DUBLIN 4TH INTERNATIONAL CONFERENCE ON OCEAN ENERGY 2012

CONFERENCE PROGRAMME

Presented by: SUSTAINABLE ENERGY AUTHORITY OF IRELAND, European Ocean Energy Association, OES OCEAN ENERGY SYSTEMS
ACKNOWLEDGEMENTS

The organisers and delegates of ICOE 2012 are very appreciative of the support and participation given by the following sponsors and exhibitors.

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• Marine Institute
• IBM
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• UCD

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Vattenfall

Wave Energy Centre

West Normandy Marine Energy
Dear Delegates

As the current chairman of the International Committee, it gives me great pleasure, on behalf of the Committee, to welcome you to ICOE 2012, the 4th holding of this event. We follow a proud succession of European port cities – Bremen, Brest and Bilbao – in the venue for this conference, and welcome the further voyage of the ICOE ‘ship’ into international waters.

I must thank my colleagues on the International Committee for their work, over the past two years, in helping to develop the programme for this conference. I want to thank, too, our partner organisations, OES, the Implementing Agreement for Ocean Energy of the International Energy Agency and the European Ocean Energy Association, our host organisation, the Sustainable Energy Authority of Ireland, their partners, sponsors and contractors, and the many individuals whose hard work has brought this assembly of companies, organisations and individuals together for what, we hope, will be an exciting and important event.

The ongoing evolution of ICOE, as the global forum for sharing industrial perspectives and experience about the many challenges associated with Ocean Energy, is intended to parallel and enhance similar efforts at national and regional level. We welcome the growing association with OES, the intergovernmental collaboration agreement of the International Energy Agency and the European Ocean Energy Association, our host organisation, the Sustainable Energy Authority of Ireland, their partners, sponsors and contractors, and the many individuals whose hard work has brought this assembly of companies, organisations and individuals together for what, we hope, will be an exciting and important event.

The development of ocean energy technologies is, inherently, a demanding task. We are taking complex engineering into dynamic and hostile environments. It is also an expensive task, as is the development of any major energy technology and infrastructure. In the current economic environment it is an extremely challenging time for OE technology and project developers. Events like ICOE are very important in a number of ways: they support the essential collaborations between the many subsectors and players that make up the sector, they inform the policy-makers and regulators, and particularly in a venue like the CCD in the centre of a capital city, it communicates the inspiring message of opportunity that is also inherent in ocean energy.

We hope that ICOE 2012 will inform and inspire you and that the experience will be valuable and enjoyable for all delegates, exhibitors and visitors. We on the Committee look forward to interacting with you all during the event.

Eoin Sweeney
Chair, ICOE 2012 Committee

Dear Delegates

I would like to welcome you all to Dublin, Ireland for ICOE 2012. The Convention Centre Dublin is located on the banks of the River Liffey, a river which has contributed to the evolution of Dublin as a leading European and worldwide capital. It has been the backdrop for many historic events for Ireland over the centuries.

It is appropriate therefore that we gather here in 2012 to consider the global response to the era-defining challenges of sustainable energy and climate change, to be fuelled, in part at least, by the waters which surge against our coasts.

Our oceans hold vast untapped resources of ocean and offshore wind energy with the potential to power the global economy. Already the ocean energy revolution is underway with brilliant minds across the globe dedicated to imagining the ideas, developing the concepts, refining the prototypes and deploying the solutions. It calls for leading edge creativity from scientists and engineers. But it also requires the backing of the financial community, the forward thinking policies of national governments and international agencies, coupled with the development and funding of the necessary infrastructure. We also need to ensure wide societal participation and support.

Ireland’s first great electrification project early in the 20th century was powered by the waters of the Shannon, Ireland’s largest river. Now, at the start of the 21st century, Ireland finds itself once more on the cusp of something historic – the utilisation of our tremendous marine energy resource. Ireland has high aspirations for this sector and we are proud to host this gathering of so many equally committed and enthusiastic countries, organisations and people.

ICOE 2012 brings to Dublin 700 delegates from more than 40 countries. The extensive conference programme coupled with the trade exhibition, networking events and technical tours should make for a very engaging three days.

So please allow me to wish each and every dignitary, delegate, exhibitor and sponsor a very successful and enjoyable event, from which we can all learn and prosper.

Dr Brian Motherway
Chief Executive, Sustainable Energy Authority of Ireland
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# ORGANISING COMMITTEES

## NATIONAL COMMITTEE

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
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</thead>
<tbody>
<tr>
<td>Prof. J. Owen Lewis</td>
<td>SEAI</td>
</tr>
<tr>
<td>Stephen O’Sullivan</td>
<td>SEAI</td>
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<tr>
<td>Lisa Marie Powell</td>
<td>SEAI</td>
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<tr>
<td>Tony Lewis</td>
<td>HMRC</td>
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<tr>
<td>Olive Hill</td>
<td>Invest NI</td>
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<tr>
<td>Peter Heffernan</td>
<td>Marine Institute</td>
</tr>
<tr>
<td>Karen Conroy</td>
<td>Enterprise Ireland</td>
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<tr>
<td>Eoin Sweeney</td>
<td>SEAI</td>
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<td>Fiona Smith</td>
<td>SEAI</td>
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<tr>
<td>Sarah Collins</td>
<td>Conference Partners</td>
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<tr>
<td>Cera Slevin</td>
<td>ESBI</td>
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<td>Peter Coyle</td>
<td>MRIA</td>
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<tr>
<td>Ray Bowe</td>
<td>IDA</td>
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<td>Lt. Cdr. Brian Fitzgerald</td>
<td>Defence Forces</td>
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## INTERNATIONAL COMMITTEE

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
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<tbody>
<tr>
<td>Jochen Bard</td>
<td>Fraunhofer IWES, Germany</td>
</tr>
<tr>
<td>Ian Bryden</td>
<td>Edinburgh University, UK</td>
</tr>
<tr>
<td>John Huckerby</td>
<td>OES-I, New Zealand</td>
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<tr>
<td>Javier Marques</td>
<td>EVE, Spain</td>
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<tr>
<td>Neil Rondorf</td>
<td>SAIC US</td>
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<tr>
<td>Antonio Sarmento</td>
<td>Wave Energy Centre, Portugal</td>
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<tr>
<td>Jean-François Dhedin</td>
<td>EDF, France</td>
</tr>
<tr>
<td>Kai Uwe Graw</td>
<td>Dresden Universität, Germany</td>
</tr>
<tr>
<td>Kim Nielsen</td>
<td>Ramboll, Denmark</td>
</tr>
<tr>
<td>Anton Navarro</td>
<td>Iberdrola Renovables, Spain</td>
</tr>
<tr>
<td>Gouri Bhuyan</td>
<td>Canada</td>
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<tr>
<td>Chris Campbell</td>
<td>OREG, Canada</td>
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<tr>
<td>Tony Lewis</td>
<td>UCC, Ireland</td>
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<tr>
<td>Michel Paillard</td>
<td>IFREMER, France</td>
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<td>Nathalie Rousseau</td>
<td>EU-OEA</td>
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<tr>
<td>Jose Luis Villate</td>
<td>Tecnalia, Spain</td>
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<tr>
<td>Peter Fraenkel</td>
<td>Fraenkel Wright, UK</td>
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<tr>
<td>Paul Holthus</td>
<td>World Ocean Council</td>
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<tr>
<td>Mann-eung, Kim</td>
<td>Korean Shipping register, South Korea</td>
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<tr>
<td>Eoin Sweeney</td>
<td>SEAI, Chair ICOE 2012</td>
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</tbody>
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## CONFERENCE ORGANISERS

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarah Collins</td>
<td>Conference Partners</td>
</tr>
<tr>
<td>Elva Hickey</td>
<td>Conference Partners</td>
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Conference Partners Ltd.
*NOTE: Some events will take place in vessels moored on the River Liffey.*
# ICOE 2012 SOCIAL EVENTS

<table>
<thead>
<tr>
<th>WHAT: ICOE 2012 Welcome Reception</th>
<th>WHEN: Wednesday 17th October</th>
<th>TIME: 18.00 – 20.00</th>
<th>WHERE: Exhibition Hall, The Forum</th>
</tr>
</thead>
</table>

ICOE 2012 delegates will gather in the exhibition hall for a reception, with a special welcome from the Deputy Lord Mayor of Dublin Cllr. Clare Byrne. Canapés and refreshments will be served. This is time to relax and wind down after day 1 of ICOE 2012, while mingling with your friends and industry colleagues from all over the globe.

<table>
<thead>
<tr>
<th>WHAT: ICOE 2012 Gala Dinner</th>
<th>WHEN: Thursday 18th October</th>
<th>TIME: 19.00 – 23.00</th>
<th>WHERE: Trinity College Dublin</th>
</tr>
</thead>
</table>

The 2012 ICOE Gala Dinner is taking place in the historic and wonderful ground of Trinity College Dublin. Delegates will be treated to a private viewing of the Book of Kells before being taken to the famous Long Room for a drinks reception with enchanting harp music. Dinner will follow across the cobbled stones to Trinity College Dining Hall with special after dinner entertainment. Limited tickets are available for the Gala Dinner, if you wish to attend please go to the ICOE Information Desk, located at the Registration Area on the Ground Floor.

# OTHER SOCIAL EVENTS

<table>
<thead>
<tr>
<th>WHAT: Canadian Embassy Reception (Invitation Only)</th>
<th>WHEN: Wednesday 17th October</th>
<th>TIME: 19.00 – 20.30</th>
<th>WHERE: L.É Roisín, directly outside the Convention Centre Dublin, on the river</th>
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</thead>
</table>

In honour of Canada’s participation at ICOE 2012 his Excellency Loyola Hearn, Ambassador of Canada is holding a private reception on the Irish Naval Vessel, the L.É Roisín.

<table>
<thead>
<tr>
<th>WHAT: Invest Northern Ireland Reception (Invitation Only)</th>
<th>WHEN: Thursday 18th October</th>
<th>TIME: 18.00 – 20.00</th>
<th>WHERE: L.É Roisín, directly outside the Convention Centre Dublin, on the river</th>
</tr>
</thead>
</table>

Guests attending Invest Northern Ireland’s reception will hear from Professor Trevor Whittaker of Queen’s University, Belfast. This world-renowned expert in marine energy will speak about Northern Ireland’s unparalleled expertise in this area. For those attending the ICOE 2012 Gala Dinner, coaching will be available to Trinity College Dublin at 19.00.
TECHNICAL VISITS

WHAT: Open Hydro and SeaGen
WHEN: Saturday 20th October
TIME: 07.00 - 18.00
TRANSPORT: 07.00. Departs from the front entrance of the Convention Centre Dublin

This technical tour will bring delegates to see Open Hydro’s tidal turbine manufacturing facility in Greenore and the MCT SeaGen turbine in Strangford Lough. The trip includes coaching, ferry transfer from Strangford to Portaferry and lunch.

It is advised to bring waterproof coats and a scarf to keep you warm and dry on this trip!

Maximum numbers for this trip are 100 people, with only a few places left. If you are interested please go to the ICOE Information Desk, located at the Registration Area on the Ground Floor.

OTHER SIDE EVENTS

WHEN: Monday 15th October
WHERE: Convention Centre Dublin
This workshop is being organised by the Pacific Northwest National Laboratory, on behalf of the U.S Department of Energy and the Annex IV nations.

WHAT: SOWFIA Project – Third Workshop
Navigating the Wave Energy Consenting Process: Sharing Knowledge and Implementation of Regulatory Measures
WHEN: Tuesday 16th October
WHERE: Guinness Storehouse
TIME: 11.00 - 17.00

WHAT: TROPOS FP7 Project: First Dissemination and Communication Workshop
BEYOND THE HORIZON: the Role of multiuse offshore platforms in the Oceans of Tomorrow.
WHEN: Tuesday 16th October
WHERE: Guinness Storehouse
TIME: 18.00 - 20.00
Organisers Pedro Mayorga & Jan Hanssen at EnerOcean. Attendees registered in advance.
WHAT:  B to B with France at ICOE 2012 - Facilitating business relations between French-based companies and you
WHEN:  Tuesday 16th October / Wednesday 17th October
WHERE: Clarion Hotel Dublin (16th) / Convention Centre Dublin (17th)
The French Trade Commission, UBiFrance in Ireland, the Ireland France Chamber of Commerce and their partners have organised this event to the Renewable Energies. For further details please email christine.deniel@ubifrance.fr

WHAT:  Meeting of the Project Team for IEC62600-2 ‘Design’ under ICE Technical Committee 114
WHEN:  Tuesday 16th October / Wednesday 17th October
WHERE: Clarion Hotel Dublin
Meeting hosted by ESB who participate on the committee and also by the Commissioner of Irish Lights.
Participation by members only

WHAT:  IMERC Showcase
WHEN:  Duration of the Conference (17th - 19th October)
WHERE: L.É Roísín (Visit Exhibition Stand 55 for more details)

WHAT:  Canadian Networking Breakfast
WHEN:  Thursday 18th October
WHERE: Clarion Hotel Dublin
TIME:  07.30 - 09.00
The Canadian Ambassador to Ireland, H.E., Loyola Hearn will host and introduce 15 exhibiting Canadian companies and organizations to an invited international audience. Minister Bernard Valcourt, Associate Minister of National Defence and Minister of State, Atlantic Canada Opportunities Agency together with Chris Campbell, Director, Marine Renewables Canada plus 4 additional Canadian speakers will provide background on the Canadian ocean energy sector, encourage partnerships and investment opportunities with global players.

For further information and/or interest in attending, contact
Gerry Mongey, Trade Commissioner, Canadian Embassy Dublin
tel: 353-1-234 4017
e-mail: gerry.mongey@international.gc.ca

WHAT:  UCC Beaufort Launch (Invitation Only)
WHEN:  Thursday 18th October
WHERE: L.É Roísín
TIME:  13.00
The Beaufort Laboratory, UCC’s presence on the IMERC campus, is dedicated to multidisciplinary research and knowledge transfer to support sustainable resource developments and innovation in the maritime field.

WHAT:  International Network on Offshore Renewable Energy (INORE) workshop
WHEN:  Friday 19th October
WHERE: Convention Centre Dublin
TIME:  14.00 - 16.00
Open to young researchers and early stage career researchers, this workshop provides an informal and interactive programme and a chance to meet other young researchers and make useful contacts for your own work. The workshop comprises of an afternoon of discussions with invited panelists working within offshore renewable energy, followed by a networking evening meal. Panelists to be arranged from the tidal, wind and wave sectors.

Register for this workshop at www.inore.org
Any queries contact Hannah Buckland, Event Coordinator, 513924@swansea.ac.uk
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## PROGRAMME OVERVIEW

### WEDNESDAY, OCTOBER 17th

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<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>08:00 – 09:30</td>
<td>Registration</td>
<td>Ground Floor Foyer</td>
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<tr>
<td>08:30 – 10:15</td>
<td>ICOE 2012 Conference Opening Session</td>
<td>Liffey B</td>
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<tr>
<td>10:15 – 10:45</td>
<td>Coffee Break, Exhibition Hall</td>
<td>Exhibition Hall, The Forum</td>
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<tr>
<td>10:45 – 11:45</td>
<td>Keynote Addresses</td>
<td>Liffey B</td>
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<tr>
<td>11:45 – 13:00</td>
<td>Parallel Sessions</td>
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<tr>
<td>13:00 – 14:30</td>
<td>Lunch</td>
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<tr>
<td>14:30 – 15:45</td>
<td>Parallel Sessions</td>
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<tr>
<td>16:30 – 18:00</td>
<td>Parallel Sessions</td>
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### THURSDAY, OCTOBER 18th

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<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>08:30 – 10:00</td>
<td>Plenary Session</td>
<td>Liffey B</td>
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<tr>
<td>10:00 – 11:45</td>
<td>Parallel Sessions</td>
<td>Liffey B</td>
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<tr>
<td>11:00 – 11:45</td>
<td>Coffee Break &amp; Poster Session</td>
<td>Exhibition Hall, The Forum</td>
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<td>11:45 – 13:00</td>
<td>Parallel Sessions</td>
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<tr>
<td>13:00 – 14:30</td>
<td>Lunch</td>
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<td>14:30 – 15:45</td>
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### FRIDAY, OCTOBER 19th

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<tr>
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<tr>
<td>08:30 – 09:45</td>
<td>Plenary Session</td>
<td>Liffey B</td>
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<tr>
<td>09:45 – 11:00</td>
<td>Parallel Sessions</td>
<td>Liffey B</td>
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<tr>
<td>11:00 – 11:45</td>
<td>Coffee Break &amp; Poster Session</td>
<td>Exhibition Hall, The Forum</td>
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<tr>
<td>11:45 – 12:45</td>
<td>Parallel Sessions</td>
<td>Liffey B</td>
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<tr>
<td>12:45 – 13:30</td>
<td>Conference Closing Session</td>
<td>Liffey B</td>
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</tbody>
</table>
Wednesday 17th October

07.00 - 08.30 Registration

08.30 - 10.15 ICDE 2012 Conference Opening Session

Welcome & Chair: Dr Brian Motherway, CEO of SEAI

Mr Pat Rabbitte, Minister for Communications, Energy and Natural Resources, Irish Government
Mr Bernard Valcourt, Canadian Minister of State (Atlantic Canada Opportunities Agency)
Ms Arlene Foster, Minister for Enterprise, Trade and Investment, Northern Ireland
Mr Colin Imrie, Deputy Director and Head of Energy and International Low Carbon, Scottish Government

10.15 -10.45 Coffee Break & Exhibition

10.45 -11.45 Keynote Addresses - Enabling the Development of Ocean Energy

Chairs: Eoin Sweeney, Chair of the ICDE International Committee

John Mc Sweeney, Head of Innovation, ESB - Ocean energy, harnessing the potential
Eddie O'Connor, CEO Mainstream and Founding Member of Friends of the Supergrid - Offshore Grid: the key enabler for marine renewables
Sean Kidney, Climate Bonds Initiative - Financing pathways for the marine renewable sector

11.50 - 13.00 Wave Energy Convertors I
Chair: Kim Nielsen, Ramboll, Denmark

• Martin McAdam, Aquamarine - The development of Aquamarine
• Ali Baghaei, Oceanlinx Ltd - The world’s first 1MW wave energy converter
• Jonathan Fievez, Carnegie Wave Energy Ltd - Progress towards the worldwide deployment of the CETO® Wave Energy Technology
• Erik Fris-Madsen, WaveDragon - The development of a Wave Dragon 1.5 MW North Sea Demonstrator

• Helen Smith, University Of Exeter - Wave resource assessment for the Falmouth Bay wave energy test site (FaBTest)
• Thomas Adcock, University Of Oxford - On the tidal resource of the Pentland Firth
• Shiaw-Yih Tzang, National Taiwan Ocean University - Wave Energy Resources on Coastal Waters of Northeast Taiwan
• Takashi Okamoto, Hiroshima University - Wave Energy Resource in the Western Part of Japan

13.00 - 14.30 Lunch & Exhibition

14.30 - 15.45 Tidal Stream Technologies I
Chair: Peter Fraenkel, Fraenkel Wright Ltd

• James Ives, OpenHydro - Development of a tidal energy business
• Oliver Wragg, Atlantis Resources Corporation - Deployment and testing of the AR1000, a 1MW tidal stream turbine
• Peter Kracht, Fraunhofer IWES - Implementation of a Vertical Axis Marine Current Plant for Off-grid Village electrification in Indonesia
• Sian Wilson, Black and Veatch - Understanding the interactions of tidal power projects across the UK Continental Shelf

• Andrea Copping, Pacific Northwest National Laboratory - Renewable Ocean Energy and the Marine Environment: Filling Gaps in Knowledge
• Graham Daborn, Acadia Tidal Energy Institute - Between Scylla and Charybdis: Designing Approaches to Environmental Assessment of In-Stream Tidal Power in High Flow Environments
• Cuan Boake, Queen’s University Belfast - The Environmental Monitoring Programme related to Wake Effect of the Seagen Tidal Turbine
• Mérin Broudic, Swansea University - Long Term Monitoring of Underwater Noise at a Proposed Deployment site of a Tidal Stream Device

15.45 - 16.30 Coffee Break, Poster Session 1 & Exhibition
16.30 - 18.00

1.3 Ports Vessels and Supply Chain
Chair: Barry Carruthers, Scottish Power Renewables
- Matthew Shanley, HMRC, UCC - Offshore Wind Farm Service Vessel, Hull Design Optimisation
- Jochen Bard, Fraunhofer IWES - Offshore Supply Chain Requirements for Ocean Energy in Europe - Results from the ORECCA Project
- Cera Slevin, ESB - Supply Chain Needed for 5MW Wave Farm
- Michael Shaw, RPS Group - Port interaction with the marine renewable energy sector
- Nick Murphy, Searoc - Specialist construction & service vessels for the marine renewable energy sector

2.3 Measurement and Monitoring
Chair: Prof. A. Sarmento, Wave Energy Centre, Portugal
- Brandon Strong, University Of Exeter - Wave measurements near the Wave Hub using a 5-Beam ADCP
- Raymond Alcorn, HMRC, UCC - Lessons learned from the Galway Bay Seatrals of the EU FP7 funded CORES project.
- Harry Kolar, IBM - Real-time acoustic monitoring for the ocean energy industry
- Jean-Baptiste Richard, Fraunhofer IWES - Assessing the capabilities of acoustic Doppler sensors for quantifying dynamic phenomena in tidal streams
- Mat Thomson, GL Garrad-Hassan - Comparison of scale model wake data with an energy yield analysis tool for tidal turbine farms

18.00 - 20.00

Conference Welcome Reception - Dublin Convention Centre
Welcome from the Deputy Lord Mayor of Dublin, Cllr. Clare Byrne

Thursday 18th October

08.30 - 09.45

Plenary Session: Perspectives on the Commercialisation of Ocean Energy
Chair: John Huckerby, OES & AWATEA, New Zealand
David Ainsworth, Siemens - Cost down: Solving the challenge of successful commercialisation
Barry Carruthers & Roberto Veguillas Perez, Iberdrola - Developing a Business in Marine Renewable Energy
Peter Wesslau, Vattenfall - The need for a mature commercial value chain

09.50 - 11.00

1.4 Wave Energy Converters II
Chair: Marc Le Boullec, Ifremer, France
- Enrique Vidal Sanchez, Wavestar - Early Performance Assessment of the Electrical Output of Wavestar’s prototype
- Simon Ambuehl, Aalborg University - Reliability Assessment of Wave Energy Devices
- Keyyong Hong, Kordi - Distinctive Technologies Applied to Yongsoo Pilot Plant of 500kW OWC Wave Energy Converter
- Clym Stock-Williams, E.On - Lessons from the Pelamis Deployments at EMEC

2.4 Test and Demo Facilities I
Chair: Jose Luis Villate, Tecnalia, Spain
- Yago Torre-Enciso, EVE - Mutiku: First year review
- Eileen Linklater, EMEC - Innovation in action - EMEC update on learning from 11 marine energy converters in Orkney
- Yann-Herve De Roeck, Ifremer - France Energies Marines offers a coordinated panel of sea-trial test sites
- Claire Gibson, Wave Hub Ltd - Responding to the challenge of deploying a commercial array

11.00 - 11.45

Coffee Break, Poster Session 2 & Exhibition

11.45 - 13.00

1.5 International Perspectives on Ocean Energy
Chair: Nathalie Rousseau, EU-OEA
- Henry J effrey, University of Edinburgh - European Energy Research Alliance Joint Programme on Ocean Energy

2.5 Test and Demo Facilities II
Chair: Ana Brito e Melo, Wave Energy Centre, Portugal
- Mark Healy, HMRC, UCC - MARINET Free access to test facilities: How Europe’s leading research centres have joined forces to accelerate the development of marine renewable energy

3.3 Hybrid Systems
Chair: Gerardo Hiriart, Mexico
- Israel Martinez, Acciona - Methodology for assessing multiple combined wind and ocean energy technologies as part of the EU FP7 MARINA Platform Project
- Katie Lynch, HMRC, UCC - Site Selection Methodology for combined wind and ocean energy technologies in Europe
- Carlos Pérez, Universidad De Santiago De Compostela - Integration of Wave Energy Converters and Offshore Windmills
- Antoine Peiffer, Marine Innovation and Technology - Design of an oscillating wave surge converter on the WindFloat structure
- Franklin Martin, Floatin - Offshore Wind and Wave Together - AFLOAT

3.4 Components, Moorings and Materials
Chair: David Bell, Invest Northern Ireland
- Sam Weller, Ifremer - Durability of synthetic mooring lines for ocean energy devices
- Jeffery Steynor, Edinburgh University - A Design Tool for the Wear Pattern and Thermal Response of Plain Bearings Submersed in Sea Water
- Paul McEvoy, Technology From Ideas Ltd - Combined Elastomeric & Thermoplastic Mooring Tethers
- Yukio Kamizuru, Bosch Rexroth AG - Efficient Hydraulic Power Take-Offs for Ocean Energy Devices

3.5 Tidal Stream Technologies II
Chair: Dr Keyyong Hong, KORDI, Korea
- Chris Sauer, ORPC - Making History: Launching the First Commercial Tidal Energy Project in the United States
- Luke McCween, Gurtl - Cost-effective tidal turbine blades
11.45 - 13.00
- Dengwen XIA, State Oceanic Administration (SOA) and Administrative Centre for Marine Renewable Energy (ACMRE), People's Republic of China - The activities of marine renewable energy in China
- Chris Campbell, Canada - Turning potential into reality - creating an industry out of an iconic resource
- Mike Reed, DoE USA - Recent US efforts to advance marine hydrokinetics
- Jose Luis Villate, Tecnalia & OES - Ocean energy activities in Spain and vision of the OES

• J aver Marques EVE - Lessons learnt and future steps towards the exploitation of BIMEP
• Anna Redden, FORCE - The Importance of Tidal Demonstration facilities in Advancing Technology Development - A Fundy Ocean Research Centre for Energy (FORCE) Perspective
• Terence Browne, CEI Collins Engineers Ltd - Overview of the ASCE COPRI Marine Renewable Energy Facilities Guide Document
• Cheng-Han Tsai, National Taiwan Ocean University - Tidal power potential and the Development and testing of a Tidal Stream device for the sea near Keelung, Taiwan
• Adam Holland, McLaughlin & Harvey - The route to commercially viable foundation installation and deployment of wave and tidal devices
• Stephen Salter, University Of Edinburgh - Are nearly all Tidal Stream Turbines Designs Wrong?

13.00 - 14.30 Lunch & Exhibition

Elevator Pitch Session (in Exhibition Hall)
- CyanWave WEC - Tim Morrissey, Cyan Technologies
- The DUO - Paul Brewster, Pure Marine
- Sea Power Platform - Ben Wrafter, Sea Power Ltd
- An active-controlled submerged wave energy device with energy focussing - Umesh Korde, South Dakota School of Mines and Technology and R. Cengiz Ertekin, University of Hawai'i
- Eco Wave Power - David Leb, Eco Wave Power Company

14.30 - 15.45
1.6 International Roadmaps
Chair: Henry Jeffery, Edinburgh University, UK
- Nathalie Rousseau, EU-OEA - European Initiatives for Ocean Energy
- Soraya Hamawi, Wave Energy Centre - Wave Energy in Portugal, the path towards successful implementation
- J oaquín Hernandez, Canary Islands - Vision for marine renewables in the Canary Islands
- Kyung Hwa Song, Korea Institute of Marine Science and Technology Promotion - Policy and Roadmap of Ocean Energy R&D in Korea

2.6 Site Investigation
Chair: Javier Marques, EVE, Spain
- Brian Polagye, University Of Washington - Multi-scale tidal resource characterisation: A case study for Admiralty Inlet, Puget Sound
- Patricio Monardez, Baird & Associates - Wave energy map in intermediate and shallow water depth in Chile based on a 30 year long validated 2D spectral hindcast of the Pacific Ocean
- Richard Karsten, Acadia University - Analysis of Tidal Turbine Arrays in Digby Gut and Petit Passage, Nova Scotia

3.6 Evaluation and Standards
Chair: Claudio Bittencourt, Det Norske Veritas, UK
- Neil Rondorf, SAIC & Chairman IEC TC-114 - Standards: Value added in development and commercialisation
- Matt Folley, Queens University Belfast - Standardising resource assessment for wave energy converters
- Frank Fortune, Royal Haskoning - An environmental perspective on project risk management in the wave and tidal sector
- J ohn Fitzgerald, ESB - Technology Readiness for Wave Energy Projects; ESB and Vattenfall classification system
- Jochem Weber, Wavelab - WEC Technology Readiness and Performance Matrix - finding the best research technology development trajectory

15.45 - 16.30 Coffee Break, Poster Session 3 & Exhibition

16.30 - 18.00
Plenary Session:
Chair: Chris Campbell, OREG, Canada
An overview of recent developments and trends:
- Peter Fraenkel, Fraenkel Wright Ltd - Tidal Stream Turbine Sector
- Max Carcas - Wave Energy Convertor Sector

Panel Debate - The Next Generation: From prototyping devices to prototyping an industry

18.00 End of the Second Day of Conference
19.00 Gala Dinner - Trinity College Dublin (See map on page 32)
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<td>Tom Kelly, Enterprise Ireland</td>
<td>Miguel Marques, Economy of the Sea Executive Partner at PricewaterhouseCoopers</td>
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<td>Garrett Monaghan, Arthur Cox - Access to project finance for ocean energy projects</td>
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<td>David Walker, European Investment Bank - Financial instruments for the ocean energy sector</td>
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<td>David Krohn, Renewables UK - Removing the barriers: making the most of our global resource</td>
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<td>09.50 - 11.00</td>
<td><strong>1.7 Economics of Ocean Energy I</strong></td>
<td>Peter Coyle, Marine Renewable Industry Association, Ireland</td>
<td>Gordon Dalton, HMRC, UCC - Impact of inter-annual resource data variability on techno-economic performance of the WaveStar</td>
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<td>Mirko Previsic, RE Vision Consulting - Lifecycle Cost and Supply Curves of Marine Technologies in the U.S.</td>
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<td>Marc Paish, Pulse Tidal - Are 1MW tidal systems big enough?</td>
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<td>Iain Fairley, Swansea University - A consideration of the deployment of wave energy converters in Welsh waters based on resource and financial considerations</td>
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<td>11.00 - 11.45</td>
<td><strong>1.8 Economics of Ocean Energy II</strong></td>
<td>Mike Reed, Department of Energy, USA</td>
<td>Borja de Miguel, Oceantec Energias Marinas - New perspectives on the long term feasibility of wave energy conversion: a techno-economical approach</td>
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<td>Alex Raventos, WavEC - Techno-economic tool for WEC design optimization</td>
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<td>Anne Van Houten, Bluewater - Reducing the cost of ocean energy</td>
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<td>Ronan Costello, NUI Maynooth - Techno-Economic Optimisation for Wave Energy Converters</td>
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<td>11.45 - 12.45</td>
<td><strong>2.7 Power Compliance and Grid Issues</strong></td>
<td>Roberto Veguillas Perez, Iberdrola, Spain</td>
<td>Fergus Sharkey, ESB - Voltage Flicker Evaluation for Wave Energy Converters - Assessment Guidelines</td>
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<td>Andrea Mansolfo, Eirgrid - Wave, Tidal and Grid Connection: Opportunities for an Irish Offshore West Grid</td>
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<td>Ijula Fernandez Chozas, Aalborg University - Economic Evaluation of Integrating Wave and Wind Power Productions in Day-Ahead Electricity Markets</td>
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<td><strong>Conference Closing Session</strong></td>
<td>Kate Freeman, INORE - INORE: knowledge exchange across borders and amongst young researchers</td>
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<td>Matthew King, DG Maritime Affairs and Fisheries, European Commission - EU Perspectives on Ocean Energy - the Atlantic Strategy and the new Horizon Programme</td>
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<td>Conference Closing Remarks - Eoin Sweeney, Chairman of the ICOE International Committee</td>
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<td><strong>Saturday 20th October</strong></td>
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<td>Guided Tour to OpenHydro, Greenore, Co. Louth &amp; MCT SeaGen, Strangford Lough</td>
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</table>
1 in 4 of the world’s full scale marine energy prototypes have been developed, tested or manufactured in Northern Ireland.

Northern Ireland is known for its lush countryside and wonderful views, but did you know we also design and build the latest in renewables technology?

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In order of appearance

**DAY 1 - WEDNESDAY 17th**

**John McSweeney**  **Head of Innovation, ESB**  
John McSweeney was recently appointed as Head of Innovation ESB, having served as Acting Executive Director of ESB Energy International in 2011. He previously held senior positions as Manager of ESB Asset Development, Manager of Engineering and Facility Management at ESB International and Manager of ESB IT Solutions and Telecoms. A Physics Graduate and Mechanical Engineer, John joined ESB in 1992. Prior to his career in the energy sector, he held senior positions in the Irish Industrial Development Authority including Director of Germany, and is a former Irish Army Officer.

**Dr. Eddie O’Connor**  **Founder and Chief Executive, Mainstream Renewable Power**  
Eddie was named World Energy Policy Leader by Scientific American magazine in 2003. In February 2008, Dr Eddie O’Connor founded Mainstream Renewable Power. Previously he was the Founder and Chief Executive of Airtricity from 1997 until January 2008, when the company was sold to E.ON and Scottish & Southern Energy for approximately €2 billion. Eddie is acknowledged as the driving force behind the European Offshore Supergrid. This vision and activity will, when built, guarantee European energy self-sufficiency as well as producing carbon free electricity.

**Sean Kidney**  **Co-founder and Chair, Climate Bonds Initiative**  
The Climate Bonds Initiative is an investor-focused NGO working to mobilize capital markets to fund a rapid, global transition to a low-carbon economy. It recently launched an International Standards and Certification Scheme for climate bonds; investor groups representing $10 trillion AUM sit on its board. The Initiative also promotes public sector guarantee schemes for renewable energy and public transport; green investment banks; and “sustainable financial solutions” for large-scale residential energy efficiency schemes. Sean is a member of the UK Government’s Capital Markets Climate Initiative and a director of the Network for Sustainable Financial Markets. He was previously marketing advisor to a number of the largest Australian pension funds and a social marketer and publisher.

**DAY 2 - THURSDAY 18th**

**David Ainsworth**  **Business Development Director – Marine Current Turbines, Siemens**  
David Ainsworth has a degree in Aeronautics & Astronautics from the University of Southampton and is a Chartered Engineer (C.Eng., EurIng, MRAeS). He has nearly 30 years of experience of delivering R&D projects, initially in the aerospace sector where he was involved in designing hydraulic systems and gas turbines for numerous aerospace applications. David joined MCT in 2003 and has been responsible for programme management, project development, consenting and grant applications for SeaGen in Strangford and all other MCT projects. He now heads the Business Development team in MCT which also includes the project development group.

**Barry Carruthers**  **Marine Development Engineer – Scottish Power Renewables**  
Barry is the Marine Development Engineer at Scottish Power Renewables. Focusing on the wave and tidal sector, he works on all aspects of marine project development from site and technology evaluation, to balance of plant and project financing. Through the pioneering sector activities in Scotland, Scottish Power Renewables works closely with colleagues in Iberdrola in order to develop the global marine energy business strategy for the years ahead.
Roberto Veguillas  Head of Technology Innovation - Iberdrola
Roberto Veguillas is Industrial Engineer with the Universidad Politécnica de Madrid. He also undertook the Executive MBA from the EOI Business School of Madrid, the Superior Program in Project Management from the IE Business School of Madrid and the Master in Energy Business from the ENERCLUB of Madrid. He joined Iberdrola in 2006, and worked in several positions related with the construction of electrical infrastructures worldwide. Currently, he is Head of Technology Innovation in the Renewables Business Unit of Iberdrola, leading the R&D activities and the technological prospective of the business. Since 2001, he also worked for Unión Fenosa, ABB and AREVA T&D.

Peter Wesslau  UK Country Manager, Vattenfall
As UK Country Manager for Vattenfall, Peter represents Vattenfall’s activities in the UK, including 590MW of on and offshore wind generation, a 7.2GW development portfolio of offshore wind in partnership with Iberdrola and early stage developments in ocean energy and subsea interconnection. Peter has more than 15 years of professional management experience at Vattenfall, recently as head of Strategic and Finance spearheading Vattenfall’s Europe-wide wind strategy. Peter graduated from the Stockholm School of Economics.

Peter Fraenkel  Partner, Fraenkel-Wright Ltd.
Peter Fraenkel is a partner in Fraenkel-Wright Ltd, a consultancy business specialising in renewable energy and focussing on marine applications. Peter has taken a prominent role in the promotion of tidal current energy for some 20 years, having been a founder and Technical Director until March 2012 of the pioneering tidal turbine company, Marine Current Turbines Ltd, now owned by Siemens. He is a Chartered Mechanical Engineer, a Fellow of the Institution of Mechanical Engineers, a Fellow of the Energy Institute and he is also a Visiting Professor at the University of Edinburgh.

Max Carcas  Managing Director, Caelulum Ltd
Max has many years’ experience in offshore renewables. He is founder of Caelulum Ltd, a company providing strategic advice to the offshore renewables market and economic modelling of offshore wind, wave and tidal projects. He also represents EMEC in its external relations, supporting its customers and stakeholders and helping to develop its strategy for the future. Prior to this he was Business Development Director at Pelamis Wave Power where he was instrumental in raising >£70m of investment, sales and grants, securing customers including E.ON, Iberdrola/Scottish Power Renewables, Babcock & Brown and creating joint ventures with Vattenfall and EDP.

Garrett Monaghan, Partner, Energy & Projects Group - Arthur Cox
Garrett is a Partner in the Arthur Cox Projects and Energy Group; Arthur Cox is a leading “all island” Irish law firm with offices in Dublin, London, Silicon Valley and New York. Garrett’s practice areas are primarily project finance, energy trading, M&A and private equity and has advised on the development, financing, acquisition and operation of multiple renewables assets including onshore & offshore wind, CHP, biomass, wave and waste to energy transactions. Garrett is recognised as one of the most active renewables and project finance lawyers in Ireland. Garrett is a member of the policy committee of the Irish Wind Energy Association.
**David Walker**  
**Senior Investment Manager, European Investment Bank (EIB)**  
David works in the Climate Change and Environment Division within the EIB, where he has particular responsibility for investment in renewable energy and environment-related infrastructure funds. Prior to joining EIB he worked at the European Investment Fund (EIF), investing in the early stage, venture capital and private equity sectors in Europe. With overall some 18 years of private equity investment experience, he has also worked in the economic development field for Scottish Enterprise, and for the London Stock Exchange, where he was part of the team which set up the AIM market for smaller companies.

**David Krohn**  
**Wave and Tidal Energy Development Manager, Renewables UK**  
After completing a BSc in Environmental and Geographical Science and an MPhil in Environmental and Marine Pollution Law, David worked for the Construction Industry Research and Information Association concentrating on Nuclear Decommissioning and major infrastructure projects. Since joining RenewableUK, he has coordinated and executed the association’s policy work. This has included work around the Renewables Obligation banding, shaping the upcoming Electricity Market Reform and clarifying the situation around consenting and access to the grid. He participates in various wave and tidal energy forums and currently sits on the Marine Energy Programme Board, the European Ocean Energy Association’s Board of Directors and the Offshore Renewable Energy Licensing Group amongst others.

**Miguel Marques**  
**Economy of the Sea Executive Partner, PricewaterhouseCoopers**  
Miguel Marques is the Economy of the Sea Executive Partner at PricewaterhouseCoopers Portugal and a member of the PricewaterhouseCoopers Economy of the Sea Global Team. Since he completed the degree in Economics at Porto University he has been working at PricewaterhouseCoopers as advisor of multinational companies related with several industries, including renewable energy. Miguel has worked with leaders and executives across Europe, The Americas and Asia in order to help them make the best business decisions. Miguel is the author of HELM – PwC Economy of the Sea Barometer (Portugal), a compilation of data that allows, a better understanding of the evolution of the economy of the sea.
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- Grid Connections
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The world needs answers that last. Siemens provides them today.
### Session 1: Posters on Wave Energy Convertors, Hybrid Systems, Moorings and Foundations

#### WEDNESDAY OCTOBER 17th
15.45 - 16.30 - Exhibition Hall

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<td>Violette Harnois</td>
<td>University Of Exeter</td>
<td>Physical measurement of a slow motion of a drag embedment anchor during sea trials</td>
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<td>1.2</td>
<td>Luca Pietra</td>
<td>Centro De Engenharia E Tecnologia Naval Instituto Superior Tecnico</td>
<td>Numerical modelling of the power take off for the UGEN floating wave energy converter</td>
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<td>1.3</td>
<td>William Finnegan</td>
<td>NUI Galway</td>
<td>The Structural Dynamics of a Two-Body Wave Energy Converter</td>
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<td>Lucia Margheritini</td>
<td>University of Bologna</td>
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<td>Elisa Angelelli</td>
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<td>Michael Livingstone</td>
<td>GL Garrad Hassan</td>
<td>Development of a wave energy converter (WEC) design tool - application to the Waveroller WEC including validation of numerical estimates</td>
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<td>1.7</td>
<td>Bruno Borgarino</td>
<td>Eosea</td>
<td>A preliminary study of the hydro-elastic modelling of the WaveStar wave energy converter</td>
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<td>Boris Fischer</td>
<td>Fraunhofer IWES</td>
<td>Online-Algorithm using Adaptive Filters for Short-Term Wave Prediction and its Implementation</td>
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<td>Vladimir Krivtsov</td>
<td>Heriot-Watt University</td>
<td>Measurements of WEC motions and mooring loads</td>
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<td>Pauline Laporte Weywada</td>
<td>GL Garrad Hassan</td>
<td>Development of a wave farm planning tool - preliminary verification of a wave energy converter array model in the spectral-domain</td>
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<td>Raul Gaunche</td>
<td>IH Cantabria</td>
<td>Towards the development of a time-domain numerical model of a floating multi-chamber OWC wave energy extraction device</td>
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<td>Augustin García Santana</td>
<td>University Of Seville</td>
<td>Frequency-matching assessment under reactive control on wave energy converters</td>
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<td>Wanan Sheng</td>
<td>HMRC, University College Cork</td>
<td>On the Primary Wave Energy Conversion of Oscillating Water Column Devices</td>
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<td>Julia Fernandez Chozas</td>
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<td>Combined Production of a full-scale Wave Converter and a full-scale Wind Turbine - a Real Case Study</td>
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<td>Garret Brady</td>
<td>Institute Of Technology Blanchardstown</td>
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<td>Rui Gomes</td>
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<td>Ignacio Cobo</td>
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<td>Julio Rodriguez</td>
<td>University Of Victoria</td>
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# Session 2: Posters on Tidal Devices and Site Investigations

**THURSDAY OCTOBER 18th**

11.00 - 11.45 - Exhibition Hall

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<td>University College Dublin</td>
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<td>Ciaran Kennedy</td>
<td>NUI, Galway</td>
<td>Fatigue life of glass fibre reinforced polymer composite tidal turbine blades</td>
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<td>Brendan Cahill</td>
<td>HMRC, University College Cork</td>
<td>Resource Variability and Extreme Wave Conditions at the Atlantic Marine Energy Test Site</td>
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<td>Barbara Proenca</td>
<td>University Of Plymouth</td>
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<td>Paul Evans</td>
<td>Cardiff University</td>
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<td>Darren Coppinger</td>
<td>Ryan Institute, NUIG</td>
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<td>Sian Tedds</td>
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<td>Wake characteristics of Horizontal Axis Tidal Stream Turbines in uniform and non-uniform steady flows</td>
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<td>David Fallon</td>
<td>Ryan Institute, NUI Galway</td>
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<td>2.13</td>
<td>Valentina Vannucchi</td>
<td>Universita Di Firenze, Dipartimento Di Ingegneria Civile E Ambientale</td>
<td>Estimation of the offshore wave energy potential of the Mediterranean Sea and propagation toward nearshore areas</td>
</tr>
<tr>
<td>2.14</td>
<td>Ian Masters</td>
<td>Swansea University</td>
<td>A Modified k-epsilon Turbulence Model for Tidal Stream Turbine Simulations Using a Coupled BEM-CFD Model</td>
</tr>
<tr>
<td>2.15</td>
<td>Simon McIntosh</td>
<td>University Of Oxford</td>
<td>The Influence of Vertical Velocity Shear on Tidal Turbine Performance and Wake Recovery</td>
</tr>
<tr>
<td>2.16</td>
<td>Enayatollah Zangiabadi</td>
<td>Swansea University</td>
<td>Characterisation of the Coastal Hydrology of Oceans Using 3D Computational Fluid Dynamics</td>
</tr>
<tr>
<td>2.17</td>
<td>Michael Togneri</td>
<td>Swansea University</td>
<td>Comparison of marine turbulence characteristics for some potential turbine installation sites</td>
</tr>
<tr>
<td>2.18</td>
<td>Duncan Sutherland</td>
<td>University Of Edinburgh</td>
<td>Site Characterisation using Acoustic Sensor Arrays Installed on a Commercial Scale Tidal Turbine</td>
</tr>
<tr>
<td>2.19</td>
<td>Justine McMillan</td>
<td>Acadia University</td>
<td>Validation of High Resolution Numerical Model Tidal Currents</td>
</tr>
<tr>
<td>2.20</td>
<td>Abhinaya Sankaran Iyer</td>
<td>University Of Edinburgh</td>
<td>Quantifying the Impact of Tidal Current Energy Variability and Matching UK Demand</td>
</tr>
<tr>
<td>2.21</td>
<td>Joel Culina</td>
<td>Acadia University</td>
<td>The effect of sea-bed drag on power potential</td>
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<tr>
<td>2.22</td>
<td>Lucy Cradden</td>
<td>University Of Edinburgh</td>
<td>A combined resource atlas for marine energy</td>
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<tr>
<td>2.23</td>
<td>Thomas Furey</td>
<td>Marine Institute</td>
<td>Energy From The Bottom Up</td>
</tr>
<tr>
<td>2.24</td>
<td>AbuBakr S. Bahaj</td>
<td>University of Southampton</td>
<td>Energy yield differences between fixed-orientation and yawing tidal turbines at the Fall of Warness</td>
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**Session 3: Posters on Test Facilities, Measurement and Monitoring and Installation Issues**

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<th>Institution</th>
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<tbody>
<tr>
<td>3.1</td>
<td>Michael O'Connor</td>
<td>HMRC, University College Cork</td>
<td>Weather window analysis incorporating wave height, wave period, wind speed and tidal current with relevance to deployment and maintenance of marine renewables</td>
</tr>
<tr>
<td>3.2</td>
<td>Peter Robins</td>
<td>Bangor University</td>
<td>The impact of tidal energy extraction on the morphodynamics of the Irish Sea</td>
</tr>
<tr>
<td>3.3</td>
<td>Michael Hartnett</td>
<td>NUI Galway</td>
<td>Ocean energy numerical modelling and experimental testing facilities at the National University of Ireland, Galway</td>
</tr>
<tr>
<td>3.4</td>
<td>Simon Neill</td>
<td>Bangor University</td>
<td>Impact of WEC array operation on nearshore processes</td>
</tr>
<tr>
<td>3.5</td>
<td>Gregory Pion</td>
<td>University Of Le Havre</td>
<td>Numerical modelling of horizontal axis marine current turbine arrays</td>
</tr>
<tr>
<td>3.6</td>
<td>Glenn Nolan</td>
<td>Irish Marine Institute</td>
<td>Oceanographic service provision to Ireland’s emerging ocean energy sector</td>
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<tr>
<td>3.7</td>
<td>Ruth De Silva</td>
<td>Bio3</td>
<td>Portuguese offshore renewables Pilot Zone - producing environmental guidelines for development</td>
</tr>
<tr>
<td>3.8</td>
<td>Mat Thomson</td>
<td>GLGarradHassan</td>
<td>Full-scale validation of a numerical tool for the prediction of the hydrodynamic performance of axial fbw tidal turbines</td>
</tr>
<tr>
<td>3.9</td>
<td>John O’Callaghan</td>
<td>HMRC, University College Cork</td>
<td>Technical and Practical Guidance for Conducting Sea Trials at Galway Bay Wave Energy Test Site</td>
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<tr>
<td>3.10</td>
<td>Paul Gaughan</td>
<td>Marine Institute</td>
<td>The Future Internet: A Marine Renewable Sector’s View</td>
</tr>
<tr>
<td>3.11</td>
<td>Pedro Liria</td>
<td>Azti Tecnalia</td>
<td>Operational oceanography services in the Biscay Marine Energy Platform: BIMEP</td>
</tr>
<tr>
<td>3.12</td>
<td>Miguel Santos</td>
<td>Wedge Global S.L.</td>
<td>Testing of a full-scale PTO based on a Switched Reluctance Linear Generator for Wave Energy Conversion</td>
</tr>
<tr>
<td>3.14</td>
<td>Morten Kramer</td>
<td>Wave Star</td>
<td>Comparison between linear numerical models and experimental results on a Wavestar point absorber</td>
</tr>
<tr>
<td>3.15</td>
<td>Thomas Davey</td>
<td>FloWave TT Ltd</td>
<td>The All-Waters Test Facility - a new resource for the marine energy sector</td>
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<td>3.16</td>
<td>Jochen Bard</td>
<td>Fraunhofer IWES</td>
<td>Research activities in the MaRINET project: keeping the European marine energy development facilities at world class level</td>
</tr>
<tr>
<td>3.17</td>
<td>Mike Devane</td>
<td>Marine Institute</td>
<td>SmartBay Ireland: Leveraging State Infrastructure to create enterprise</td>
</tr>
<tr>
<td>3.18</td>
<td>Ann Marie Downey</td>
<td>ESBI</td>
<td>Coastal Process Impact Assessment for the Atlantic Marine Energy Test Site (AMETS)</td>
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<tr>
<td>3.19</td>
<td>Davide Magagna</td>
<td>Plymouth University</td>
<td>Development of a Data Management Platform of the integration of European Wave Energy Impact Assessment datasets</td>
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<td>3.20</td>
<td>Lisa Isaacman</td>
<td>Fundy Energy Research Network</td>
<td>The Fundy Energy Research Network: Fostering Tidal Energy Research Collaborations in the Bay of Fundy, Canada</td>
</tr>
<tr>
<td>3.21</td>
<td>Brian Flannery</td>
<td>HMRC, University College Cork</td>
<td>An Assessment of the Performance of a Point Absorber Restricted to Heave Motions Only</td>
</tr>
<tr>
<td>3.22</td>
<td>Timothy Poate</td>
<td>Plymouth University</td>
<td>Assessment of Potential Morphodynamic Response to Wave Hub</td>
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### Session 4: Posters Financing and Economics, Power, Grid and Environmental Issues

**FRIDAY OCTOBER 19th**

11.00 - 11.45 - Exhibition Hall

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<th>Name</th>
<th>Institution</th>
<th>Poster Title</th>
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<tbody>
<tr>
<td>4.1</td>
<td>Clym Stock-Williams</td>
<td>E.On</td>
<td>Quantifying the Potential Global Market for Wave Power</td>
</tr>
<tr>
<td>4.2</td>
<td>Anne Blavette</td>
<td>HMRC, University College Cork</td>
<td>Grid Impact of a Wave Farm: Analysis at Different Connection Points in Ireland</td>
</tr>
<tr>
<td>4.3</td>
<td>Ralf Bucher</td>
<td>University Of Edinburgh</td>
<td>De-risking utility-scale marine energy investments by extending the regular project implementation by a competitive technology qualification routine</td>
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<td>4.4</td>
<td>Audrey Journoud</td>
<td>DCNS/PIMENT Laboratory</td>
<td>Experimental Ocean Thermal Energy Conversion (OTEC) project in French overseas departments</td>
</tr>
<tr>
<td>4.5</td>
<td>Fergus Sharkey</td>
<td>ESB</td>
<td>Practical Analysis of Key Electrical Interfaces for Wave Energy Converter Arrays</td>
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<tr>
<td>4.6</td>
<td>Ralf Starzmann</td>
<td>University Of Siegen</td>
<td>Aero-Acoustic Analysis of the Wells Turbine with Guide Vanes</td>
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<td>4.7</td>
<td>Sofia Matias</td>
<td>Idmec</td>
<td>Roadmapping Ocean Energies: Uncertainties Review and Assessment</td>
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<td>4.8</td>
<td>Brian Holmes</td>
<td>HMRC, University College Cork</td>
<td>Is Wave Energy Development as Confused as a Stormy Sea Surface? Funding must be made available to encourage and allow engineers to finish developing operational devices</td>
</tr>
<tr>
<td>4.9</td>
<td>Vidina Monagas</td>
<td>The Oceanic Platform Of The Canary Island (PLOCAN)</td>
<td>An Electrical Grid Connection in PLOCAN Testbed to support new marine technologies</td>
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<td>4.10</td>
<td>Gregorio Iglesias</td>
<td>Univ. Of Santiago De Compostela</td>
<td>To what extent should tidal power peaks be exploited? A cost sensitivity analysis</td>
</tr>
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<td>4.11</td>
<td>Pablo Ruiz-Minguela</td>
<td>Tecnalia</td>
<td>Design, Modelling and Analysis of a Submarine Electrical &amp; Data Socket for Marine Energy Arrays.</td>
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<tr>
<td>4.12</td>
<td>Dara O’Sullivan</td>
<td>HMRC, University College Cork</td>
<td>Case studies on the benefits of energy storage for power quality enhancement: oscillating water column arrays</td>
</tr>
<tr>
<td>4.13</td>
<td>Juan Bald</td>
<td>AZTI-Tecnalia</td>
<td>The Biskay Marine Energy Platform (BIMEP), environmental impacts and monitoring plan</td>
</tr>
<tr>
<td>4.14</td>
<td>Micheal O’Cathain</td>
<td>SSER</td>
<td>Towards increased confidence in wave and tidal energy production estimates</td>
</tr>
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<td>4.15</td>
<td>Keith O’ Sullivan</td>
<td>HMRC, University College Cork</td>
<td>Deterministic Economic Model for Wind-Wave Hybrid Energy Conversion Systems</td>
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<td>4.17</td>
<td>Darren Mollaghan</td>
<td>University College Cork</td>
<td>SEAGRID: A New Dynamic Modelling Tool for Power System Analysis of Ocean Energy Devices</td>
</tr>
<tr>
<td>4.18</td>
<td>Patrick O’Rourke</td>
<td>ESBI</td>
<td>Design methodology and survey investigations required for the Atlantic Marine Energy Test Site and the WestWave pilot wave energy project.</td>
</tr>
<tr>
<td>4.19</td>
<td>William Kingston</td>
<td>Trinity College Dublin</td>
<td>Hydrofoils for economical turbine anchoring</td>
</tr>
<tr>
<td>4.20</td>
<td>Greg Trowse</td>
<td>Dalhousie University</td>
<td>At the End of the Line: Approaches for Adding Renewable Energy to Rural Maritime Communities</td>
</tr>
<tr>
<td>4.21</td>
<td>Dan Maher</td>
<td>Nua Venture</td>
<td>Ireland’s Smart Ocean - Emerging Innovation Cluster</td>
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<tr>
<td>4.22</td>
<td>Tim Persoons</td>
<td>Trinity College Dublin</td>
<td>Feasibility Study and Cost-Benefit Analysis of Tidal Energy: A Case Study for Ireland</td>
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</table>
ICOE 2012 ON THE RIVER

The location and venue for ICOE 2012 is truly unique with its proximity to the River Liffey. Delegates will be able to visit the various vessels which are berthed on the North and South side of the Quays for ICOE 2012. Tours and demonstrations will take place on these vessels.

VESSELS AND KIT AT ICOE 2012

Island Shipping - Island Kestrel

Geological Survey Ireland - RV Keary

Marine Institute - Celtic Voyager

Naval Services - L.E Roisin
REGISTRATION DESK

The main registration and information desk will be open in the conference venue as follows:

- **Tuesday 16th October**: 17.00 – 19.00  
  Early Registration for delegates arriving to Dublin on Tuesday
- **Wednesday 17th October**: 07.00 – 18.30
- **Thursday 18th October**: 07.30 – 18.00
- **Friday 19th October**: 08.00 – 14.00

Enquiries for the following should be made at the registration desk:

- Registration queries
- Accommodation queries & bookings
- Gala Dinner bookings
- General information
- Social events
- Technical Tour
- Taxi bookings
- Internet access

NAME BADGES AND GALA DINNER TICKETS

Badges must be worn at all times as this is your ticket to all sessions, including the Welcome Reception. Please note, if you have booked to attend the gala dinner you will find your ticket in your badge pocket. Access to the Convention Centre Dublin will not be given without a badge. Kindly note there is a €10.00 fee to replace a lost name badge.

IDENTIFYING DELEGATES

The following colours will identify the various registration types. This will be seen on the bottom of the badge.

- **Delegate**: Clear
- **Speaker**: Red
- **Committee**: Grey
- **Sponsor/Exhibitor**: Yellow
- **Media**: Green
VOLUNTEERS

Volunteers will be on site for the duration of the ICOE 2012. Volunteers will assist you with directions, event details or information you may require while visiting Dublin. You will easily identify volunteers by their blue t-shirts.

USEFUL ONSITE CONTACTS

For all delegate & accommodation queries please contact:
Lieneke Hodnett, ICOE 2012 Delegate Services Manager - Tel: +353 863490039

ACCOMMODATION

Should you require any information regarding your accommodation please proceed to the registration desk located in the foyer area on the ground floor of the Convention Centre Dublin.

SPEAKER PREVIEW ROOM

The speaker preview room is located on the first floor, Liffey Meeting Room 3. Speakers should make themselves known at the registration desk where directions to the speaker preview room will be given. If you have already provided your presentation it is advised to preview this in the speaker preview room in advance of your session. Please ensure you provide and preview your presentation no later than 1 hour before your speaker slot.

PRESS CENTRE

The Media Centre is located on the first floor, Liffey Meeting Room 1. Access will only be given to those with media name badges.

For all Media Enquiries please contact the registration desk on the ground floor.
Fiona Smith, Marketing and Communications Manager, SEAI
EXHIBITION

ICOE 2012 is located in the Forum on the Ground Floor of the CCD. Access will only be given to those with name badges. Please see the full list of exhibitors on the inside front cover.

Opening Hours:
Wednesday 17th October 08.00 - 18.00
Thursday 18th October 08.00 - 18.00
Friday 19th October 08.00 - 15.00
Friday 19th October (Public access to the exhibition) 11.30 - 14.00

FIRST AID

If First Aid assistance is required, please notify any volunteer or member of staff. The onsite first aid team will then be notified immediately.
INTERNET ACCESS

Wireless is available in the Convention Centre Dublin. No password is required for this. Please choose the network named “CCD Guest”

ACCESSIBILITY

For those with visual impairments:
- Assistance Dogs are allowed in parts of our venue and water bowls will be provided on request. Please ask a volunteer or member of staff for assistance.
- A describer system for the visually impaired is available in many of the meeting rooms. Please ask a volunteer or member of staff for assistance.
- All rooms, halls, lifts and toilets are signposted in large print and braille.

For those hearing impairments:
- Assisted hearing is available in many of the meeting rooms. Please ask a volunteer or member of staff for assistance.

For those with physical disabilities:
- The CCD main entrance is accessible via a ramp.
- There is lift access to all levels, in addition to escalators and stairwells.
- Eight parking spaces for those with a “disabled persons parking card” are available and the car park lifts gives access to all floors.

Wheelchair Access:
- All meeting spaces are wheelchair accessible.
CLOAKROOM

A cloakroom will be open in the foyer for the duration of the conference, free of charge.

CATERING POINTS

Refreshments will be available for purchase in the Forum (Exhibition Hall) on the ground floor.

LOST PROPERTY

Articles lost or found should be reported to the registration desk.

USEFUL INFORMATION - DUBLIN, IRELAND

Telephone Numbers
Directory Inquiries: 11850 or 11890 or 11811
Republic of Ireland telephone code: 00353
International telephone code: 00

Nearby Services
For a list of local services available adjacent to the CCD please see the map on page 32.
This includes ATMs, restaurants, cafés, pubs, shops, hotels, post office, Garda Station and doctors.

Emergency Contact Numbers and Doctors
In an acute emergency dial 999 or 122 (Ambulance, Fire Brigade, Garda Síochána (Police) Lifeboat, Mountain/Coastal rescue)

Local Garda Síochána Station
Store Street Garda Station,
Store Street, Dublin 1.
Tel: +353 1 666 8000

Medical Assistance
Medical centres in close proximity to the CCD:

Custom House Square Medical Centre
2 Gandon House, Mayor Street Lower, IFSC, Dublin 1.
Telephone: 00-353-1-8290902 Appointments
www.custommedical.ie
Opening Hours: Monday to Friday: 7.00am - 7.00pm,
Saturday: 10.00am - 2.00pm.
The practice remains closed on Bank Holiday Saturday and Monday.

Hanover Medical
1 Forbes Street, Sir John Rogerson’s Quay, Dublin 2.
T: 00-353-1-678 6086
www.hanovermedical.ie
Opening Hours: Monday to Thursday: 8am - 7pm,
Friday: 8am - 3pm.

To see a doctor in case of emergency outside our working hours please contact D-DOC clinic on 1850-224477.
PUBLIC TRANSPORT

Bikes
Dublin Bikes are a perfect way to get around the city, while minimising your effect on the local environment. There are 40 Dublin Bikes stations distributed throughout the city centre to enable easy access and optimal use. Located in close proximity to each other, every station has a minimum of 15 stands in place. There are two stations located in the Docklands area beside the CCD:
  • Custom House Quay - Northside beside the Sean O’Casey Bridge
  • Pearse Street - Southside near Pearse Street Train Station

DART
The DART (Dublin Area Rapid Transit) is the rail line running along the coast of Dublin, from Malahide and Howth southwards as far as Greystones, Co Wicklow. You can connect to the regular train service for communities north of Dublin, right up to Belfast. Pearse Street and Tara Street DART stations are both located about ten minutes’ walk from the CCD.

LUAS
The Luas Red Line runs directly behind the CCD, conveniently linking to downtown Dublin and to Connolly and Heuston rail stations. Stops are provided at George’s Dock, Mayor Square and Spencer Dock.

Taxis
Increased availability of taxis in Dublin means that it’s easy to travel to and from Dublin city, day or night. There are now nearly 12,000 taxis available in Dublin city. Fares are regulated and tips are at your own discretion.
Taxis can be arranged at the registration desk.

Dublin Bus
Dublin Bus offers a high frequency, accessible and easy to use service from all over Dublin City Centre and the surrounding area. These services include city bus services, Railink, School link, Airlink, Nitelink and DART feeder buses. Dublin Bus also operates day tours and is obliged to provide services to people with disabilities. There is no bus service serving the CCD.

Shopping
Dublin has a busy city centre shopping area around Grafton Street and Henry Street. There is a huge range of products to bring home – from traditional Irish hand-made crafts to international designer labels. Things to buy: woolen knits, tweeds, crystal, claddagh rings, pottery, silver and music. Shopping hours are from 9.00am to 6.00pm Monday to Saturday, with shops open until 8.00pm on Thursdays, and many shops open from 12.00pm – 6.00pm on Sunday.

Eating Out
Ireland is known throughout the world for its high quality food. There is a varied broad selections of restaurants in Dublin. Please also see a list of restaurants adjacent to the CCD listed on the Local Services Map on page 32. A further list is also available at the registration desk.

Tipping
Tipping is at your discretion. In some hotels and restaurants a service charge of 10 - 15% is added to your bill. A small tip is appreciated for good service.

Smoking Policy
Under Irish law smoking is not permitted in pubs, restaurants, hotel lobbies and all enclosed public buildings.

Insurance
The Conference Organising Committee or its agents will not be responsible for any medical expenses, loss or accidents incurred during the congress. Delegates are strongly advised to arrange their own personal insurance to cover medical and other expenses including accident or loss. Where a delegate has to cancel for medical reasons, the normal cancellation policy will apply. It is recommended that citizens from EU countries bring with them a current EHIC card.
We've got quite a reputation for invention, innovation and enjoying the good life. MRI scanning, Keyhole surgery. The beta-blocker. Whisky. It's a long list. And it's still growing. In every sector from renewable energy and finance, to electronics and our pioneering work in life sciences, we strive to set standards. We have world-class academic institutions, outstanding research and superb facilities. And passionate people with a hunger to win. We can develop your products and expand your business. And that's precisely why companies invest in Scotland.

To find out more visit us on stand 4A at ICOE 2012 or visit www.sdi.co.uk/energy
1. ICOE 2012 Venue: Convention Centre Dublin
2. The Regency Hotel: 10 min. by shuttle bus
3. North Star Hotel: 15 min. walk / 3 min. walk from Luas
4. O’Connell Street: 15 min. walk
5. Henry Street: 15 min. walk
6. Ely bar and brasserie, IFSC: 10 min. walk
7. J’uys Inn Custom House: 10 min. walk
8. Clarion Hotel IFSC: 3 min. walk
9. The Gibson Hotel: 5 min. walk
10. O’Connell Bridge: 15 min. walk
11. Maldron Hotel Cardiff Lane: 3 min. walk
12. Fleet Street Hotel: 15 min. walk
13. Temple Bar Hotel: 15 min. walk
14. Trinity College Dublin (Gala Dinner): 12 min. walk
15. Pearse Hotel: 8 min. walk
16. Grafton Street: 15 min. walk
17. Grand Canal Hotel: 17 min. walk
Marine Renewables Canada and its partners invite you to...

ICOE 2014

INTERNATIONAL CONFERENCE ON OCEAN ENERGY

HALIFAX - NS
OCTOBER 2014

2014 tradeshow to overlap with The Maritimes Energy Association’s annual CORE conference – an event having roots in the offshore oil and gas industry since it began in Atlantic Canada.

Congratulations and thank you to Sustainable Energy Authority of Ireland and its partners for another successful ICOE!

www.icoe2014canada.org
Ocean Energy Development Unit
Supporting the development of Ocean Energy in Ireland