

# Industry-Led Awards 2018

Marine Institute Grant  
Awards in Support of the  
Marine Economy





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## Introduction

Innovation 2020, Ireland's strategy for research and development, science and technology states that despite the importance of research and innovation for firms, firms under-invest in research. Therefore there is a strong case for the state to encourage firms to undertake research by providing co-investment. However, this investment must be targeted at areas of commercial opportunity that are strategically important. This is the underpinning rationale of Research Prioritisation (2018-2023), which identifies 6 Themes and 14 Priority Areas that present particular market opportunities for Ireland.

The first goal of Harnessing Our Ocean Wealth is "A Thriving Maritime Economy", which focuses on the marine opportunities to achieve economic recovery with socially inclusive and sustainable growth. The Development Task Force Report developed a strategic framework identifying three interventions to drive growth across five thematic areas and create economic growth opportunities for the marine sector:



As part of the preparation of the National Marine Research & Innovation Strategy 2017-2021, the Marine Institute has carried out a detailed analysis of national marine research capability and the range of supports that are available to the marine research and innovation community. The 15 research themes (and related sub-themes) were analysed in terms of overall maturity under three dimensions: human capacity, infrastructure and networks & relationships.

## Objectives of Call

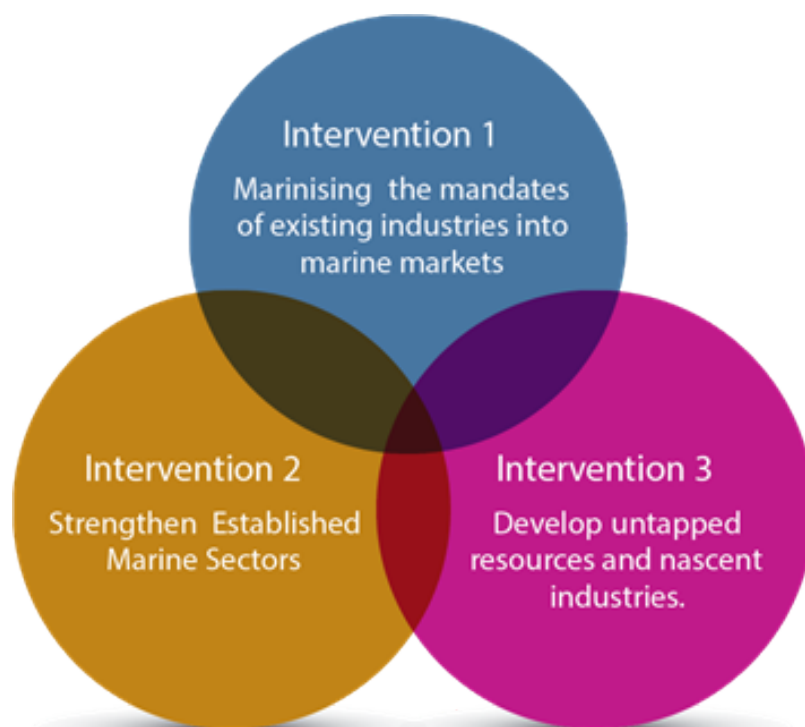
In May 2018, the Marine Institute launched the Industry-Led Call, designed to provide funding for SMEs to raise the maturity levels for their research theme across these three dimensions (human capacity, infrastructure and networks & relationships).

The call aims to fulfil national strategic objectives as follows:

- National Marine Research and Innovation Strategy 2017-2021 - Implementation of Action 8 Increase opportunities for SMEs to participate in marine research.
- Innovation 2020 - Action point 2.4 Optimising Enterprise RDI Supports.

The funding aims to:

- Support research and innovation costs for the development of innovative technologies, products and services from existing or new marine-based business.
- Help marine companies to develop capacity, capability and their networks & relationships.
- Support “novel” marine research that has not previously received funding to create new knowledge or a new product, process or service or to substantially improve existing products, processes or services.



## Call Subscription and Results

There was high demand for the call with 22 eligible applications received for the call close date of 21<sup>st</sup> June 2018 requesting a total of €4.38m grant-aid funding. The applications submitted covered five Research Themes (Advanced Technologies 3, Bioresources 7, Engineering 2, Renewable Energy 8, Transport & Logistics 2) as specified under the National Marine Research & Innovation Strategy 2017- 2021.

Of the 22 applications 13 were Company only and nine were collaborative (eight with the Higher Education Sector, and one with another SME partner). The location of the companies were five in the Northern and Western Region and 17 in the Southern Region. Each application requested €190-€200k in grant aid . No partners from Northern Ireland, but one mainland UK partner.

The applications were evaluated by a panel of 12 experts each with an excellent international reputation, are published widely and have extensive expertise in their respective fields of science and research. All evaluators signed a Declaration of Confidentiality and Conflict of Interest form.

The applications were ranked based on the scores following the evaluation process, with the top twelve ranked proposals recommended for funding and approval by the Marine Institute Board.

The successful applications all accepted the offer of grant-aid, with the total grant-aid awarded being €2.38m (54% success rate). The grant-aid awarded is €1.87m to SMEs and €0.51m to HEIs. The grantees will be contributing €0.68m of their own funding. The grant-aid will fund circa 40 research positions (2018 to 2021).

## Funding

Funding for the successful research projects will be provided by the Marine Institute and the Irish Government, co-funded under the European Regional Development Fund (ERDF) under priority 1 – Strengthening Research, Technology Development and Innovation.





## Project 1

# Development Of Marine Functional Food to Support Muscle Health and Healthy Aging in Older Adults

Research Theme: Bioresources – Processing for Food & Other Use

## Project Summary

Hydrolysed protein generated from the enzymatic hydrolysis of whole blue whiting fish by BII has high biological value and a favourable amino acid profile. This project aims to evaluate the potential of soluble fish protein hydrolysate (BII-SPH) as a functional food for healthy aging i.e. in an elderly adult cohort to support skeletal health assessed by muscle mass and function in response to exercise training.

Through cell-based bioassays and two human trials including an exercise intervention study, a scientific evidence base will be generated towards the application of blue-whiting fish protein hydrolysates to older adults to optimise skeletal muscle health and function. The research will be conducted at three locations in an integrated manner. The project will be co-ordinated by BII. Trials will be conducted at BII plant to produce SPH with improved biological value and enriched leucine content, the key determinants of the efficacy of supplemental protein in supporting muscle health. At UL, potential translational markers of protein anabolism in skeletal muscle cells will be evaluated using a novel, recently validated ex vivo-in vitro cell culture platform with serum conditioned by in vivo feeding of BII-SPH. At DCU, a functional food supplement developed by BII using BII-SPH will have sensory qualities assessed, after which the plasma amino acid kinetics of BII-SPH in older adults will be established and compared to the industry benchmark, whey protein concentrate.

Also at DCU, a human intervention study will be conducted on medically-stable older adults (>65 y) undertaking exercise training while supplementing with BII-SPH to assess impact on adaptation to training (muscle mass, physical function and biochemical parameters) compared to isonitrogenous and whey-supplemented conditions.

This project will deliver a significant impact on sustainability of complete value chain of fish industry and will introduce a new Irish health ingredient in the market worth \$12.4 billion.



## Company Lead

**Bio-marine Ingredients Ireland Ltd**  
www.biomarine.ie



Bio-marine Ingredients Ireland (BII) is a marine bio-tech company located in County Monaghan. BII is a joint venture between Irish fishing vessel owners and Norwegian partners who are experts in marine ingredients. BII produce the highest quality marine ingredients utilising the vast quantities of blue whiting which are located proximate to the Irish coast. The main shareholders in BII are fishermen who are the key holders of these quotas which constitute the bulk of the raw materials being supplied to the BII facility.

The combination of an integrated supply chain and state-of-the-art production facilities means BII is a leader in the supply of marine-based proteins, lipids and calcium to the international marketplace.

## Partners

**Dublin City University**  
www.dcu.ie



**University of Limerick**  
www.ul.ie



**UNIVERSITY of LIMERICK**  
OLLSCOIL LUIMNIGH

<b>Total Project Grant -Aid Awarded</b>	€200,000.00
<b>Award Duration:</b>	18 months

## Project 2

# Aquamoor

Research Theme: Bioresources – Processing for Food & Other Use

### Project Summary

Aquaculture is one of the key growth sectors of the blue economy in terms of food supply, job creation and growth potential. To deliver increased production fish farms need to move offshore, where a key challenge to be overcome are the increased loads on the cages and the mooring system. New mooring and anchorage solutions for fish farms are essential to expansion into offshore locations. Tfl have developed and trialled such components in the wave and tidal sector with loads reduced by ~70%

In this project we validate the impact of polymer components (based upon the knowhow Tfl have developed from the wave and tidal sector), in the aquaculture space. In the first instance we are undertaking an evaluation of the loads experienced on offshore fish farms in exposed environments. This in itself is challenging as there is little publishing of actual loads in these environments and it is clear from our interaction with fish farm operators that they would like to better understand these loads. Loads need to be monitored at multiple points throughout the mooring system. There will be monitoring of two cages, one with polymer components installed and one without.

Initial monitoring from the cage without components will be used to provide the input data for the accurate modelling of fish farm behaviour, and then the subsequent for the design of suitable polymer components. These will be deployed on the second cage and monitoring of both cages will then be used to validate the relative change in performance.

A suitable fish farm in the west of Ireland has been chosen for this work and we will be regularly disseminating the monitoring data and will have strong dissemination programme to inform the industry of the outcome.

## Company Lead

Technology From Ideas Ltd  
[www.technologyfromideas.com](http://www.technologyfromideas.com)



Technology from Ideas's (Tfi) core business is developing polymer technology for the marine market. An Irish SME with a multidisciplinary team of physicists and engineers who have world class expertise in the use of polymers for load reduction in the marine environment.

In this funding application, Tfi is seeking to take the knowledge and skills developed in the renewable energy sector and apply them to researching and developing a polymer based mooring solution for the aquaculture sector.

We consider our polymer mooring to be an enabling technology for the offshore deployment of fish farms.

<b>Total Project Grant -Aid Awarded</b>	€199,957
<b>Award Duration:</b>	36 months

## Project 3

# A Morphodynamic Study of the Irish Sea

Research Theme: Renewable Energy

## Project Summary

Ireland's expansive marine resource has the potential to provide significant economic growth through the development of critical infrastructure such as offshore renewable energy installations. Offshore wind farm developments may alter the marine environment in a number of ways, including increasing turbidity, development of scour around turbine foundations, as well as erosion around electricity cables. This can have environmental implications, as well as impacts on the operation of the wind farm. For instance, erosion around the electricity cables can result in infrastructural damage, which may result in operational downtime for the wind farm. To fully understand the seabed morphodynamics before and following offshore wind development, a thorough understanding of the hydrodynamics and seabed morphodynamics processes is required.

This project will conduct a morphodynamic study of designated areas in the Irish Sea. This will involve a geological, geotechnical, sediment and morphodynamic assessment of the seabed sediments. Repeat surveys will be conducted to assist in understanding seabed changes over time. Furthermore, predictive sediment transport modelling, validated against field data, will be used to characterise future seabed changes and to quantify the risk for future potential offshore wind developments in the Irish Sea. This project supports our national strategy for the sustainable development of Ireland's marine resource, as outlined in the National Marine Research and Innovation Strategy 2017-2021. The project specifically supports three of the fifteen themes outlined in this strategy document: 1) Renewable Energy, 2) Ocean Observation & Seabed Mapping, and 3) Engineering. Furthermore, the project supports Ireland's Offshore Renewable Energy Development Plan by removing some of the barriers to the development of the offshore wind sector in Ireland.

The outcomes of the project will support developers in efficient design, installation and maintenance planning of offshore renewable assets and will reduce the risk associated with future wind farm developments in the Irish Sea.

## Company Lead

Gavin & Doherty Geosolutions  
www.gdgeo.com



Gavin & Doherty Geosolutions Ltd. (GDG), founded in 2011 by Paul Doherty and Kenneth Gavin, is a specialist geotechnical engineering consultancy, providing innovative geotechnical solutions across a broad range of civil engineering sectors.

GDG is actively involved in a range of international infrastructure projects including harbours/marinas, offshore oil/gas installations, onshore and offshore windfarms, commercial structures and basements. Our clients include large civil and building contractors, project developers and engineering consulting firms. We also offer forensic engineering and expert witness services to the Insurance and Legal sectors.

Our principal areas of expertise are Infrastructure, Renewables, Structures, Offshore and Research & Development.

## Partners

University College Cork  
www.ucc.ie



Total Project Grant -Aid Awarded	€199,957
Award Duration:	24 months

## Project 4

# Development of the Next Generation Fisheries Surveys Using a “Swarm” of Unmanned Surface Vessels

Research Theme: Advanced Technologies

## Project Summary

The project involves the development of advanced fisheries research survey tools through the use of unmanned technology.

A key component of fisheries research is the estimation of fish stocks. One tool used in the estimation of stocks is the use of a specialist sonar mounted on a research vessel, which then physically traverses a site while collecting data. This data can be interpreted to find and identify fish, and is ultimately used to estimate stock levels of different species.

Typically these vessels operate alone, and therefore generate a single point measurement at a single point in time. As fish are highly mobile this is an inherent limitation in single sonar surveys - interpretation is required and uncertainty is introduced. This project concerns development of a cost-effective way of deploying and using multiple sonar devices simultaneously to survey for fish in an area, in ways that can increase spatial and temporal resolution of the survey measurements.

The technical development to be undertaken in this project concerns the research, design, implementation and testing of tools and techniques to allow the safe, efficient and effective use of unmanned vessels in a 'swarm' formation for fisheries research.

At the end of the project, the technology will be fully demonstrated in the live environment.

## Company Lead

**Xocean Limited**  
www.xocean.com

The logo for Xocean Limited, featuring the word "XOCEAN" in a bold, sans-serif font. The letter "X" is orange, while the letters "O", "C", "E", "A", and "N" are grey.

Xocean Ltd was established in February 2017 by James Ives who was previously CEO of Openhydro Group Limited. James and the founding team built Openhydro, a tidal turbine technology company, from inception to 145 staff with a sales pipeline of €1.4 billion and a company valuation in excess of €250 million when sold.

Xocean is transforming ocean data collection through the use of marine robotics, supporting the sustainable and economic growth of our most precious resource.

<b>Total Project Grant -Aid Awarded</b>	€199,739
<b>Award Duration:</b>	24 months

## Project 5

# Floating Solar Hybrid Energy Project

Research Theme: Renewable Energy

## Project Summary

Our unique FSHEP design concept, (Floating Solar Hybrid Energy Platform), is based on a disruptive innovative technology that creates synergies between different forms of renewable energy and storage technologies and places them on a single floating platform. These floating energy plants could potentially be deployed in both nearshore marine environments and on inland waters.

The Industry-Led grant would enable us to further develop our existing floating platform designs and energy technology through a combination of fundamental research and technology demonstration. On this R&D project we would examine how to harness solar energy on a floating platform to power an electrolysis unit to produce Hydrogen in an electrofuel form whilst using battery storage for the release of electrical power when required. Our collaborative research will deliver:

- Technical research leading to the design of a Hydrogen fuel storage and distribution system that can be integrated onto a floating solar energy platform for use in industry, shipping and for energy supply to grid connected or non-grid connected communities.
- An understanding of aero-hydrodynamic loads experienced by a floating solar platform when supporting a hybrid energy system design.
- Research into the influence of wind induced hydrodynamic motion on energy plant power capture.
- Investigation into component marination and corrosion issues in the marine environment.
- Knowledge of how to design BOP (Balance of Plant) systems to integrate H<sub>2</sub> generation, H<sub>2</sub> electrofuel and battery storage and solar energy production.
- Research into Control and interface system requirements between an interruptible energy generator (solar) and a H<sub>2</sub> generating facility.

This is an opportunity for us to develop and integrate other renewable energy production sources with our designs and to build links with UCC and MAREI, and hopefully also open up further funding opportunities (EU FP9 etc), and industry links through the Port of Cork.



## Company Lead

**Solar Marine Energy**  
www.solarmarinenergy.com



Floating Solar Energy SolarMarine Energy Ltd (SME) deliver complete floating hardware solutions for supporting PV Panels on water both inshore and offshore. These floating power plants can be used for either 'Private Wire' feeds to local industry or full grid connection. We design site specific energy plant solutions for installation on:

- Reservoirs/Water Treatment facilities/Lakes
- Hydroelectric & Pumped Storage facilities
- Nearshore Fish farms
- State authorities using otherwise useless land on flood plains
- Mining & Quarrying/Flooded pits, power used on site

SME are the first company to design, engineer and manufacture cost competitive floating solar energy products – Floating Solar Panels in accordance with Maritime industry Best Practice.

## Partners

**University College Cork**  
www.ucc.ie

<b>Total Project Grant -Aid Awarded</b>	€195,465
<b>Award Duration:</b>	24 months

## Project 6

# Eureka-SeaWind: A Lighter, More Cost-effective Solution for Floating Offshore Wind

Research Theme: Renewable Energy

### Project Summary:

Offshore Wind is an abundant source of clean renewable energy. To date, electricity generated from offshore wind has focused on near-shore, sea-bed mounted devices but floating wind projects are not yet economically viable. To make floating wind a commercially reality, further technology innovation is necessary.

This project aims to develop a reliable and efficient floating wind turbine technology based on a novel concept that reduces cost and weight. The most advanced floating wind project globally is the 30MW Hywind project which exploits technology derived from conventional onshore wind turbines. In contrast, the Eureka-SeaWind project will evaluate the benefits of reconfiguring the turbine by moving the generator to the bottom of the tower.

Advantages include a lower centre of gravity, decreased loading on the tower and floating structure and increased stability. The new design will also reduce installation and maintenance costs by improving access to the generator.

The project will use state-of-the-art computational analysis techniques to design a detailed prototype. The prototype will be evaluated through hydrodynamic frequency-domain analysis and structural analysis and it will be refined iteratively based on resulting learnings. Finally, a demonstrator turbine and floating structure will be manufactured and tested and results from testing will be used to verify and validate the computational models.

The project aims to prove the validity of the technology and achieve a Technology Readiness Level of 6 (technology demonstrated in relevant environment). At project completion, the company aims to commercialise the technology through venture capital or H2020 supports, such as the SME instrument or the Fast Track to Innovation scheme. The long-term aim is to collaborate with established utilities and wind turbine OEMs and to license the technology for use in floating offshore wind farms.

## Company Lead

### Marine Materials Ireland Ltd

Marine Materials Ireland Ltd (MMI) is a start-up company that was established to develop technology for floating wind energy. Full-scale designs for floating wind have been tested by companies like Equinor (previously known as Statoil) but significant cost reductions are needed to deliver electricity from marine renewable energy at costs that can rival fossil fuels. Marine Materials Ireland aims to develop novel, cost-effective materials and equipment, that remain robust in harsh ocean conditions, and hence reduce the price of marine energy.

MMI was founded by Dr Tomás Flanagan – an experienced researcher with a proven track-record in R&D. He is the principle investigation for the €2.7m PowderBlade H2020 project and he has secured over €4.8m in R&D funding for marine and renewable energy projects.

MMI has developed a novel design for floating wind and intends to develop a prototype to evaluate the concept.

The long-term aim of MMI is to establish a reliable and efficient floating wind turbine technology that delivers a reduction in the cost of clean, renewable energy. For floating wind to become a commercial reality, a 50% reduction in the cost of electricity must be delivered through technology innovations such as those proposed by MMI.

<b>Total Project Grant -Aid Awarded</b>	€199,816
<b>Award Duration:</b>	24 months

## Project 7

# The IDS Smart Buoy Project

Research Theme: Advanced Technologies

## Project Summary

Our mission is to provide marine technology that is regarded by our clients as a valuable asset that always delivers the data rather than a source of problems that are technically challenging. This mission has been motivated by feedback from clients and our experience delivering over 200 buoy solutions worldwide. It is our expectation that the next generation of the IDS Data Buoy for coastal and inshore environmental monitoring will include the enhanced features that very substantially eliminate the perceived problem areas for many clients and specifically we will make it easier to assemble, deploy and use our buoys, make it cheaper to purchase and maintain and greatly enhance the value of the information delivered. This project will greatly enhance our opportunity for international business development.

This project will:

- redesign the physical structure of the buoy.
- upgrade the system electronics and software and this will include a wave sensor component as an option
- design a standard set of moorings which would be appropriate in almost all scenarios.

## Company Lead

IDS Monitoring Ltd  
[www.idsmonitoring.com](http://www.idsmonitoring.com)



IDS Monitoring Limited was established in 2011 and has a senior team of five and the key members of the team have been working together for almost 20 years. The company and this project is led by John Wallace (owner and chief engineer). The IDS Monitoring Limited mission is "to provide robust operational solutions that are regarded by our clients as a key asset and not a problem and achieve this by reliably delivering the operational information that a business needs in a timely, cost effective manner." More specifically, IDS Monitoring specialise in the supply and support of autonomous data acquisition solutions for environmental monitoring in the aquatic environment (both Marine and Fresh water).

This project concerns the further R&D on our buoy technology and in this regard IDS has close to 200 buoy solutions that are operational in several countries including Ireland, the UK, Spain, Canada, the mainland USA, Ecuador, Chile, Hawaii, New Zealand, Japan, Singapore, Kazakhstan, Oman, the Lebanon and soon will have systems in a number of other countries. This project is about building on our current technology so that we can expand and deliver new Irish marine technology to many hundreds of clients globally.

<b>Total Project Grant -Aid Awarded</b>	€196,275
<b>Award Duration:</b>	24 months

## Project 8

# OWSC – Designing and Manufacture, Deployment, Operation, Maintenance and Decommissioning

Research Theme: Renewable Energy

## Project Summary

The proposed project aims to take Resolute Marine Limited's well-understood and characterised Oscillating Wave Surge Converter (OWSC) flap system from concept through to a robust design that is optimised for locations in the developing countries and islands targeted for commercial installations of RML's innovative wave-powered desalination systems. The final design will evolve according to a structured engineering approach that considers:

- likely areas of deployment and locally available support skills and resources; ease of manufacture;
- transportability from place of manufacture to site of deployment; ease of deployment and recovery;
- failure modes of the flap and associated systems;
- maintainability of flap and associated systems including consideration of;
  - fault conditions;
  - gradual degradation of performance rather than complete failure so maintenance;
  - interventions can be planned for favorable weather windows;
  - repair strategies: in-situ repair by replacement or system recovery and repair on-shore;
  - means for putting the flap in a safe, locked-down, state prior to maintenance interventions and recovery.

If awarded, this project will advance the Irish wave energy industry and provide jobs for 3 additional highly-trained experts in the fields of hydrodynamics, ocean engineering and project management.

## Company Lead

**Resolute Marine Ireland**  
[www.resolutemarine.com](http://www.resolutemarine.com)



Resolute Marine Limited (an Irish company established in 2014) is engaged in the development and commercialisation of a marine renewable energy (MRE) technology focused on seawater desalination. Resolute Marine Limited (RML) is a research-oriented micro SME and it has two 100%-owned subsidiaries: Resolute Marine SA Proprietary Limited (South Africa) and Resolute Marine Cape Verde, both of which are engaged in the development of wave-powered desalination projects in those two countries.

RML's core business is to develop, own and operate wave-powered desalination projects. Its target markets are coastal and island communities in developing nations where there is sufficient scale to enable cost-effective project development. Project development opportunities are found in locations that have persistent water shortages, insufficient electric grid capacity to support a "traditional" desalination plant, and a nearby energetic wave resource. RML's Wave2OTM technology has been designed to displace diesel electric desalination plants which are in wide use throughout the world.

RML's first commercial opportunities are on the African continent.

The Wave2OTM technology is powered by an Oscillating Wave Surge Converter (OWSC) which is mounted on the seabed in about 8m of water. The OWSC functions as a pump to convey pressurised seawater onshore to: a) a modular onshore reverse osmosis (RO) desalination plant; and b) a modular onshore electric plant that generates electricity to meet the "hotel" loads (control system, thermal management, lighting, etc.) of the integrated system.

<b>Total Project Grant -Aid Awarded</b>	€199,955
<b>Award Duration:</b>	18 months

## Project 9

# Development of Micropile Technology for Subsea Environment

Research Theme: Renewable Energy

## Project Summary

Use of robotically-installed micropiles in the subsea environment represents important innovation and potential cost saving for marine renewable energy projects. Marine micropile anchor systems typically comprise multiple, relatively small, hollow micropiles (~100mm diameter) drilled into the seafloor using a robotic seabed drill and expendable drill bits. Grout is pumped through the hollow micropile, filling the hole around the pile. The micropiles are installed through a template which forms the anchor fixture. The entire system is designed for deployment using a small size (i.e. cheaper) vessel.

This project will include the design and temporary installation of two demonstration micropile anchors. The anchor frames will represent structures which would support the foundations of offshore wind turbines or hydrokinetic energy converters. The two anchors will be load tested both horizontally and vertically and the results compared with design predictions.



## Company Lead

**Subsea Micropiles Ltd**  
www.subseamicropiles.com



Subsea MicroPiles Ltd (SML) was established in Ireland in 2017 to commercialise micropile technology for subsea foundation and anchor systems in the offshore energy sector. SML holds an exclusive worldwide license to IP developed under Lockheed Martin's Ocean Thermal Energy Programme.

Our principal business activity is the commercialisation of subsea micropile technology for offshore energy applications using robotic drilling systems, and providing engineering, procurement, construction, and installation services for customers.

Commercial rationale:

1. Since the 1950's micropiling has grown to become the dominant foundation and anchoring solution for onshore infrastructure.
2. Recent advances in underwater robotics now opens the vast market for offshore piling and anchoring to low-cost micropiling.
3. Lockheed Martin and Department of Energy (US) funded research resulting in a worldwide patent.
4. Micropiling allows the rapid and low-cost integration of site survey, design and construction thus saving expenditure and generating significant value.

<b>Total Project Grant -Aid Awarded</b>	€199,902
<b>Award Duration:</b>	12 months

## Project 10

# 1kW Inline Gator – Aquaculture Application

Research Theme: Renewable Energy

### Project Summary

Exceedence Ltd (EXC) and Technology from Ideas (tfi) propose to develop a novel renewable energy solution for the aquaculture industry (Gator). Communications with the fish farm industry over the past year, identified that every fish cage requires electricity, the majority of which is currently delivered by diesel generators. Fish farmers are actively searching for renewable energy sources to replace the diesel consumption as this brings concerns of emissions and increases risk of oil spills when transporting diesel to the feed barges. Wind and solar generation on the cages is unable to meet the power needs and is fundamentally challenging when mounted so close to the ocean itself, requiring high maintenance. Wave energy, especially when coupled with the existing mooring system is seen as a very appealing solution.

The Inline Gator at its core is a novel, innovative, polymer spring that when configured into a pump with check valves converts the motion of the fish cage into pressurised water. This pressurised water is pumped through a conventional hydro-electric turbine producing electricity. Essentially the Inline Gator will harness the natural power of the waves by converting the motion of the fish cage into electricity thereby mitigating the need for fossil fuels.

This 18-month project will develop a 1kW Gator spring with response curves suitable to the sea states in which fish farms are located. The spring and Inline Gator will be tested both in a lab environment and in a real sea environment to demonstrate and validate its fit for purpose. It is expected that by the end of this project the Inline Gator will be ready for pre-commercialisation. As part of the route to market it will also be important to identify further Inline Gator opportunities and to validate the cost benefit of the Inline Gator for the aquaculture industry.

## Company Lead

Exceedence Ltd  
[www.exceedence.com](http://www.exceedence.com)



Exceedence Ltd was set up in 2014 to catalyse commercialisation and investment in the renewable industry by providing sector specific, independent credible and robust financial planning, evaluation and optimisation software which was built and tested around international standards. Exceedence aim to provide the gold standard evaluation for the sector to create sound, equitable and independent financial planning which will bring confidence into and de-risk the sector.

## Partners

Technology From Ideas Ltd  
[www.technologyfromideas.com](http://www.technologyfromideas.com)



Total Project Grant -Aid Awarded	€199,532
Award Duration:	18 months

## Project 11

# Engineering Advanced Materials for Marine Energy and Aquaculture applications

Research Theme: Engineering

### Project Summary

The use of composite materials in marine applications has normally been reserved for high value pleasure craft using moulded construction. There is an opportunity to adapt the use of Fibre Reinforced Polymer (FRP) prefabricated components into low cost marine structures suitable for mass production. Preliminary studies have shown that there is potential for significant savings in construction costs as well as ease of construction method. What is required are robust engineering solutions for the jointing and fabrication for the complete structures made from the components which can then be utilised in energetic marine environments. Jointing of FRP materials is at a reasonable level of development but the performance in the marine environments is still relatively unknown. In this proposal, the basic structural design for joint configurations will build on preliminary work undertaken by Ocean Energy in a previous project funded by the U.S. Department of Energy.

Using existing expertise, the specific research undertaken will be (i) initial joint and adhesive characterisation, (ii) Laboratory testing of the selected joint and adhesive samples. In parallel with this process, suitable coating materials specifically designed for FRP material in the marine sector will be evaluated and field tested to develop the optimum combination for dynamic marine applications. The final technical phase will be to produce preliminary structural designs of the validated joints to be incorporated into scaled field deployments – these designs will be evaluated for manufacturability and finally we will complete an economic assessment of the application of FRP construction for the Marine Energy sector and the Aquaculture market i.e. feed barges and other support infrastructure.

Building on existing knowledge, this project will deliver a validated and commercial method of FRP jointing and construction for application in the Marine Energy and Aquaculture sectors – thus giving these sectors a competitive and sustainable advantage.

## Company Lead

New Wave Technologies Ltd  
trading as Ocean Energy  
[www.oceanenergy.ie](http://www.oceanenergy.ie)



Ocean Energy, is a specialised commercial company developing wave energy technology. The company is developing technology which has been extensively tested and is now at a stage where it is one of the most commercially viable technologies for harnessing the power of the oceans. The device, through careful development, has the advantages of a robust and practical design, one moving part and proven survivability having withstood over 3 years of live sea trials in Atlantic waves. To date no other Wave Energy systems can claim success in these areas to a similar or greater extent.

## Partners

NUI Galway  
[www.nuigalway.ie](http://www.nuigalway.ie)



NUI Galway  
OÉ Gaillimh

Total Project Grant -Aid Awarded	€195,565
Award Duration:	18 months

## Project 12

# Marine EcoPowa Project

Research Theme: Renewable Energy

### Project Summary

The aim of this Project is to create a new generation of medium power (12-15KW/20-30HP) environmentally-friendly marine propulsion and energy regeneration systems that will replace what is currently termed "outboard motors". w1Da has already developed an initial low power 4 to 6kw prototype system that is currently powering its prototype w1Da 33 yacht. This proves the concept but several areas of improvement have been identified. By providing the resources to inject academic expertise and water tank testing, as well as increasing electrical, magnetic, structural, hydrodynamic and environmental analysis, this Project will create a prototype of an advanced system. This will lead and underpin a new generation of internationally competitive products, that can extend from small to large boats; from sailing to powerboats and address several other marine markets in the future. This project aims to build upon our current working prototype by developing an environmentally-friendly system with zero emissions.

The potential financial benefits to boat users in Ireland are significant- we aim to prototype an initial configuration that could cost less than half that of petrol and diesel motors over a ten year lifetime.

The technical advantages are a steep change and improvement in reliability. According to RNLI figures, 84% of callouts to boats in distress are created by the breakdown of the gas-guzzling hydrocarbon-based motors, that have more than 400 parts and need expert maintenance. For people, flora and fauna and marine life in Ireland, the short and long term benefits of a silent non-polluting propulsion systems will be profound, as every fisherman, sailor, skier, and the entire coastal community will be able to enjoy a cleaner environment with a significant reduction in noise and water pollution.

## Company Lead

w1Da Experience Ltd  
www.w1Da.com



w1Da Experience Limited has developed the world's first electrically powered and renewable energy production sailing yacht, the w1Da 33. w1Da (pronounced "Wonder") is entirely electrically powered. W1Da has developed IP, technology, and products and is currently establishing a production system that will enable silent, electrically-powered boats to be built in Mayo and delivered to a worldwide market, currently worth €22bn pa.

Driven by Customer Experience, Environmental Legislation and Technologies. Before developing or building anything, w1Da carried out substantial market research which identified major gaps between what recreational and commercial boat owners want to experience, and the boats and craft that existing boat builders are offering.

w1Da's first yacht has unique characteristics that differentiate clearly from existing yachts on the market.

w1da has been a research and development-driven company since 2014.

## Partners

University College Cork  
www.ucc.ie



University of Southampton  
www.southampton.ac.uk



Total Project Grant -Aid Awarded

€198,763

Award Duration:

24 months

Project	Theme	Company	Partners	Total Project Grant-Aid Awarded	Award Duration
Development of marine functional food to support muscle health and healthy aging in older adults	Bioresources – Processing for Food & Other Use	Bio-marine Ingredients Ireland Ltd	Dublin City University, University of Limerick	€200,000	18 months
Aquamoor	Bioresources – Aquaculture & Biomass Production	Technology From Ideas Ltd	-	€199,957	36 months
A Morphodynamic Study of the Irish Sea	Renewable Energy	Gavin & Doherty Geosolutions	University College Cork	€199,957	24 months
Development of the next generation fisheries surveys using a “swarm” of Unmanned Surface Vessels	Advanced Technologies	Xocean Limited	-	€199,739	24 months
Floating Solar Hybrid Energy Project	Renewable Energy	Solar Marine Energy	University College Cork	€195,465	24 months
Eureka-SeaWind: A lighter, more cost-effective solution for floating offshore wind	Renewable Energy	Marine Materials Ireland Ltd	-	€199,816	24 months
The IDS Smart buoy Project	Advanced Technologies	IDS Monitoring Ltd	-	€196,275	24 months
OWSC – Designing and Manufacture, Deployment, Operation, Maintenance and Decommissioning	Renewable Energy	Resolute Marine Ireland	-	€199,955	18 months
Development of Micropile Technology for Subsea Environment	Renewable Energy	Subsea Micropiles Ltd	-	€199,902	12 months
1kW Inline Gator – aquaculture application	Renewable Energy	Exceedence Ltd	Technology From Ideas Ltd	€199,532	18 months
Engineering Advanced Materials for Marine Energy and Aquaculture applications	Engineering	New Wave Technologies Ltd trading as Ocean Energy	NUI Galway	€195,565	18 months
Marine EcoPowa Project	Renewable Energy	w1Da Experience Ltd	University College Cork, University of Southampton	€198,763	24 months





## Contact Details

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