



Marine Alliance for Science and Technology for Scotland Graduate School

2017 Call for Proposals from PhD Supervisors Funding available for PhD Studentships

The Marine Alliance for Science and Technology for Scotland (MASTS: www.masts.ac.uk), in conjunction with Scottish Natural Heritage (SNH), EMEC (www.emec.org.uk), and Marine Scotland Science (MSS), is offering 50% funding for up to seven Ph.D. studentships for outstanding projects. The intention is to encourage excellent individuals to engage in innovative research across a broad spectrum of marine science disciplines. Our ambition is to maintain a community of outstanding researchers and future influencers who remain linked through MASTS as they develop their careers.

Specific Opportunities: 50% funded studentships

1. MASTS is providing support for two 50% funded studentships and would be interested in proposals linked to any of the three MASTS Research Themes: Productive Seas; Marine Biodiversity, Function and Services; or Dynamics and Properties of Marine Systems. (50% funding required from host institution).

2. Scottish Natural Heritage is providing support for up to two 50% funded studentships and would be interested in proposals in the following areas and linked to an appropriate MASTS Theme (50% funding required from host institution)

Areas of SNH interest:

- Connectivity of protected benthic features within MPAs and the wider environment – the need for integrated marine planning and management
- Synergies between ecosystem services benefits and economic activities in the marine and coastal environment
- Blue carbon – the functional importance of burrowed mud habitats and their component species
- Community engagement and the use of citizen science to inform marine management
- Impact of ADDs used as deterrents at aquaculture sites on marine mammals
- Impacts of large scale harvesting of wild seaweed and development of protocols for their sustainable exploitation

3. EMEC is providing support for one 50% funded studentship to address the following priority research area: *Development of Environmental Monitoring Tools and Techniques for Ocean Energy Applications*. See Appendix A for further details. (50% funding required from host institution).

4. Marine Science Scotland will offer up to 50% funding for two studentships to address the following priority areas:

- Developing an evidence base for the assessment of Scottish fish stocks using data obtained through Remote Electronic Monitoring (REM) systems
- New methods for monitoring deep-water marine protected areas

See Appendix B for further details. (A minimum of 50% funding from the host institution is required)

A completed application form should be emailed to masts@st-andrews.ac.uk before 16.00 on Friday 24th February. Enquiries can also be directed to this email address.

FINANCIAL ARRANGEMENTS

- MASTS/SNH/EMEC/MSS will contribute a maximum of 50% of the total costs outlined below: Any additional financial commitments from third parties should be used to offset the costs to MASTS and the host institution equally.
- Funding is available for up to 3.5 years only.
- Funding will cover student stipend, at Research Councils UK published rates; university registration fees, at the 'Home/EU rate'; and Graduate School fees.
- Students who do not meet the Home/EU eligibility criteria may be liable for 'Overseas' fee rates. The cost difference between Home/EU and Overseas fees is a matter between the candidate and the institution; and should be discussed during the application stage but will not be covered by MASTS.
- Studentships are expected to start in October 2017. Should there be any delay in appointing the studentship, it is important to note that the sum MASTS is prepared to commit for the studentship is fixed at the time we award the studentship.

Assumed Total Cost of Stipend (Per Studentship)*	£55,097
Assumed Total Cost of Fees (Per Studentship)	£15,880
Graduate School Fees	£1,400
Total Cost of Studentship	£72,378
Maximum cost to MASTS	£36,189
Maximum cost to each academic partner (or other sponsor)	£36,189

**Subject to normal cost of living increase.*

FURTHER DETAILS

1. The studentships must be jointly supervised between two (or more) MASTS partners. SNH/MSS will provide a supervisor for the studentships their funds support.
2. Each project should involve a period of research at more than one partner institution.
3. All applications should clearly engage industry, policy and/or regulators, as interested parties providing endorsement.
4. MASTS-funded studentships can only be allocated to original members of the MASTS Consortium. Associate Members may collaborate with Consortium members (joint supervision) where appropriate. In addition, Members and Associate Members (i.e. Dundee, Edinburgh and West of Scotland) are eligible to submit proposals for support from SNH, EMEC and MSS.
5. The process will be conducted in two stages: 1) Approval of project; and 2) Recruitment of candidates.
6. Project proposals will be assessed within one month of the application submission deadline. An independent Steering Group will use clear selection criteria, and scored assessments will be used to rank projects and be used as the basis for identifying applications for support. These criteria may include weightings favouring those applicants who have secured the material involvement of non-academic partners in industry, policy and regulation for example.
7. Any Steering Group members party to applications will not be able to take part in the assessment process
8. The highest-ranking proposals will be selected and asked to seek candidates.

9. Candidates will be selected on the basis of the host institutions normal academic procedures, as agreed between partners. This process must be open to MASTS review to ensure standards are maintained.
10. Candidates where material support and funding for the project is supplied from the non-academic partners may be preferred provided academic standards are met.
11. Successful candidates will be expected to start their programme of research on 2 October, 2017. The successful candidates will be inducted into the MASTS Graduate School in addition to following their own institutional procedures. Where suitable candidates cannot be recruited to start on 2 October 2017 projects may be withdrawn and reallocated.

Appendix A: Details of EMEC research area of interest

Proposed Project Title	Development of Environmental Monitoring Tools and Techniques for Ocean Energy Applications
Introduction, background and rationale	<p>The European Marine Energy Centre (EMEC) is the world's leading facility for testing pre-commercial wave and tidal energy technologies. There have been more systems deployed at its sites in Orkney than any other location worldwide with a range of innovative companies attracted to use its facilities.</p> <p>EMEC is working with developers and experts to expand our research agenda to cover a range of industry-related environmental and operational issues. We join regulators, government and developers alike in endeavouring to make full use of the device testing stages of the developing wave and tidal energy industries as they evolve from pre-prototype design through to commercial viability.</p> <p>This project will focus on the development of environmental monitoring techniques used to understand interactions between this emerging technology and the surrounding environment. These tools will be used to help the sector address regulatory concerns (e.g. collision and displacement) as well as improve our understanding of how the environment effects these machines (e.g. condition monitoring).</p>
Details of any previous/recent work	<ul style="list-style-type: none"> • MaRINET D4.7 Best practice report on environmental monitoring and new study techniques • Acoustic Monitoring Programme • Integrated Monitoring Platform • Land-Based Surface Wildlife Observation Programme • Flow, Water Column & Benthic Ecology 4D (FLOWBEC) • Understanding how marine renewable device operations influence fine-scale habitat use and behaviour of marine vertebrates (RESPONSE)

<p>What data (if any) will be provided.</p>	<p>EMEC has been gathering environmental data from its sites for over ten years. This includes:</p> <ol style="list-style-type: none"> 1. Wave and tidal resource data 2. Device operational data (confidential) 3. Underwater acoustics 4. Metrological 5. Marine radar 6. Wildlife observations 7. ROV 8. Temperature 9. Vessel movements 10. Numerous modelling activities e.g. regional hydrodynamic model <p>This represents a vast data set that has been largely untapped for research purposes.</p>
<p>List of main objectives and any key milestones of relevance</p>	<p>Primary objectives:</p> <ol style="list-style-type: none"> 1. Review of the range of environmental monitoring technologies available such as active/passive acoustics 2. Develop a smart platform to integrate simultaneous data collection streams 3. Conduct a variety of data collections campaigns working with the companies testing on site 4. Analyse the data gathered, utilising modelling where required 5. Communicating findings to industry
<p>Does this project have any dependencies (i.e. on cruise/boat availability, software, high cost items etc)?</p>	<p>EMEC has a number of projects lined up that will support data collection costs. Further data collection campaigns are expected to emerge during the course of the studentship. Access to modelling software may be required through the university.</p>
<p>Is there a minimum amount of time that you would like the student to spend remote to the University (i.e. within the company/at field sites)?</p>	<p>EMEC would like the student to spend 50 – 100% of their time based with the company in Orkney.</p>
<p>Are there any commercial sensitivities and/or IP issues related to this project?</p>	<p>Client confidentiality will need to be respected when undertaking any studies involving ocean energy device developers.</p>
<p>Additional Information (e.g. links to papers/reports etc)</p>	<ul style="list-style-type: none"> • www.emec.org.uk • IEA OES Annex IV • Tidal Turbine Collision Detection – Requirements Report

Appendix B: Details of MSS research areas of interest

Developing an evidence base for the assessment of Scottish fish stocks using data obtained through Remote Electronic Monitoring (REM) systems

Remote Electronic Monitoring (REM) provides a safe and economic means of data collection from fisheries. For example, CCTV systems currently provide a method to count and measure fish being discarded. Automatic image recognition systems are in development which will speed analysis and allow high throughput of data. At present the data which a REM-based sampling scheme could provide are not directly equivalent to that obtained through an at-sea observer-based programme (for example, CCTV allows increased measurement of numbers-at-length, but cannot generally provide length-at-age data). To support the development of REM-based data collection, an evidence base which clearly demonstrates the utility of data collected is necessary. This would involve investigating the precision of CCTV data (length estimates from CCTV systems vs. observer/survey length estimates), investigating precision of CCTV vs. observers in estimating discard rates, comparing the spatial distribution of observer trips with VMS and logger data from the fleet, and investigating the data required to produce stock assessments without loss of accuracy or precision compared to current procedures when using CCTV as the source of discard information.

Species of interest at this stage include monkfish, hake and elasmobranchs, which have issues with aging and therefore length based assessments are currently being investigated; cod and whiting on the west coast, which are often caught as bycatch in other fisheries; and scallops, which suffers from a paucity of data from some grounds due to the lack of observer data.

New methods for monitoring deep-water marine protected areas

Scotland has a vast area of deep-water marine habitat that is potentially vulnerable to human activities such as fishing and oil and gas exploration. As a precautionary measure, several large deep-water areas have been designated as marine protected areas or special areas of conservation. Management plans will shortly come into effect and there is a need to research and monitor these areas to assess if conservation objectives are being met. Deepwater MPAs, however, present a unique challenge from a monitoring perspective due to their remoteness and the technical difficulty and cost of working in deep water. For some areas we simply don't even know which species or habitats are present. Some recent success has been made using towed camera surveys, but this has its limitations and new complementary methods are required to provide more representative sampling and robust data. The aim of this PhD will be to develop new approaches to monitoring, including the use of environmental-(e)DNA and the deployment of long term seabed observatories. These new methods will be compared and contrasted to video surveys and more traditional methods of sampling the deep-sea such as benthic trawls and sediment cores/grabs.

The project will be comprised of 2 main elements;

1) Development of e-DNA techniques for deep-water sites. E-DNA is derived from biological material shed by organisms into the surrounding water. The technique has recently been successfully applied to assess species composition of marine ecosystems. This project will involve near-bottom sampling (to depths of 2000 m) of water inside MPAs and SACs using niskin bottles. Water samples will be filtered aboard MRV Scotia and preserved for molecular analysis onshore. In the same area visual surveys and physical sampling of the benthic community will be used to compare taxa diversity indicated by the e-DNA approach. For fish species, e-DNA results will compared to historic trawl survey data from the area. These will both serve as validation tools for the method.

2) Development of multiple long term lander observatories within MPAs. This will involve the deployment of small benthic landers inside MPAs. Each lander will be equipped with a time lapse camera, settlement plates and environmental sensors such as temperature and salinity. Landers will be released (via acoustic release) up to 1 year later. Camera data will be used to assess individual growth rates of benthic organisms, e.g. sponges and count transient fauna, e.g. echinoderms, as they pass the field of view. Settlement plates will allow quantification of incoming species and recruitment of benthic organisms and provide physical material for DNA metabarcoding