

# TETHYS ENGINEERING BLAST



**11 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.

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## **Announcements**

### New *Tethys Engineering Blast*

Following the launch of [Tethys Engineering](#), we are excited to release the *Tethys Engineering Blast*. We have automatically subscribed individuals currently subscribed to the *Tethys Blast*, with the hope that the *Tethys Engineering Blast* serves as an additional resource to keep you connected to the marine renewable energy community. If you would like to unsubscribe from the *Tethys Engineering Blast*, you may update your preferences [here](#).

### Call for Abstracts

Abstracts are being accepted for the [International Conference on Ocean Energy](#) (ICOE) in Washington D.C. on 19-21 May 2020. The event will showcase innovations in ocean energy technology research and development, prepare ocean renewable energy to benefit the larger “Blue Economy” and the electrical grid, and identify research needed to further advance the state of the technology. The content and abstract submission deadline has been extended to 15 November 2019.

### Marine Energy Collegiate Competition

The U.S. Department of Energy (DOE) 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 18 October 2019.

### Funding Opportunity

Applications are being accepted for the National Science Foundation's [Graduate Research Fellowship Program](#) (GRFP), which will provide three years of support for the graduate education of individuals who have demonstrated their potential for significant research achievements in STEM or STEM education. Applications are due 21-25 October 2019 depending on discipline and can be submitted [here](#).

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## Upcoming Events

### Upcoming Conferences

[energy3: Canada's Energy Conference](#) will be held in Halifax, Nova Scotia on 16-18 October 2019. energy3 is a three-day conference and trade exhibition focused on Canada's energy industry, putting the spotlight on our strengths, challenges and opportunities.

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

The inaugural [Pan-American Marine Energy Conference](#) (PAMEC 2020) will be held in San Jose, Costa Rica on 26-28 January 2020. The conference will examine energy from tidal currents, waves, ocean thermal currents, salinity gradients, offshore fixed and floating wind, plus all the technologies to integrate marine renewables with other renewables, storage and a grid.

### Upcoming Webinar

The Ocean Energy Research Association (OERA) will be hosting a [webinar](#) entitled, "Developing Enhanced Marine Operations (DEMO) in High Flow Tidal Environments" from 1:00-2:00pm AST on 12 December 2019. Register [here](#).

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## New Documents on *Tethys Engineering*

### [Magnet failure-resilient control of a direct-drive tidal turbine](#) – Toumi et al. 2019

This paper deals with the resilient control of a permanent magnet synchronous generator-based tidal turbine subjected to magnet failures. In this context, a magnetic equivalent circuit method is used to model the synchronous generator magnet failures. A fault-resilient controller is therefore derived for magnet failure resilience purposes. The proposed fault-resilient controller is evaluated and tested based on extensive simulations using real tidal velocities of the Raz de Sein site in Bretagne, France.

### [Review of mooring design for floating wave energy converters](#) – Xu et al. 2019

A review of some representative floating wave energy converter (WEC) projects in the world, including the wave energy capturing technology, development history, main dimensions and tested sea sites is presented. The design essentials of WEC mooring system are discussed and a mooring system design procedure for WEC is proposed, which includes the introduction of related design codes and mooring analysis methods. In the last part, a comprehensive review of mooring system design in the current WECs projects is conducted.

### **[A review of deep learning for renewable energy forecasting](#) – Wang et al. 2019**

This paper provides a comprehensive and extensive review of renewable energy forecasting methods based on deep learning to explore its effectiveness, efficiency and application potential. We divide the existing deterministic and probabilistic forecasting methods based on deep learning into four groups, namely deep belief network, stack auto-encoder, deep recurrent neural network, and others. We also dissect the feasible data preprocessing techniques and error post-correction methods to improve the forecasting accuracy.

### **[Effect of slope and number of blades on Archimedes screw generator power output](#) – Dellinger et al. 2019**

A computational fluid dynamic (CFD) simulation of an Archimedes screw generator (ASG) was carried out in conjunction with laboratory-scale experiments to determine the effect of inclination angle and number of blades on ASG power production and performance. Overflow and gap leakage losses were found to increase at higher inclinations - these losses decreased with the addition of blades. Both CFD simulations and the experiments showed that overflow leakage started to happen much sooner at higher inclination angles, as expected.

### **[A parameter study and optimization of two body wave energy converters](#) – Al Shami et al. 2019**

This paper studies the multidisciplinary nature of two body wave energy converters by a parametric study based on the Taguchi method which helps to understand the effect of different dependent parameters on the wave energy conversion performance. Seven different parameters are analyzed and their effect on the maximum captured power, resonance frequency and bandwidth is studied. This paper should provide a guideline for designers to tune their parameters based on the desired performance and sea state.

### **[O&M Models for Ocean Energy Converters: Calibrating through Real Sea Data](#) – Thomaz et al. 2019**

This work presents an Operation and Maintenance (O&M) model calibrated with data from real sea experience of a wave energy device deployed at the Biscay Marine Energy Platform (BiMEP): the OPERA O&M Model. Two additional case studies, utilising two other O&M calculation methodologies, are presented for comparison with the OPERA

O&M Model. The results illustrate the potential advantages of utilising real sea data for the calibration and development of an O&M model.

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## News & Current Events

### [New Opportunities for OTEC in India](#) – Marine Energy

The ministry of new and renewable energy in India has declared that ocean energy is officially a renewable energy source and now falls under Renewable Purchase Obligations (RPO). This recent policy change offers new opportunities for ocean thermal energy conversion (OTEC) in India. The RPO states power suppliers are required to procure a part of their power from renewable sources. By including ocean power as a renewable source, investing in OTEC is made more attractive. This development stimulates research and funding.

### [Re-installation of D10 tidal turbine near Ushant Island](#) – Sabella

SABELLA's D10-1000 turbine was successfully redeployed onto its gravity-based foundation in the Fromveur Passage, one of the most energetic tidal sites in France. The subsea cable enabling electricity export towards Ushant's Island grid was then connected to the tidal turbine during the night. The D10 tidal turbine will be progressively commissioned within the next few weeks in order to begin the electricity injection to Ushant's Island grid by the end of October.

### [Malin Group gains consent for first phase of Clyde marine industry park](#) – Scottish Construction Now

Glasgow-based engineering company Malin Group wants to create a marine manufacturing hub at Old Kilpatrick. Now planning consent has been granted by West Dunbartonshire Council for phase one of the Scottish Marine Technology Park (SMTP) in the shadow of the Erskine Bridge. The first phase includes a large fabrication facility, consent for a deep-water jetty with a 1100Te ship hoist - the largest of its kind in Scotland - and a remediation strategy required to develop the former oil storage site.

### [EMEC Supporting KRISO Wave Energy Test Site in Korea](#) – EMEC

The European Marine Energy Centre (EMEC) has entered an agreement to continue to support the development of the Korea Research Institute of Ships and Ocean Engineering – Wave Energy Test Site (KRISO-WETS) on the western coast of Jeju Island. This agreement builds on three years of strong collaboration and strengthens the ties between EMEC and KRISO. As KRISO-WETS enters operational mode, EMEC will provide further operational guidance around environmental impacts, metocean data, commercial guidance, and third-party verification.

**Nova Innovation applies to provide clean, predictable power in Nova Scotia – Nova Innovation**

Nova Innovation has applied to develop a tidal energy array in Petit Passage, in the Bay of Fundy area of Nova Scotia. The project will use Nova's 100kW turbines which have been operating in Scotland for over three years. The carefully phased plan will see the first device deployed in 2020 and operated to build understanding and confidence of performance and environmental effects. The operation and monitoring will be undertaken in consultation with public and statutory consultees, before proceeding with subsequent phases of the project.