



# Research Surveys and Dedicated Training

Compendium of Shiptime Awards 2007



The Marine Institute is the national agency which has the following functions:

“to undertake, to co-ordinate, to promote and to assist in marine research and development and to provide such services related to research and development that, in the opinion of the Institute, will promote economic development and create employment and protect the marine environment”  
Marine Institute Act 1991.

### Sea Change: A Marine Knowledge, Research & Innovation Strategy for Ireland

Sea Change—A Marine Knowledge, Research & Innovation Strategy for Ireland 2007-2013—was launched in early 2007 and was the outcome of extensive analysis and consultation with government departments, state agencies, industry and the third-level sector. It outlines a vision for the development of Ireland’s marine sector and sets clear objectives aimed at achieving this vision, namely to:

1. Assist existing, and largely indigenous, marine sub-sectors to improve their overall competitiveness and engage in activity that adds value to their outputs by utilising knowledge and technology arising from research.
2. Build new research capacity and capability and utilise fundamental knowledge and technology to create new marine-related commercial opportunities and companies.
3. Inform public policy, governance and regulation by applying the knowledge derived from marine research and monitoring.
4. Increase the marine sector’s competitiveness and stimulate the commercialisation of the marine resource in a manner that ensures its sustainability and protects marine biodiversity and ecosystems.
5. Strengthen the economic, social and cultural base of marine dependant regional/rural communities.

The Sea Change strategy was developed as an integral part of the government’s Strategy for Science, Technology and Innovation (SSTI) and the Marine Institute as the lead implementation agency is working within SSTI policy and with government departments and agencies to deliver on the Strategy.

The Marine Institute managed Marine Research Sub-Programme, one of eight sub-programmes within the Science, Technology and Innovation (STI) Programme of the National Development Plan 2007—2013, targets funding to meet the objectives of the Sea Change strategy.

Over the lifetime of Sea Change, funding will be provided for:

- Project-Based Awards
  - Strategic Research Projects
  - Applied Research Projects
  - Demonstration Projects
  - Desk/Feasibility Studies
- Researcher Awards
  - Strategic Research Appointments
  - Research Capacity/Competency Building
  - Post-Doctoral Fellowships
  - PhD Scholarships
- Industry-Led Research Awards
  - Company Awards
  - Collaborative Awards
- Infrastructure Awards
  - Infrastructure Acquisition
  - Access to Infrastructure

Further copies of this publication can be obtained from:  
Marine Institute, Rinville, Oranmore, Co. Galway, Ireland or [www.marine.ie](http://www.marine.ie).

© Marine Institute 2010. Cover photograph courtesy of the Integrated Marine Exploration Programme (IMEP), Marine Institute  
ISSN: 2009-3195

# Marine Research Sub-Programme 2007–2013

## Shiptime Programme 2007 Awardees

---

*Integrated Research Surveys*

*Dedicated Training Programmes*

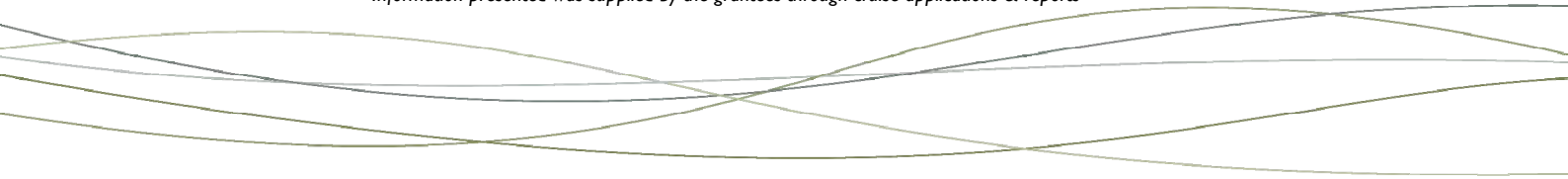
---

Compendium compiled by\*:  
Rebecca Corless  
Sea Change Management Unit  
Marine Institute  
Rinville, Co. Galway  
Ireland



The Integrated Marine Exploration Programme, funded under the National Strategy for Science, Technology & Innovation (SSTI) was carried out under the Sea Change strategy with the support of the Marine Institute and the Marine Research Sub-Programme of the National Development Plan 2007–2013.

*\*Information presented was supplied by the grantees through cruise applications & reports*





# Table of Contents

Introduction .....	1
Summary of Awardees 2007 .....	2

## **Integrated Research Surveys**

---

Standard Oceanographic Section Cruise: Irish Coastal Waters.....	4
Harmful Algal Blooms in Thin Layers.....	5
Salmon Smolt Survey .....	6
Irish Deepwater Ecosystem Survey 2007.....	7
Ground-Truthing Seismic Images of Ocean Structure in Rockall Trough, Part I: Baseline Survey of Biological Productivity and Water Motion along WESTLINE.....	8

## **Dedicated Training Programmes**

---

NMCI – Trainee Deck & Engineering Officers .....	10
Multidisciplinary Offshore Training for Marine Scientists (UCC – MOTS).....	11
Marine Environment – Undergraduate and Graduate Programme .....	12
Multi-disciplinary Training during the PAP Mooring Service Visit.....	13

## **Bright Sparks Award**

---

Undergraduate Training in Fisheries and Oceanographic Sampling Techniques at Sea.....	14
---	----





## Introduction

### Background

*Sea Change, A Marine Knowledge, Research & Innovation Strategy for Ireland 2007–2013*, identified the need for a dedicated competitive Research Vessel Grant-Aid Programme, to make grant-aid available to researchers on a competitive basis, enabling them access to shiptime as part of institutional and co-operative international marine research and training programmes. The benefits of the provision of funding for ship-time include:

- significantly improving the competitiveness of Irish researchers in applying for EU research funding, putting Irish researchers on an equal footing with their EU counterparts;
- maximising the value for money and return on investment by the state in world-class research infrastructure and its' use on strategic projects consistent with the objectives of *Sea Change*; and
- provision of training to undergraduate and postgraduate students on world-class research vessels.

In 2007, the Marine Institute received grant-aid under the Government's Strategy for Science, Technology and Innovation (SSTI) 2006–'13, funded via the Marine Research Sub-programme of the 2007–'13 NDP, to operate a two-year Integrated Marine Exploration Programme (IMEP). The aim of the IMEP was to develop Irish research capacity and capability in marine exploration by developing a pool of trained personnel who can utilise national assets and increase the quantum and nature of information gathered on surveys. In addition, in order to expand existing marine research capabilities and build research potential, the programme provided grant-aid, on a competitive basis, for access to the national research vessels for:

- Higher education institutions on the island of Ireland, to provide dedicated training programmes at sea; and
- Higher education institutions and R&D institutions on the island of Ireland to carry out integrated research surveys of a multidisciplinary nature.

### National Marine Research Vessels

The Marine Institute operates the national marine researcher fleet (RV *Celtic Explorer* and RV *Celtic Voyager*), on behalf of the Irish Government and the Irish marine research community, on a charter basis. The vessels are used for research and development, monitoring and training programmes by government departments and agencies, research institutions (including the higher education sector) and industry.



The RV *Celtic Explorer* is a 65.5m, multipurpose, ocean-going research vessel, capable of carrying out fisheries, acoustic, oceanographic, buoy handling, environmental, geological and hydrographic work. It has a maximum endurance of 30 days, accommodates 31 personnel, including up to 18 scientists, and hosts large laboratory spaces, IT rooms fitted with scientific equipment, a full complement of survey equipment and winches, wet and dry laboratories and a full workshop. The vessel is acoustically silent, which minimises fish avoidance and provides an ideal environment for the collection of high quality acoustic data with minimal interference. It is adapted to accommodate a variety of Remotely Operated Vehicles including the Marine Institute's deepwater ROV *Holland I*.

The RV *Celtic Voyager* is a 31.4m multi-purpose research vessel suited to coastal research and offshore survey operations, with a maximum endurance of 14 days. The vessel has wet, dry and chemical laboratories, which are permanently fitted with standard scientific equipment, and can accommodate 15, including up to 8 scientists. The *Voyager* facilitates the collection of fisheries, geophysical, oceanographic and environmental data and is the dedicated vessel for the provision of training at sea for students.

## Summary of Awardees 2007

In 2007, a total of €734,000 was provided in grant-aid for 66 vessel days (*Celtic Explorer* 37 days; *Celtic Voyager* 29 days). This grant-aid supported:

- Five research surveys, totalling 45 days at sea (€495,000), led by four Irish public research performers, with a total of seven participating institutions;
- Five ship-based postgraduate and undergraduate training programmes, totalling 16 days at sea (€204,000) and providing training for over 80 students from four higher education institutions; and
- One 'Bright Sparks' award, consisting of the provision of the *Celtic Voyager* for a student-led, five-day research/training programme (€35,000).

The five grant-aided **research surveys** contributed to ongoing research projects that are addressing objectives within a number of *Sea Change* research programmes (e.g. Aquaculture, Marine Environment, Fisheries Resources, Seabed & Resource Mapping and Climate Change). In addition to the research carried out, 15 student places were provided during these surveys, providing valuable, practical student training. A summary of each survey is provided below.

The ship-based **training programmes** and 'Bright Sparks' award provided training for 85 students (undergraduate and postgraduate) from six higher education institutions. These students came from a range of disciplines, including marine geology, marine biology, fisheries, oceanography, environmental science and trainee deck/engineering officers. A summary of each of the training programmes is provided below.



# Integrated Research Surveys

---

## Standard Oceanographic Section Cruise: Irish Coastal Waters

Year Awarded:	2007
Value of the Shiptime:	€60,000
Total Number of Days:	10
Student Participation:	2
Lead Partner:	Oceanographic Services, Marine Institute
Partners:	Earth & Ocean Sciences, NUI Galway

### Background:

Marine Institute scientists work in many diverse areas including marine environment, fisheries and aquaculture. Typical questions asked of and by MI scientists are often complex and require dedicated research and monitoring over a sustained period to begin to answer them. Oceanographic measurements are made by many countries in the ICES region each year in an attempt to get closer to answering or at least providing context for these key questions.

In order to begin to collect key oceanographic data, 2 dedicated research cruises are conducted each year in the Irish region. The backbone of the cruises is the acquisition of oceanographic data such as temperature, salinity, dissolved oxygen, fluorescence and ocean currents. A cross service group element is used by acquiring phytoplankton, zooplankton, and fish larva samples and gathering bathymetric data (including ground truthing samples) for the INFOMAR project.

Conducting and completing these standard cruises on an annual basis allows time series to be generated of the key oceanographic phenomena which is at the heart of understanding the likely impact of future ocean climate scenarios on key marine sectors e.g. fishing, aquaculture, wave energy, environmental protection and coastal flood defence. This work helps to define the likely future ocean climate these marine sectors have to contend with in terms of water temperatures, wave heights, tidal surges and nutrient and plankton concentrations.

### Activity undertaken:

- Collection of CTD profile data along the standard offshore sections (samples of Phytoplankton, nutrients, salinity).
- Collection of grab samples at key locations on the Irish shelf, collect multi-beam bathymetric data in gap areas on the western Irish Shelf.
- Acquisition of ADCP data at the shelf break to validate model output.
- Deployment of a coastal buoy in Inverin, Galway Bay.



## Harmful Algal Blooms in Thin Layers

Year Awarded:	2007
Value of the Shiptime:	€120,000
Total Number of Days:	8
Student Participation	3 postgraduates
Lead Partner:	Martin Ryan Institute, NUI Galway
Partners:	-

### Background

The occurrence of farmed shellfish contaminated with phytoplankton derived biotoxins is recognised as a serious hindrance to the development of shellfish aquaculture. In particular, contamination with DSP and AZP toxins are the two main types of contamination which cause harvest closures and associated socio-economic losses. The main causative organisms of DSP intoxication are species from the genus *Dinophysis*.

The majority of shellfish production area closures around Ireland result from the presence of DSP toxins derived *Dinophysis*. In 2004, of the 11 areas where closures occurred, nine were in the southwest, with duration of up to 11 weeks. Clearly, HABs are a serious threat to the development of this industry and mitigation of these harmful algal events is a key priority nationally.

It has only recently come to light that *Dinophysis* can occur in high density thin layers below the surface of the sea. However, because of the small length scales associated with their existence, these 'thin layers' are often missed during routine sampling operations. Additionally, the study of thin layers is a new aspect of marine biology. This cruise used state of the art (unique) equipment and technology provided by collaborating institutions which together provided the best forum for tackling outstanding problems.

### Activity undertaken:

- Study of the behaviour of species from the HAB genus *Dinophysis*, within the waters of the Northern Celtic Sea off the Southwest coast of Ireland.
- Investigation of the presence of sub-surface thin layers of phytoplankton in the vicinity of south-western Ireland, in particular the potentially harmful phytoplankton, from which species of the genus *Dinophysis* is a priority.
- The cruise has contributed to a five-day predictive forecast available on-line ([www.marine.ie](http://www.marine.ie)), which providing information on the likelihood of a HAB event around the southwest coast.



## Salmon Smolt Survey

Year Awarded:	2007
Value of the Shiptime:	€60,000
Total Number of Days:	10
Student Participation:	1
Lead Partner:	Zoology, Ecology & Plant Science/Aquaculture & Fisheries Development Centre, UCC
Partners:	Research Section, Central Fisheries Board

### Background

Significant technological advances in genetics (particularly in DNA microsatellites) now make it practicably possible to have a true and fair (unequivocal) method to identify, discriminate between and quantify the contribution of the river specific populations occurring in mixed stock commercial fisheries. New developments in Genetic Stock Identification (GSI), the use of genetic markers for identifying the proportions of different contributing populations in mixed stock fisheries, such as individual assignment (IA) and mixed stock analysis (MSA) methodologies, have been demonstrated to be powerful and valuable tools for the management of fisheries. To utilise these technological advances in the management of Ireland's valuable salmon resource the Marine Institute, under the auspices of the National Development Plan, funded a comprehensive programme of analysis in 2005 to be undertaken by the Central and Regional Fisheries Boards and University College Cork.

The principle aim was to provide fisheries managers with information regarding the contribution of the main Atlantic salmon (*Salmo salar*) producing rivers to the commercial salmon fishery operating off the Irish coast. This involved two tasks. The first was to identify, map and prioritize discrete spawning areas within known salmon bearing rivers, and to sample juveniles accordingly. Samples of adults from the mixed stock fishery operating off the Irish coast were also collected in an ancillary programme being undertaken by the Marine Institute. The second is the genetic analysis of these samples (juvenile and adult) in the laboratory and the subsequent analysis and interpretation of the genetic data obtained. This programme reported its findings in December 2007.

### Activity undertaken:

This 10 day cruise was carried out by an interdisciplinary crew of scientists, who tested the efficacy of the novel trawl in preparation for surveys of three areas in the North east Atlantic under the SALSEA-MERGE programme in 2008 and 2009. The deployment of the gear was linked to onboard oceanographic information on currents and water temperature regimes (North Atlantic Drift).

## Irish Deepwater Ecosystem Survey 2007

Year Awarded:	2007
Value of the Shiptime:	€135,000 <sup>1</sup>
Total Number of Days:	14 (9 funded)
Student Participation:	4
Lead Partner:	Fisheries Science Surveys, Marine Institute
Partners:	Earth & Ocean Sciences, NUI Galway Marine Environment & Health Services, Marine Institute

### Background

The deepwater environment harbours a complex and highly diverse ecosystem that is shaped by its unique physical and biological characteristics. Most fish species are slow growing and long living, and therefore are particularly vulnerable to over fishing and any recovery will be slow.

In the early nineties the Marine Institute ran a series of deepwater fisheries surveys along the shelf in order to obtain information on the distribution and abundance of deepwater fishes. Since then the fishery has drastically expanded and the deepwater commercial species as well as species taken as a bycatch have experienced severe fishing pressure with many of the stocks being depleted or close to depletion.

In order to warrant its urgent protection and the development of its sustainable management, there needs to be a better understanding of the deepwater ecosystem and its impact by humans.

### Activities undertaken

- The initial 1990s survey areas were revisited.
- A multidisciplinary study of its ecosystem was carried out.
- Characterisation of all aspects of its ecosystem
- Investigation into the impact of the high levels of exploitation on the abundance and biological parameters of deepwater species.

In addition, this multidisciplinary survey strengthened research collaboration between the Department of Earth and Ocean Science in NUIG and several scientific groups in the Marine Institute.

---

<sup>1</sup> An additional €75,000 for ship-time (5 days) was provided for this survey via EU fisheries Data Collection Regulation funding.



## Ground-Truthing Seismic Images of Ocean Structure in Rockall Trough, Part I: Baseline Survey of Biological Productivity and Water Motion along WESTLINE

Year Awarded:	2007
Value of the Shiptime:	€105,000
Total Number of Days:	8
Student participation:	5
Lead Partner:	School of Natural Sciences, Trinity College
Partners:	Ocean Science Services, Marine Institute School of Geological Sciences, University College Dublin Department of Earth Sciences, Durham University

### Background

This survey was the first in a series of surveys in Rockall Trough aimed to establish the link between seismic images of oceanic structure, oceanic mixing processes and biological productivity. When this link is established, it will become possible to re-use large amounts of legacy seismic data, originally collected in course of hydrocarbon exploration, to help tackle problems in oceanography and marine biology.

Ground-truthed seismic maps of oceanic structure can contribute to oceanographic modelling e.g. the ROMS Ocean Model used by the Marine Institute. This model predicts ocean currents, tides, temperatures and salinity on the shallow continental shelf around Ireland's coast for a variety of end-users including commercial shipping, leisure activities, search & rescue services etc. Model predictions for coastal regions are intimately connected with model behaviour in deeper water regions west of Ireland. However, the amount and distribution of tidal energy dissipation in deep-water regions such as Rockall Trough is poorly known. If a direct connection can be made between maps of seismic reflectivity structure and tidal energy dissipation, then the seismic maps could be used to improve the representation of tidal energy dissipation in the deep-water part of the ocean model. Such an improvement would lead directly to more accurate model predictions at Ireland's coast.

Another potential use of ground-truthed seismic maps of oceanic structure is in fisheries management. A theoretical case for a relationship between regions of enhanced seismic reflectivity and enhanced biological production is being investigated. If such a connection can be verified by this and other experiments, the seismic maps become a powerful new tool in understanding and predicting the location of fisheries.

### Activity undertaken

This survey obtained baseline oceanographic measurements coincident with the WESTLINE seismic reflection profile. The survey and associated research provides:

- A new understanding of how seismic reflection images of the ocean can be interpreted in terms of ocean mixing and biological productivity.
- A new seismic processing flow for producing images of the water layer on seismic reflection data.
- The new interpretation framework for seismic oceanographic images allows Ireland's large legacy seismic reflection database to be used for marine research, adding value both to the seismic database and to the legacy database of oceanographic measurements.

# Dedicated Training Programmes

---

## NMCI – Trainee Deck & Engineering Officers

Year Awarded:	2007
Value of the Shiptime:	€60,000
Total Number of Days:	4
Student Participation:	16
Lead Partner:	Nautical Studies, National Maritime College of Ireland (NMCI)
Partners:	Irish Maritime Development Office, Marine Institute

### Background

Ireland's reliance on seaborne trade to move the vast majority of goods both into and out of the country, underlines the strategic importance of port infrastructure and merchant shipping to the country's economic growth and stability. Unless Ireland has a trained pool of professional mariners with the skills and expertise to manage and develop its port and shipping infrastructure, it will become exposed to a dependency on foreign expertise to ensure the safe movement of its imports and exports. This training programme brought together for the first time, two of the states leading maritime bodies (IMDO & NMCI) to enhance the training and development of its professional mariners, and contribute to the expansion of the maritime knowledge pool at a national level.

This survey was a dedicated training programme for professional mariners. The training ensured for the first time that Irish officer cadets (both Merchant Marine & Naval service) were given an introduction to the unique operational requirements of service on Survey / Research Vessel at an early stage in their career. It gave young Irish mariners a clear understanding of the scientific research capacity that has been made available to the country by the delivery and operation of the *RV Celtic Explorer*.

### Students Trained

- 16 Students enrolled on the BSc in Nautical Science & BEng in Marine and Plant Engineering participated

### Activities undertaken:

- Practical, structured on-board training for Trainee Deck Officers undertaking the BSc in Nautical Science at the National Maritime College of Ireland.
- Practical, structured on-board training for Trainee Engineering Officers undertaking the BEng in Marine and Plant Engineering at the NMCI.
- Introduction to the Safety Familiarisation regime as required the STCW Code, ensuring students know how to respond in an emergency, and to the Shipboard Familiarisation regime as required under Regulation 1/14 of the STCW Convention.
- An introduction to Irish professional seafarers (both Merchant Marine & Naval service) to the unique operational requirements of service on Survey / Research Vessel at an early stage in their career and provision to young mariners of a clear understanding of the scientific research capacity which is made available through the use of the vessel.
- Laid the foundations of a good working relationship between the lecturers of the NMCI and the Marine Institute/ P&O Maritime seagoing and shore management staff.





## Multidisciplinary Offshore Training for Marine Scientists (UCC – MOTS)

Year Awarded:	2007
Value of the Shiptime:	€15,000
Total Number of Days:	1
Student Participation:	34
Lead Partner:	Department of Geology & Environmental Research Institute, UCC
Partners:	-

### Background

The cruise was divided into two separate days- one day for leaving certificate students, and one day for undergraduate/postgraduate students. The inclusion of leaving certificate students was strategic and essential to creating a broad-based on upcoming undergraduates with an interest in the marine.

Day one gave leaving certificate students an insight into offshore marine research, as well as the marine system functioning. Students were given a tour of the vessel before proceeding on a transit from Cork Harbour offshore. The students were introduced to various operations, such as how the data was collected; what the data was representing; and why we were interested in collecting the data.

Students were given a ‘hands-on’ experience to the processes of seabed mapping; sound velocity profiling; target hunting and water mass studies using technologies.

The second day saw the undergraduate/postgraduates follow a similar format as the first day. The difference in emphasis was the collecting and logging of data in a more systematic format.

Operations on both days followed a course from Cobh, out of the harbour mouth and then follow an offshore transect crossing a variety of substrates and the Kinsale Head gas pipeline.

### Students Trained

- 34 in total, 20 undergraduate, three PhD, 11 final year leaving certificate students.

### Activities undertaken

- Collection of a multidisciplinary dataset for student training and research purposes as part of their undergraduate / postgraduate / leaving cert education.
- Familiarisation of students (undergraduate and final year leaving cert) with the nature and excitement of offshore research.
- Provision of an insight into offshore marine research.
- Provision of an insight into marine system functioning.



## Marine Environment – Undergraduate and Graduate Programme

Year Awarded:	2007
Value of the Shiptime:	€12,000
Total Number of Days:	2
Student Participation:	10
Lead Partner:	Department of Zoology, Trinity College Dublin
Partners:	-

### Background

The main objective of the cruise was to demonstrate to selected undergraduate and postgraduate students a working research vessel, and a variety of sampling methodologies for fish, for benthos, for plankton, and for physical and chemical water properties. The methods provided a sub-sample of the biodiversity in the Dublin Bay ecosystem.

The data that was obtained on the cruise will be used for process and system models of Dublin Bay, which can then be integrated into the Bay Management Plan. The models can also be used as the basis for similar ICZM plans.

Scientifically, the programme filled in gaps identified as priorities by previous work (Wilson and Parkes, 1998) and formed part of international collaboration with groups in UK, France, Spain, Ukraine and Georgia. The cruise demonstrated a multidisciplinary study of physical, chemical and biological oceanography.

### Students Trained

- 10 students

### Activities undertaken

The training involved:

- Demonstrating a working research vessel, and a variety of sampling methodologies for fish, for benthos, for plankton, and for physical and chemical water properties.
- Utilising data for process and system models of Dublin Bay, which can then be integrated into the Bay Management Plan.
- Utilising the models as the basis for similar ICZM plans.
- Scientifically, filling of gaps identified as research priorities by previous work that form part of international collaboration with groups in UK, France, Spain, Ukraine and Georgia.

The cruise helped the students by greatly broadening their experience; it provided practical training of major benefit in job market; provided a learning experience otherwise unavailable; broadening their understanding of marine ecosystem; and providing them exposure to field taxonomy.



## Multi-disciplinary Training during the PAP Mooring Service Visit

Year Awarded:	2007
Value of the Shiptime:	€105,000
Total Number of Days:	7
Student Participation:	4
Lead Partner:	Earth & Ocean Sciences, NUI Galway
Partners:	-

### Background

This training cruise used the *RV Celtic Explorer* as a platform to provide a multi-disciplinary training program for a number of final year students taking the Earth and Ocean Sciences (EOS) and Marine Science (Mar Sci.) degrees at NUI, Galway. Use was made of the *RV Celtic Explorer* as it made a service visit to the Porcupine Abyssal Plain (PAP) mooring site by scientists from the National Oceanography Centre, Southampton (NOC). This provided the opportunity for the students to witness, and participate in, a number of various scientific activities such as CTD/Bottle sampling work, plankton sampling, observation of the deployment of a long hydrographic mooring, and running other instruments such as a sub-bottom profiler and underway ADCP.

The students observed first hand not only the science involved in the ANIMATE project but also directly the practical side of such research (e.g. mooring deployment/recovery).

### Students Trained

- Four students, a combination of undergraduates and postgraduates participated

### Activities undertaken

The data collected was used to develop training manuals, designed to be a quick, but simple, guide to the set up and running of oceanographic instruments, as well as some information about quality control and post processing of the data collected. The manuals are intended to be a companion guide for any student/inexperienced scientist on board that receives training in the use of the equipment, and hence act as a point of reference for subsequent use of the instruments.

The survey also provided data for the two 3<sup>rd</sup>/4<sup>th</sup> year undergraduates as part of their final year projects, and hence constituted part of their compulsory field work component of their project work.

In summary the training involved:

- Developing training manuals in the use of oceanographic instruments, principally the CTD and underway ADCP system, using the *RV Celtic Explorer* as a platform to develop a pilot multi-disciplinary training program for the final year students taking Earth & Ocean Sciences (EOS) and Marine Science (Mar Sci) degrees.
- Seeing first hand research work being carried out that directly links to their final year modules.
- Participating in a number of various scientific activities such as CTD/Bottle sampling work, plankton sampling, observation of the deployment of a long hydrographic mooring, and running other instruments such as a sub-bottom profiler and underway ADCP.



## Undergraduate Training in Fisheries and Oceanographic Sampling Techniques at Sea

Year Awarded:	2007
Value of the Shiptime:	€12,000
Total Number of Days:	2
Student Participation:	16
Lead Partner:	Galway-Mayo Institute of Technology
Partners:	-

### Background

The cruise aimed to train third year degree students on the GMIT course, Applied Marine and Freshwater Biology, in various fisheries and oceanographic sampling methods at sea. The cruise was carried out in inner Galway Bay, between Galway Harbour and the Inverin- Black Head line to minimise steaming time. Students received training and became competent in station position fixing and data logging at sea and the use a range of sampling devices and on-board sampling processing at sea.

The cruise aimed to enhanced the skills of graduates at GMIT. These skills are very relevant for biologists intending to work in the marine and freshwater sectors in academic institutions, the Marine Institute and the private sector. They will also benefit those intending to go on the post-graduate training in aquatic research areas. The skills obtained and the additional training received in third year at GMIT in sea-survival training and small boat handling facilitate the graduates in acting as on-board observers and volunteers for seagoing cruises.

### Students trained

- 16 third year undergraduate students

### Activities undertaken

In summary the training involved:

- Training students from GMIT in various oceanographic and fisheries sampling methods at sea.
- Enhancing the planning, project management and sea-going skills of graduates of GMIT.
- Enabling students to become competent in station position fixing and data logging at sea, the use of a range of sampling devices, and on-board sampling processing at sea.
- Facilitating the deployment of equipment and sample collection by research students and staff where this has a clear education value for the undergraduate students.
- Teaching students the importance of accurate sampling and logging of data for follow-up reports.
- Teaching students how to estimate the abundances of seabirds and cetaceans at sea using visual line transect techniques and the computer programme 'Distance' and will also monitor cetacean activity using a towed hydrophone.

## Bright Sparks Award 2007

---

The Bright Sparks Competition offers emerging marine scientists (undergraduate and postgraduate students) the opportunity to gain hands-on experience in undertaking research in Irish waters on board the *R.V. Celtic Voyager*.

The successful applicant is offered five days onboard the *R.V. Celtic Voyager* plus up to €5,000 to cover the costs of consumables, logistics etc.



## Benthic and Demersal Assemblages on Sandbanks in the Western Irish Sea and Potential Impacts of Offshore Windfarms

Year Awarded:	2007
Value of the Shiptime:	€35,000
Total Number of Days:	5
Student Participation	5
Lead Partner:	Marine Biodiversity Ecology & Evolution, UCD
Partners:	-

### Background

The identification of climate change as a global threat has led to increased pressure on nations to reduce their carbon emissions and large investments in the renewable energy sector. In 1999 the Irish Government published the Green Paper on Sustainable Energy, which set targets to reduce Ireland's dependence on fossil fuels and to increase renewable energy resources. The primary aim was to reduce greenhouse gas emissions and thereby meet carbon mitigation obligations under European Directives and the Kyoto protocol. The development of wind energy was identified as the main contributor to the increase in renewable resources and it was proposed to increase productivity from 1% of the national energy requirements to 7% by 2005. The consequence of this was intensification in wind farm development and in particular an impetus towards the establishment of offshore wind farms.

While offshore wind farms are well established in Europe, the Arklow Bank installation was the first in Ireland, and the first to install 3.6MW turbines in the world. At present seven turbines are in operation on that site but there is a proposal to increase this number to 200 turbines. Ireland is in a position to develop its wind energy market, through both onshore and offshore installations to an extent whereby it can generate enough energy to cover the country's demand and have some left over for export. While this is good news for the renewable energy market and for lowering CO<sub>2</sub> emissions the extent to which turbine erection may impact the environment is not fully understood. The Irish Sea is home to a number of productive and profitable fisheries (eg. whelks, seed mussels) and contain sensitive and protected habitats and species (eg. *Sabellaria* spp. reefs). Therefore, it is essential that potential impacts of wind farms be understood, so that they can be minimized or offset.

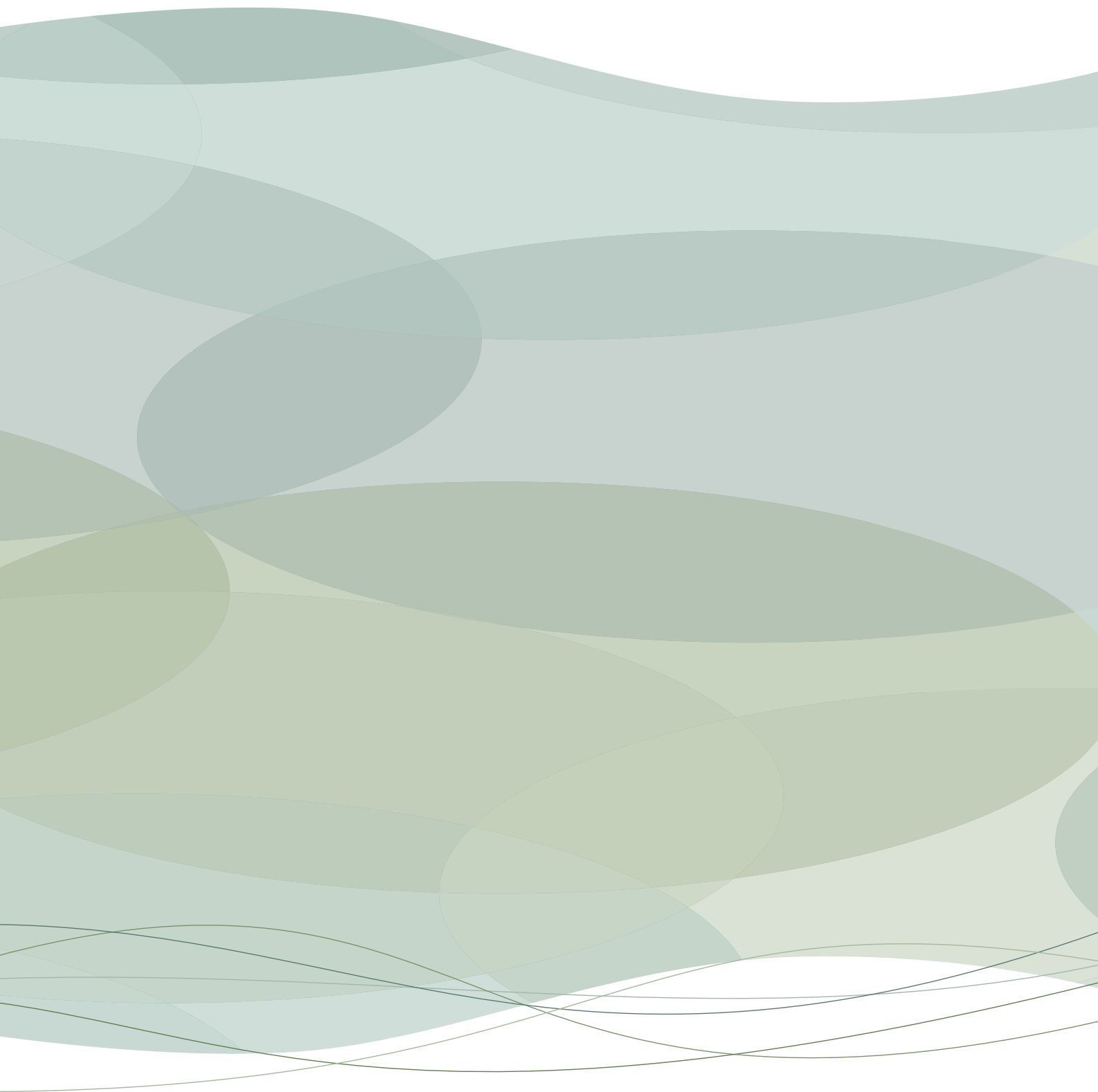
### Student participation

- Five postgraduate students

### Activities undertaken

- A quantitative survey of three different faunal type (benthic, teleost and elasmobranch) assemblages in the West Irish Sea, in areas where wind turbines are already in operation and those which may provide suitable construction sites in the future.
- Collection of valuable baseline information for future research and environmental impact assessments, which also assists in identifying potential impacts of the existing wind turbines on the Arklow Bank.





[www.marine.ie](http://www.marine.ie)

**Headquarters**

Marine Institute  
Rinville  
Oranmore  
Co. Galway  
Tel: +353 91 730 400  
Fax: +353 91 730 470  
Email: [institute.mail@marine.ie](mailto:institute.mail@marine.ie)

**Marine Institute Regional Offices & Laboratories**

Marine Institute  
80 Harcourt Street  
Dublin 2  
Tel: +353 1 476 6500  
Fax: +353 1 478 4988

Marine Institute  
Furnace  
Newport  
Co. Mayo  
Tel: +353 98 42300  
Fax: +353 98 42340