating mosaics with native saltmarsh vegetation. Having originated on the south coast of England, *Spartina anglica*, has been making its way to 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, *Spartina* 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 *Spartina* 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 *Spartina* has only recently been observed. This is because control methods may be more damaging to the environment than the impact of *Spartina* establishment (Angus, Internal Review).

This project aims to produce a robust mapping protocol for *Spartina anglica* from aerial imagery, distinguishing it from other saltmarsh vegetation. Understanding if, where, and how change in *Spartina* extent is happening, will support an ongoing assessment of the impact that this changing extent is potentially having on biodiversity at Caerlaverock NNR, Solway Firth. Building on recent work that looked at the feasibility of mapping *Spartina* over a localised area at Caerlaverock, this Project has several objectives:

- 1) To produce a robust remote-sensing-based model from high-resolution aerial imagery and extensive ground-truthing to successfully map *Spartina* and provide recommendations for scaling up this method to other sites.
- 2) To use the model to map the current extent of *Spartina* to create a detailed baseline of distribution and extent.
- 3) Initial investigation of whether sedimentation mediated by *Spartina* differs from sedimentation in surrounding vegetation / tidal flats and develop recommendations for more detailed future work.

The student should familiarise themselves with saltmarsh ecosystems, including ecological and geomorphological processes, and previous GIS work to map *Spartina* at Caerlaverock NNR. The student will be required to develop GIS techniques for mapping *Spartina* using remote sensing data to produce a higher accuracy and robust model that allows for annual change detection. This will require regular site visits to Caerlaverock to gather the necessary ground-truthing information. The student may also consider how to investigate whether *Spartina* is having an impact on the localised sediment budget at the site. This may be achieved by relating basic field observations to any available repeat high-resolution topographic survey data. NNR staff can provide expertise and support fieldwork.

Haynes, T.A. 2016. Scottish saltmarsh survey national report. Scottish Natural Heritage Commissioned Report No. 786.

(<https://www.nature.scot/doc/naturescot-commissioned-report-786-scottish-saltmarsh-survey-national-report>)

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?):

Project timescale limitations: Spring-Summer months preferred for fieldwork

The student should have some knowledge of the coastal/marine environment and should be comfortable with carrying out a literature review to understand saltmarsh ecosystems and explore potential methodologies to undertake spatial analysis of remote-sensing data. 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 advanced 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 project will be a hybrid of desk-based work (and can be carried out at the University), in addition to regular fieldwork trip to Caerlaverock NNR (i.e. to ground truth aerial imagery) and

previous fieldwork experience would be desirable. We would encourage applicants from areas that have good access to Caerlaverock. The student should be comfortable with challenging and exposed coastal terrain. At least some travel and subsistence may be covered for fieldwork.

We invite the student to visit a NatureScot office to meet with relevant colleagues and the student is encouraged to present their work at the annual student conference in Inverness (although on-line option is possible).

We plan to host a MSc student seminar at the end of August 2027 at NatureScot's HQ in Inverness. We invite the student to present their research at this seminar and meet with relevant colleagues as well as other MSc students carrying out projects within NatureScot. We plan that travel and subsistence could be covered for this journey, although this will be confirmed nearer the time.