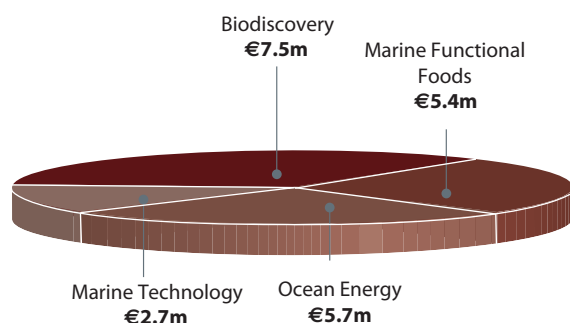


Discovery Research Measure



Overview

Significant research funding was secured in 2007 to meet the objectives of the four Programmes in the Discovery Research Measure. Sizable funds were made available through the Charles Parsons Energy Research Awards (DCENR) and the Beaufort Marine Research Awards (MI/DAFF). These awards, together with funding secured by the Marine Institute under the SSTI, co-funding received from DAFF's FIRM Programme, and recent successes by Irish researchers in EU FP7 Projects, amount to a total of €21.3m being committed across the four Research Programmes.

Research Programme	Funds Committed
Marine Biodiscovery/ Biotechnology	€7.5m
Marine Technology	€2.7m
Renewable Ocean Energy	€5.7m
Marine Functional Foods	€5.4m

Note: Reporting on the Rapid Climate Change Programme can be found under the Policy Support Research Measure below.

Summary of Impact

This investment has provided the opportunity to build new internationally competitive multidisciplinary research teams across the four Research Programmes; bringing together knowledge and expertise from non-marine areas and focussing on these new emerging marine sectors. This investment has been focussed primarily on human capital, supporting 13 research groups across eight research institutions and four SME's. The investment has resulted in the creation of significant new capacity (three new research teams, 23 new research positions, 34 PhD scholarships & 52 summer students), in addition to funding for existing researchers.

Marine Biodiscovery/Biotechnology Research Programme

The Marine Institute, in partnership with a range of national and international centres of expertise, has developed a National Marine Biodiscovery Programme. The focus of activity during 2007 was to build on previous work (e.g. proof of concept exercise) and secure funding for the creation of new multidisciplinary research teams.

The allocation of research funds through the Beaufort Marine Research Awards has significantly enhanced activities in this programme. €7.3m has been awarded to three HE Institutions, supporting seven new research positions, 12 PhD scholarships and 38 student placements. This team will:

- develop core research capabilities in taxonomy, natural products chemistry, chemogenomics and bioinformatics; and
- develop capabilities for the isolation and identification of novel chemical compounds or

proteins for use by the biopharma sector and the medical device industry (e.g. adhesives, biofilms and sensors).

In addition to this Beaufort Award, two further initiatives have helped to increase research capacity in this area:

- Through funds secured in 2006, via the HEA's Strategic Innovation Fund (SIF), two new Professorships have been established in marine biodiversity (NUIG) and marine microbial diversity (UCC); and
- During 2007, three PhD biodiscovery scholarships (in DCU and UCD) were funded by the Marine NDP Sub-Programme and implemented through IRCSET's PhD Scholarship Programme.

Marine Biodiscovery/Biotechnology Research Projects/Initiatives Funded in 2007

Project Title/Focus	Project Type
Beaufort Marine Research Award (€7.3m)	
Marine Biodiscovery Award	Capacity Building
NDP Marine Research Sub-Programme/IRCSET (€234k)	
Suite of three PhDs in the area of Marine Biotechnology/Biodiscovery	PhD Scholarships (x3)

Funded via the SSTI Integrated Marine Exploration Programme, the Marine Institute has established an initial capability to aid with the collection of samples for the Biodiscovery Programme via surveys taking place onboard the national research vessel fleet. In addition, the Marine Institute is in the process of establishing a Biodiscovery Laboratory, at its Oranmore Laboratory Facilities, for the preparation and initial processing of marine samples prior to dissemination to research groups.

Marine Technology Research Programme

Activity in the Marine Technology Programme in 2007 focussed on monitoring and managing the outputs from investments made in 2004 under the Marine Institute's and EPA's jointly funded initiative, which funded three advanced technology projects (i.e. SmartCoast and Smart Catchment Projects). These investments have helped to build a multi-disciplinary, industry-oriented research capability in the area of sensors and environmental technologies.

In 2007, investment in the programme was further boosted by the announcement of the Beaufort Marine Research Award in Marine Sensors and Communications, resulting in a €2.5m investment in the programme over a seven-year period, supporting two new research positions (including one PI), five PhD scholarships and 14 summer students. This investment will further enhance research capacity and build on previous investments in the priority area of sensors and communications systems for the marine environment. The focus of the research includes sensor systems and related telemetry and communications, and data management related to monitoring water quality and the marine environment.



Prof. E. Kennedy and Prof. D. Diamond, (DCU) accepting the Beaufort Award in Marine Sensors and Communications from Ms. Mary Coughlan T.D. and Mr. Eamonn Ryan, T.D.

Strong synergies exist between the *Sea Change* Technology Programme and the EPA's STRIVE (Science, Technology, Research & Innovation for the Environment) Programme, which includes research into the development of environmental technologies, e.g. for water quality monitoring.

Summary of Marine Technology Research Projects/Initiatives Funded in 2007

Project Title/Focus	Project Type
Beaufort Marine Research Award (€2.5m)	
Marine Sensors and Communications	Capacity Building
NDP Marine Research Sub-Programme(€64k)	
Acoustic Based Cetacean Detection	Industry-Led
EPA & IRCSET Scholarships (€167k)	
Novel Passive Sampling Devices for the Monitoring of Priority Pollutants	EPA PhD Scholarship
Development of Navigational System for UUV Mapping/ Reconnaissance	IRCSET PhD Scholarship

Case Study: Flagship Research Platform for Marine Environmental Technologies

The Marine Institute is currently in the process of scoping a major flagship research project for Galway Bay entitled SmartBay. This initiative falls under the Discovery and Infrastructure Measures in *Sea Change* and is also a specific deliverable in the National Strategy for Science, and Innovation.

SmartBay will be an inter-disciplinary and inter-agency research, test and demonstration platform. It will link the emergence and availability of new environmental technologies with a wide range of monitoring and management applications.

The system will comprise a network of seafloor cables, buoys and other infrastructure, supporting a range of sensors, information systems, telemetry and other communication technologies. Together they provide the basis for in-situ, real time monitoring. SmartBay will service the testing of new sensor systems, provide a learning curve for Celtnet (EU Deep Sea Observatory Initiative) and offer a platform for collaboration with research and industry.

It will also act as a significant attraction for international research consortia. This flagship project will help develop Ireland as a global monitoring centre for climate change assessments in the context of the North Atlantic Gulf Stream (a national priority identified under the SSTI).



SmartBay is currently being developed in conjunction with the EPA, IDA, EI, HEA and relevant government departments. A number of industry partnerships were developed in 2007, e.g. with IBM, Intel, Transas, WISEN. Other collaborations are being developed with SMEs and environmental consultancies.

Renewable Ocean Energy Research Programme

The focus of activity in 2007 in this Research Programme involved further strengthening in Irish research capability and capacity in ocean energy, through the BluePower Initiative, initially funded under the Marine Institute's NDP Marine RTDI 2000-2006 Measure.

Through the DCENR Charles Parsons Energy Research Awards, €3.5m was awarded to ocean energy research groups (UCC's HMRC and UL). The award provides funding for an additional five new postdoctoral research positions (in the areas of electronics, hydrodynamics, environmental conditions and economics) and three PhD scholarships in the Hydraulics and Maritime Research Centre (UCC) and a senior research fellow (in ocean systems modelling) in UL. Other national funding includes two IRCSET PhD scholarships (wave and offshore wind) and an industry award under the Marine Institute's NDP Programme.

Furthermore, Irish ocean energy researchers are continuing to build on previous EU Funding successes – two ocean energy research projects have recently been awarded FP7 funding to the value of €1.6m.

Other Strategic Initiatives

During 2007, the Marine Institute continued to service and manage the Galway Bay Wave Energy Test Site³, providing support for device developers to test their devices at sea. In October 2007, the Galway Bay Site became the first test site to simultaneously host two prototype devices (Wavebob and Ocean Energy). In addition to this inshore site, plans to establish a grid-connected offshore test site were initiated.

The Marine Institute has continued to liaise with both industry and policy-makers involved in the development of Ocean Energy in Ireland with respect to the successful implementation of the National Ocean Energy Strategy, with particular emphasis on creating the conditions in which an Irish ocean energy industry sector can develop and compete on international markets. In December 2006, the Marine Institute set up and held the first meeting of the 'Ocean Energy Industry Forum' to provide an informal communications mechanism for all stakeholders in this area. The forum brings together developers, investors, researchers and state agencies with an interest in ocean energy. In 2007, two meetings of the Forum took place, involving over 100 participants.

³ www.marine.ie/home/aboutus/organisationstaff/researchfacilities/Ocean+Energy+Test+Site.htm

Renewable Ocean Energy Research Projects/ Initiatives Funded in 2007	
Project Title/Focus	Project Type
DCENR Parsons Energy Research Awards (€3.5m)	
Parsons Award in Ocean Energy	Capacity Building
NDP Marine Research Sub-Programme (€96k)	
Development of an Efficient Design Technique for the Optimisation of Mooring Systems for Wave Energy Arrays	Industry-Led
EU FP7 (€1.6m)	
Components for Ocean Renewable Energy Systems (CORES)	EU FP7 Project
Pre-Normative Research for Ocean Energy (Equimar)	EU FP7 Project
IRCSET (€216k)	
Multi-Terminal HVDC for Offshore Wind-Farms	PhD Scholarship
Analysis of Power Generation System of Wave Energy Power Converter	PhD Scholarship
Bearing Design Development and Wear Characterisation for a Tidal Stream Energy Extraction Device	PhD Scholarship

Minister Ryan launches major new Ocean Energy initiative, January 2008

On the 15th January 2008, the Department of Communications, Energy & Natural Resources announced a major programme of activity, grants and supports to develop ocean energy in Ireland. Over €26 million in targeted funding will go to the sector over the next three years. Minister Eamon Ryan also announced a significant boost for the future of the sector with the first ever guaranteed price for wave energy.

In 2008, the initiative will target:

- €1 million towards a world class, state-of-the-art National Ocean Energy facility in UCC.
The Facility will have an advanced wave basin for the development and testing of early ocean energy devices.
- €2 million to support and develop a grid-connected wave energy test site.
- €2 million in grants under the Ocean Energy Prototype Fund. This will help developers to make their devices commercial.
- The introduction of a new feed-in-tariff under the REFIT scheme for wave energy of €220 per MegaWatt Hour.
- €500,000 to establish an Ocean Energy Development Unit located within Sustainable Energy Ireland (SEI), operating with the support and assistance of the Marine Institute. This unit will oversee the implementation of the initiative.

Marine Functional Foods Research Programme

Activity during 2007 in this Research Programme focussed on further scoping and kick-starting a national marine functional foods programme. The Marine Functional Foods Research Initiative (see Case Study below) is a major flagship project linked to the implementation of the *National Strategy for Science, Technology & Innovation* (SSTI), *Sea Change* and the Seafood Development Strategy *Steering a New Course*.

Research outputs will provide the Irish marine and foods sectors with the knowledge on which to base new high value-added products.

Summary of Marine Functional Foods Research Projects/Initiatives Funded in 2007

Project Title/Focus	Project Type
SSTI MI/DAFF Award (€5.2m)	
Marine Functional Foods Research Initiative	Capacity Building
NDP Marine Research Sub-Programme (€100k)	
Flavouring and Taste Components in Irish Seaweeds	Industry-Led



Dr. Declan Troy (Teagasc), Ms. Mary Coughlan T.D. & Dr. Peter Heffernan (Marine Institute) at the launch of the Marine Functional Foods Research Initiative January 2007

In addition to this large investment by the Marine Institute and DAFF, the Marine Institute has also provided funding to an SME through its NDP Industry-Led Awards for an 18-month project which involves the investigation of the flavouring and taste components in Irish seaweeds.

Case Study: Innovation within the Food Sector: Marine Functional Foods Research

In March 2007, the Marine Institute (via SSTI funding) and the Department of Agriculture, Fisheries and Food (via the Food Institutional Research Measure) signed an agreement to co-fund a national research programme in marine functional foods and ingredients. The total funding of €5.2m aims to develop new research capabilities and additional research capacity in marine functional foods.

This major research initiative spans across two Research Measures and two Research Programmes within *Sea Change*; addressing a major objective within the Seafood Processing Research Programme of the Industry Measure and helping to achieve the vision of the Marine Functional Foods Research Programme within the Discovery Measure.

The five-year award, led by Teagasc, will create two new research teams across six research institutions on the island of Ireland, creating nine new research positions (two Principal Investigators and seven Post-Doctoral fellowships) and seven PhD scholarships.

Case Study: Innovation within the Food Sector: Marine Functional Foods Research

It is anticipated that the research teams established by the successful consortium will be in a position to support the future needs of the Irish food and seafood industries; have the capability to participate in international collaborative research programmes (e.g. FP7); and secure significant research funds to enable an expansion of their research programmes.

Marine Functional Foods Research Initiative – Chairman

The Chairman of the Marine Functional Foods Research Initiative Management Committee is Dr. Noel Cawley. His extensive experience of the Irish and global food industry, as managing director of the Irish Dairy Board and more recently as Chairman of the Seafood Industry Strategy Review Group, is particularly valuable in this position. Dr. Cawley is also a member of the High-Level Steering Group of *Sea Change*.

Discovery Research Measure

Biodiscovery/Biotechnology Research Projects/Initiatives

Funding Source & Type	Project Name	Grant-Aid (agreed)*	Project Duration	Lead Partner	Partners
Beaufort Marine Research Award (Capacity Building)	Marine Biodiscovery	€7,249,444	7 Years	National University of Ireland, Galway Martin Ryan Institute	University College Cork Environmental Research Institute Department of Microbiology Queen's University, Belfast School of Biological Sciences
Marine Institute NDP Marine Research Sub-Programme (IRCSET PhD Scholarship)	Exploiting Marine Biodiversity to Develop Drugs for Normalising Neural Communication in Disease: Therapeutics Targeting Neuronal Channel	€90,000	36 months	Dublin City University International Centre for Neurotherapeutics	
Marine Institute NDP Marine Research Sub-Programme (IRCSET PhD Scholarship)	Characterisation of Anti-Inflammatory Potential of Marine Extracts	€72,000	36 months	Dublin City University School of Biotechnology	
Marine Institute NDP Marine Research Sub-Programme (IRCSET PhD Scholarship)	Isolation and Synthesis of Bioactive Natural Products from Marine Sources	€72,000	36 months	University College Dublin Centre for Synthesis and Chemical Biology	

Marine Technology Research Projects/Initiatives

Funding Source & Type	Project Name	Grant-Aid (agreed) ⁴	Project Duration	Lead Partner	Partners
Beaufort Marine Research Award (Capacity Building)	Marine Sensors & Communication	€2,488,484	7 Years	Dublin City University <i>National Centre for Sensor Research</i>	
Marine Institute NDP Marine Research Sub-Programme (Industry-Led Project)	Acoustic Based Cetacean Detection	€64,110	22 months	Biospheric Engineering Ltd.	
EPA Strive (PhD Scholarship)	Novel Passive Sampling Devices for the Monitoring of Priority Pollutants	€95,000	36 months	Dublin City University	
IRCSET (PhD Scholarship)	Development of Navigational System for Unmanned Underwater Vehicle (UUV) Mapping/Reconnaissance	€72,009	36 months	University of Limerick <i>Mobile & Marine Robotics Research Group</i>	

Marine Functional Foods

Funding Source & Type	Project Name	Grant-Aid (agreed) ⁴	Project Duration	Lead Partner	Partners
Joint Funding: Marine Institute SSTI Award and DAFF Firm Programme (Capacity Building)	Marine Functional Foods Research Initiative	€5,200,000	7 Years	Teagasc Ashtown Food Research Centre (AFRC)	Teagasc Moorepark Food Research Centre National University of Ireland, Galway, Martin Ryan Institute University College Dublin School of Agriculture, Food Science and Veterinary Medicine University College Cork Faculty of Food Science & Technology University of Limerick Department of Life Sciences University of Ulster (Coleraine) Northern Ireland Centre for Food and Health
Marine Institute NDP Marine Research Sub-Programme (Industry-Led Project)	Investigation of the Flavouring and Taste Components in Irish Seaweeds	€99,645	18 months	Cybercolloids Ltd.	

Renewable Ocean Energy

Funding Source & Type	Project Name	Grant-Aid (agreed) ⁴	Project Duration	Lead Partner	Partners
Marine Institute NDP Marine Research Sub- Programme (Industry- Led Project)	Development of an Efficient Design Technique for the Optimisation of Mooring Systems for Wave Energy Arrays	€95,928	12 months	Marine Computation Services (MCS) Ltd.	
EU FP7 Programme (Theme 5)	CORES: Components for Ocean Renewable Energy Systems	€1,251,966	36 months	University College Cork <i>Hydraulics & Maritime Research Centre (HMRC)</i>	Marine Computation Services (MCS) Ltd. Ocean Energy Ltd. University of Limerick <i>Department of Electronic & Computer Engineering</i>
EU FP7 Programme (Theme 5)	EquiMAR: Pre-Normative Research for Ocean Energy	€304,000	36 months	University of Edinburgh, UK	University College Cork <i>Hydraulics & Maritime Research Centre (HMRC)</i>
IRCSET (PhD Scholarship)	Multi-Terminal HVDC for Offshore Wind-Farms	€72,009	36 months	University College Cork	
IRCSET (PhD Scholarship)	Analysis of Power Generation System of Wave Energy Power Converter	€72,009	36 months	University of Limerick	
IRCSET (PhD Scholarship)	Bearing Design Development and Wear Characterisation for a Tidal Stream Energy Extraction Device	€72,009	36 months	University College Dublin	
DCENR – Charles Parsons Energy Research Award (Capacity Building)	Parsons Award in Ocean Energy	€3,474,408	7 Years	University College Cork <i>Hydraulics & Maritime Research Centre (HMRC)</i>	
DCENR – Charles Parsons Energy Research Award (Capacity Building)	Parsons Award in Ocean Energy	TBC	7 Years 7 Years	University of Limerick <i>Mobile & Marine Robotics Research Centre</i>	