

TETHYS ENGINEERING BLAST



25 October 2019

The bi-weekly Tethys Engineering Blast highlights new publications on Tethys Engineering, opportunities in marine renewable energy, and news articles of international interest. We hope you find this a valuable resource to keep you connected to new research, opportunities, and industry milestones.

Announcements

WPTO Semiannual Stakeholder Webinar

The U.S. Department of Energy's Water Power Technologies Office (WPTO) will be holding the second installment of its semiannual stakeholder webinars on 5 November 2019 from 3:00 to 5:00pm ET. As the new fiscal year begins, program representatives will highlight key feedback received during discussions at the 2019 WPTO Peer Review, past year accomplishments, and upcoming priorities in 2020. Register for the webinar [here](#).

Marine Energy Collegiate Competition

The U.S. Department of Energy recently announced the first [Marine Energy Collegiate Competition](#) (MECC) designed to challenge interdisciplinary teams of undergraduate and graduate students to offer unique solutions to the burgeoning marine energy industry. The inaugural MECC will be held in conjunction with the International Conference on Ocean Energy (ICOE) in Washington, DC on 19-20 May 2020. Applications are due 1 November 2019.

Upcoming Events

Upcoming Workshops

The European Marine Energy Centre will be hosting the [MONITOR Tidal Reliability Developer Forum](#) and the [OCEAN 2G End of Project Workshop](#) in London, United Kingdom on 12 November 2019. For more information on these events, click [here](#).

Ocean Energy Systems (OES) Task 10 will be hosting a [workshop](#) in Amsterdam, Netherlands on 14-15 November 2019. The workshop will overview wave energy converter modelling techniques, validation cases, and experimental test cases.

Oregon State University, the Pacific Marine Energy Center (PMEC), and Sandia National Laboratories will be hosting a [workshop](#) in Corvallis, Oregon on 3-4 February 2020. The workshop will overview the wave energy converter design theory and experimental testing approach, with specific attention focused on dynamics, control, signal processing, experimental design and analysis, and full-scale design.

Upcoming Conferences

[OCEANS19 Seattle](#) will be held in Seattle, Washington on 27-31 October 2019. The preliminary technical program is now available [here](#). Register [here](#).

The [13th Annual International Tidal Energy Summit](#) will be held in London, United Kingdom on 11 November 2019. The one-day event will be held alongside the Offshore Wind and Floating Wind Conferences. The three events will share a networking and exhibition zone.

The [Environmental Interactions of Marine Renewable Energy Technologies \(EIMR\) Conference](#) will be held in Oban, Scotland on 21-23 April 2020. Additional details coming soon.

New Documents on *Tethys Engineering*

[Site-specific wave energy conversion performance of an oscillating water column device](#) – López et al. 2019

The energy conversion performance of oscillating water column (OWC) wave energy converters at a specific site is often studied by means of analytical models. Based on linear theory, these models lose accuracy when viscous losses and turbulence become significant—more generally, when nonlinear effects play a role, as they often do in real operating conditions. In this work we apply a novel methodology based on a combination of numerical modelling and laboratory tests to investigate OWC performance without these shortcomings.

[Rotor Loading Characteristics of a Full-Scale Tidal Turbine](#) – Harrold and Ouro 2019

Despite an extensive amount of research on the mechanical loading of model scale tidal turbines, very little is known from full-scale devices operating in real sea conditions. This paper addresses this by reporting on the rotor loads measured on a 400 kW tidal turbine. The results obtained during ebb tidal conditions were found to agree well with theoretical predictions of rotor loading, but the measurements during flood were lower than expected.

Stability based approach to design cold-water pipe (CWP) for ocean thermal energy conversion (OTEC) – Adiputra and Utsunomiya 2019

Cold-water pipe (CWP) is a novel, most-challenging component of Ocean Thermal Energy Conversion (OTEC) floating structure which is installed to transport the deep seawater to the board. For commercial scale, the transported seawater flow rate will be in the order of 102 m³/s. This large amount of internal flow may trigger instability which leads to the failure of CWP. Considering this issue, the present paper aims to design commercial-scale OTEC CWP focusing on the effects of internal flow to the stability of the pipe.

Hydrodynamic Simulation of Wave Energy Converter Using Particle-Based Computational Fluid Dynamics – Tiaple 2019

In this paper, based on the Lattice-Boltzmann method, we present particle-based CFD simulation results for the pivoted-type WEC that exhibits both vertical and horizontal motions. In this method, the computation domain need not be a mesh and complex geometry is not a limiting factor. Using a free-surface turbulence model, we simulated the fluid–structure interaction. We detail our simulation results, which show good agreement with those in the literature.

Confinement effects on energy harvesting by a heaving and pitching hydrofoil – Su et al. 2019

Wall confinement effects on the energy harvesting performance by a flapping hydrofoil (aspect ratio = 4.5) have been investigated in a circulating water flume at a Reynolds number of 50,000. Measurements of hydrodynamic forces are taken for three different confinement configurations (unconfined, one-wall and two-wall confinement) and a series of confinement levels for each configuration. Results show that the heave component of efficiency is the primary contributor to the performance improvement.

Potential and analysis of an osmotic power plant in the Magdalena River using experimental field-data – Salamanca et al. 2019

The Magdalena River mouth in Colombia is studied as a candidate site for a renewable power plant via osmotic energy technology, using pressure retarded osmosis. This power generation plant would operate through the controlled mix of two flows with different salinities (river water and seawater in this case study). A preliminary design of a pressure retarded osmosis power plant is proposed here by means of experimental data acquisition on-site at the river mouth. The obtained net power production is shown to reach 6 MW, with adequate membrane power densities above 5 W/m².

News & Current Events

Minesto receives approval for EU-funded site project in France – Minesto

Leading marine energy developer Minesto has received approval for an EU-funded project aiming at installing the company's unique renewable energy technology at the grid-connected Paimpol-Bréhat test site in France, operated by the French electric utility company EDF with the support of the Brittany Region. Minesto, as part of a wider EU-funded project called TIGER, will utilise a grant of approximately €2.4 million to manufacture, install and operate Minesto's marine energy converter DG100 at a grid-connected site off Brittany operated by the electric utility company EDF.

Game-Changing Tidal Energy Project Approved for Channel Regions – European Marine Energy Centre

Interreg France (Channel) England Programme has approved the biggest ever Interreg project that will prove to be game-changing for the European tidal stream energy sector. The Tidal Stream Industry Energiser Project, known as TIGER, is an ambitious €46.8m project, of which €28m (69%) comes from the European Regional Development Fund via the Interreg France (Channel) England Programme. The project aims to drive the growth of tidal stream energy by installing up to 8 MW of new tidal capacity at sites in and around the Channel region thus driving innovation and the development of new products and services.

Milford Haven: Wave energy hub – Dredging and Port Construction

Milford Haven Waterway is to become the site of a new tide and wave energy development and engineering hub, thanks to a collaboration between the port of Milford Haven, Marine Energy Wales, Offshore Renewable Energy Catapult, and Wave Hub. The development will act as a staging point for new development at a 90 km² leased site for the commercial deployment of a 100 MW combined wave energy and floating offshore wind array, dubbed the Pembrokeshire Demonstration Zone.

Leask Marine launch tidal energy platform – The Orcadian

Leask Marine has successfully completed the fabrication of the first ever tidal energy platform to be built in Orkney. The Marinus platform was launched into Kirkwall Bay on Monday, having been officially named by Karen Leask, director of the company. Leask Marine were awarded the contract for the manufacture and supply of the surface floating platform by Instream Energy Systems Corp of Canada. The project will utilise vertical axis hydrokinetic turbine technology developed by Canadian technology developer Instream Energy Systems and technology defence specialists BAE Systems.

€ million granted for renewable offshore platform MUSICA – SINN Power

SINN Power is part of the research project MUSICA (Multiple Use of Space for Island Clean Autonomy) that is granted € million to build and test a floating renewable offshore platform. The MaREI center for Marine and Renewable Energy takes the lead and is supported by a consortium of 15 European participants. The pilot project will

provide a floating offshore platform consisting of various innovative technologies to ensure an affordable alternative of renewable energy, clean water and food supply.