

Welcome



A message from the chair of the 8th PRIMaRE Conference 2021.

Dear PRIMaRE Delegates,

A warm welcome to the 8th PRIMaRE Conference hosted by Bangor University. Due to the exceptional circumstances caused by the ongoing COVID-19 pandemic, the conference will be taking place in an online format this year. This not only provides us with a great opportunity to showcase the high-quality work being conducted within PRIMaRE to a much wider audience, but also allows increased participation from our international partners. Therefore, we have a busy programme which includes presentations from international leaders in both academia and industry. The sessions are organised by sector (wave, tidal, wind and cross-cutting marine renewables) with a mixture of topics in each such as engineering, environmental and social impacts, policy and technology. We hope that this will promote discussion across disciplines and keep a focus on the common challenges and new opportunities of marine renewable energy.

Dr. Matt Lewis¹

¹EPSRC Research Fellow, School of Ocean Sciences, Bangor University, UK

The conference is hosted on Whova:
https://whova.com/portal/prima_202106

Important Information

Mindfully Wired Communications (MWC) will be running the event – with interactive website on whova. It is essential that you create a biography to enter the conference platform and have full access to:

- Networking
- Sessions on Marine Renewable Energy topics
- Keynotes from world leaders
- Posters Sessions and flash talks
- Panel Discussions
- Side event run by Marine Energy Wales

The conference platform is now open, please complete your profile:

https://whova.com/portal/registration/prima_202106/

An email will then be sent with a link to our website (check your spam folder) you do not need to download the app, and can view in the desktop browser. Please can you fill in your details, including adding a profile image and short bio. These details will be linked to the main conference website and be used to help promote the conference.

You can then access the conference hub here:
https://whova.com/portal/prima_202106/



PRIMaRE

Useful Links

PRIMaRE Website: www.primare.org/

Journal of Marine Science and Engineering:

<https://www.mdpi.com/journal/jmse>.

PRIMaRE Special Issues:

https://www.mdpi.com/journal/jmse/special_issues/PRIMaRE2021

International Marine Energy Journal:

<https://marineenergyjournal.org/imej>

PRIMaRE2021 will consist of invited presentations (15mins), oral (10mins) and posters (with 1min “flash talks”). These must be prepared in advance (MP4 best) and will be played as indicated in the agenda with a live “Q&A” with the authors.

To submit a question, please use the chat function. The chair will then direct you to read out your question at the end of the presentation.

Sponsor

The 8th PRIMaRE Conference is sponsored by the **Journal of Marine Science and Engineering**. JMSE (ISSN 2077-1312) is an international, peer-reviewed open access journal which provides an advanced forum for studies related to marine science and engineering. The latest impact factor is 2.033 according to the Journal Citation Reports. The journal ranks 31/66 (Q2) in the category "Oceanography". They maintain rapid, yet rigorous, peer-review, manuscript handling and editorial processes. The median publication time is 34 days (median values for papers published in this journal in the first half of 2020).

1st prize £250; 2nd prize £150; 3rd prize £100



Journal of
**Marine Science
and Engineering**

an Open Access Journal by MDPI

PRIMaRE Committee and Partners

PRIMaRE is a consortium of marine energy experts across higher education, research and industry that have joined together to establish a ‘network of excellence’ for the south of the UK.

Steering Committee

AbuBakr Bahaj (University of Southampton)
Nicola Beaumont (Plymouth Marine Laboratory)
Phillippe Blondel (University of Bath)
Claire Gibson (Wave Hub)
Deborah Greaves (Plymouth University)
Johnny Gowdy (Regen)
Jon Hardwick (University of Exeter)
Paul Harper (Bristol University)
Kerry Hayes (Regen)
Stuart Herbert (Wave Hub)

Stephen Watson (Plymouth Marine Laboratory)
Lars Johanning (University of Exeter)
Tim O’Doherty (Cardiff University)
Ricardo Torres (Plymouth Marine Laboratory)
Jun Zang (University of Bath)

Organizing Committee

Wenna Jones (Bangor University)
Matt Lewis (Bangor University)
Jonathan Demmer (Bangor University)
Scott Brown (University of Plymouth)

PRIMaRE Special Issues

PRIMaRE are pleased to announce that, in collaboration with the **Journal of Marine Science and Engineering**, selected abstracts from this year’s PRIMaRE conference will be invited to submit a full paper for a special issue journal entitled “Selected Papers from the 7th PRIMaRE Conference 2021”. Deadline for manuscript submission is **30 November 2021**. All papers can enjoy 20% discount on Article

Processing Charge (APC) in this Special Issue. Further information can be found [here](#).

PRIMaRE is also engaged with the **EWTEC IMEJ, International Marine Energy Journal**, which will accept contributed papers from the conference, some of which will be amalgamated in a special issue targeting wave and tidal energy research.



Invited Speakers Biographies



Dr. Mark Hemer is a Principal Research Scientist with CSIRO Oceans and Atmosphere, Australia, and leads the Offshore Renewable Energy Systems program of the Australian Blue Economy Co-operative Research Centre. Mark's research addresses industry challenges - Over the past decade, he has increasingly focussed efforts to assess the opportunities for offshore renewable energy (wind, wave, tidal and solar) to contribute to Australia's future energy mix. Concurrently, he has maintained his research as a shelf oceanographer, with strong interests in MetOcean conditions in a variable and changing climate, with application to coastal hazards, and the potential impacts of climate change and the implications for coastal risk management. Mark maintains a number of national and international roles, including as the Australian delegate to the International Energy Agency Ocean Energy Systems Technology Collaboration Program; Chair of Australia's Forum for Operational Oceanography Surface Waves Working Group; and a lead author on the upcoming IPCC Sixth Assessment Report (Oceans, cryosphere and sea-level change). Mark has published over 70 peer-reviewed research papers, and more than 70 other reports and articles.



Dr. Zhaoqing Yang is a Chief Scientist for Ocean Modeling at the Marine and Coastal Research Laboratory of the Department of Energy's Pacific Northwest National Laboratory and a Distinguished Faculty Fellow in the Department of Civil and Environmental Engineering at the University of Washington in Seattle, Washington, USA. Dr. Yang's recent research focuses on marine renewable energy resource assessment and the impacts of extreme events and anthropogenic disturbances on coastal infrastructure and ecosystems. Dr. Yang leads PNNL's modeling effort on wave and tidal stream energy resource characterization as well as environmental impact assessment associated with tidal energy development. Dr. Yang is a member of the Editorial Board for Journal of Renewable Energy, Journal Coastal Research and Journal of Marine Sciences and Engineering. He holds a Ph.D. in Physical Oceanography from the School of Marine Sciences, College of William and Mary.



Dr George Crossley is the manager of Falmouth Bay Test Site (FaBTest) and a Business Research Fellow on the ERDF funded Marine-I project in Cornwall. George's expertise is in the testing of novel technologies at sea, the operation of marine instrumentation, and oceanography. FaBTest is a nursery demonstration site primarily for Marine Energy Converters, their moorings and components, and is experienced in the testing of wave energy converters in moderate seas. FaBTest is, in the next year, extending its capacity to enable the testing of floating wind turbines.



Marlène MOUTEL is the Commercial engineer for SABELLA is developing tidal energy solutions, with a particular focus on offgrid and remote areas. Marlène is responsible for prospecting new tidal energy projects in France and worldwide. Ushant island, France is the main showcase of SABELLA's tidal technology where D10-1000 has been deployed several times. Marlène has been working for SABELLA for 3 years and holds a Masters degree in Renewable energy and energy efficiency from ESIEE Paris



Paul Vigers is Head of Engineering of Bombora, with 16 years' experience in the marine renewables sector. Paul spent 10 years working with Tidal Generation Limited, Rolls-Royce and Alstom resulting in 500kW and 1MW tidal turbines built and tested at EMEC. He then moved from tidal to wave energy, initially joining Wavpower before becoming part of the Bombora team in early 2018. Paul leads the engineering team in all technical areas of the design, testing, fabrication, assembly and installation of Bombora's cutting-edge submerged rubber membrane clad cell module wave energy converter system. The company is currently at the final assembly stage of a full-scale 1.5MW mWave demonstration project in Pembrokeshire. Climate change must be one of, if not the greatest challenge we currently face. Being an engineer is all about problem solving and Paul is passionate about working alongside a talented team on a project that tackles this issue head-on to develop a solution that supports a low carbon future



Steve Jermy is a master mariner and offshore renewable energy professional, Executive Chair at Wave Hub Ltd and a Non-Executive Director, with lead for marine and energy, on the Cornwall & Isles of Scilly Local Enterprise Partnership (CIOS LEP). His 35 years' offshore sector experience includes ships' diving, fishery protection, sea command, and offshore aviation. In the offshore renewable energy sector, he has worked for Mojo Maritime Ltd and James Fisher Group plc, both world-leaders in wave and tidal energy, and has led three major offshore renewable energy R&D projects. In addition to his day role at Wave Hub, he now heads up: the regional task force created to take forward floating offshore wind in Cornwall, the Great South West and Wales; Zero Carbon Cornwall, the CIOS LEP's strategy to achieve net-zero in Cornwall by 2030. Steve has a BSc in Applied Mathematics and Physical Oceanography from Bangor University, an MPhil in International Relations and International Economics from Cambridge University, and is a Fellow of both the Nautical Institute and the Institute of Marine Engineers, Scientists and Technologists.



Jeremy Thake is Head of Engineering for SIMEC Atlantis Energy, having been working in tidal energy for 20 years. He started with one of the first tidal turbines, Seaflo, installed at Lynmouth in the Bristol Channel. He has worked for IT Power, Marine Current Turbines, Tidal Generation Limited and now Atlantis. He has been involved in all aspects of turbine and site development, including Atlantis' 1.5MW AR1500 turbine installed at MeyGen, and the recent AR500 turbine installed in Japan.



With 15 years' experience in the Renewable Energy sector, **Jess Hooper** leads the Marine Energy Wales (MEW) programme. MEW is the industry led stakeholder group representing the wave, tidal and floating offshore wind industries in Wales. MEW brings together technology developers, regulators, funders, test centres, wider sectoral alliances, the supply chain, academia and the public sector to establish Wales as a global leader in sustainable emerging offshore renewable generation. Wales is blessed with some of the most diverse marine energy resources in the world and we have key energy players working to unlock the potential to harness these infinite resources.



David Glasby is a mechanical design engineer and research assistant at Swansea University. He will present the development of SELKIE's converging-Beam Acoustic Doppler Current Profiler (cADCP) tool. The converging-Beam Acoustic Doppler Profiler (cADCP) is a cutting-edge device that aims to provide current, wave and turbulence measurements for data analysis purposes. This data will be beneficial in growing our understanding and characterisation of the fluid dynamics of tidal stream sites. The cADCP is being developed as part of the SELKIE Project WP7 objectives. Once validated the design will be made available as an open-source tool for use across this sector. The cADCP device uses a highly innovative automated air lift recovery system which could help revolutionise the cost of scientific instrument deployment.



Bethan Simes is the Project Manager for the Marine Energy Test Area (META) Project, part of the Marine Energy Wales programme and one pillar of the Swansea Bay City Deal, Pembroke Dock Marine Project. With over six years project management experience, Bethan has supported the delivery of META from initial project development through to operational status.

Agenda

Day 1 (29th June) times are in UK BST (GMT+1 hour)

08:45 0845 Welcome (Matt Lewis)

09:00 Mark Hemer from CSIRO and CRC Blue Economy (Chair: Nicola Beaumont)

09:20 Cross-Cutting Session 1 (Chair: Nicola Beaumont)

Daniel Wood	Offshore Wind Farms & Marine Protected Areas: Scientific Evidence Needs for the successful use of Compensatory Measures
Jenny Bond et al.	Can citizen science and local knowledge provide robust evidence in consenting marine developments?
Andrew Edwards-Jones et al.	Local environmental impact underpins coastal community attitudes toward wave and tidal energy developments: A photo-elicitation study on the Bristol Channel, UK

10:00 Break

10:20 Marlène Moutel from Sabella (Chair Tim O'Doherty)

10:40 Tidal Energy Session (Chair Tim O'Doherty)

Larissa Perez et al.	Turbulence characterization and comparison from AD2CP measurements from two prospective tidal energy sites in Australia
Jingjing Xue et al.	Flexible Operation Optimisation of Tidal Lagoon
Matt Allmark et al.	Performance analysis of model-scale tidal stream turbines situated in different array configurations
Hafiz Ahmed et al.	Quasi-Continuous Sliding Mode Speed Control of Tidal Stream Turbine

11:30 Break

11:45 Flash talks (chair: Scott Brown)

Sam Fredriksson et al.	Flow interaction between multiple tidal power plants (Deep Green) using large eddy simulations and the actuator line method
Grazia Todeschini et al.	Challenges and opportunities for the integration of tidal energy within the electricity system
Daniel Coles et al.	Array power curve: investigating a new method for computationally efficient tidal farm modelling
Paul Dené et al.	Optimization of the layout of vertical axis tidal turbine arrays for maximising power generation
Xiaorong Li et al.	A three-dimensional regional scale model for tidal stream turbine implementation and impact assessment
Michael Kennington et al.	Marine renewable energy resource mapping for observation and communication systems

12:00 Break

13:00 Jeremy Thake from Simec-Atlantis (chair: Matt Lewis)

13:20 Jess Hooper from Marine Energy Wales (chair: Matt Lewis)

13:40 Break

14:00 Marine Energy Wales hosted special session (Selkie and META)

1400 Session introduction (**Ian Masters**)

1410 Introduction to the Selkie Project (**Ian Masters**)

1420 Introduction to the Selkie tools (**Ian Masters and Iain Fairley**)

1430 The converging beam ADCP – Background and technical design (**David Glasby**)

1445 Q&A – focusing on the tools and technical aspects (**Ian Masters**)

1455 *Break, 10 minutes*

- 1505** An overview of META – background and range of sites (**Bethan Simes**)
- 1515** An overview of META – collaboration with academia and industry (**Bethan Simes**)
- 1525** Testing the cADCP at META (**David Glasby and Bethan Simes**)
- 1535** Q&A – focusing on testing and testing opportunities at META (**Ian Masters**)
- 1550** Session close
- 16:00 Break**
- 16:20 Tidal Energy and Cross-Cutting themes Session (Chair: AbuBakar Bahaj)**
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| Arianna Zampollo et al. | The potential for wind farms to affect primary production |
| Andrea Copping et al. | A Framework for Resolving Collision Risk as a Barrier to Consenting Tidal Projects |
| Lenaig Hemery et al. | Are fish in danger? Review of effects of marine energy development on fishes |
- 17:00 Zhaoqing Yang from PNNL & US. Dept of Energy (Chair: AbuBakar Bahaj)**
- 17:30 Networking**

Day 2 (30th June) times are in UK BST (GMT+1 hour)

- 08:55 welcome (Matt Lewis)**
- 09:00 Paul Vigars from Bombora (Chair: Jun Zang)**
- 09:20 Wave Energy session (Chair: Jun Zang)**
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| Jessica Borges et al. | Wave energy assessment and feasibility study for the island of 'Eua, Kingdom of Tong |
| Michael O'Shea et al. | Standardisation of Marine Renewable Energy Technology Testing |
| Siya Jin et al. | Study on short design waves in the prediction of extreme loads for a generic hinged-raft wave energy converter |
- 10:00 Break**
- 10:20 Steve Jermy from WaveHub (Chair: Deborah Greaves)**
- 10:40 Cross-Cutting themes Session 2 (Chair: Deborah Greaves)**
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| Joanne Porter et al. | INSITE 2: Connectivity of Hard Substrate Assemblages in the North Sea |
| Ciaran Frost et al. | The future of tidal stream in England and France – an analysis of costs, subsidies and expected capacity |
| Jon Demmer et al. | Multi-use platforms at sea in the Irish Sea: a numerical study |
- 11:20 Flash talks (Chair: Matthew Allmark)**
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| Daming Wang et al. | Tank testing of hinged-raft wave energy converter with representative sea states |
| Qiang Liu et al. | A machine learning model for wave prediction based on support vector machine |
| Junru Chen et al. | Analysis of higher harmonics in a focused water wave group |
| Haoyu Ding et al. | Comparisons between a Particle-In-Cell solver and OpenFOAM on the simulation of a TLP floating offshore wind turbine |
| Qi Ye et al. | Nonlinear structural response of floating offshore wind platforms |
| Jingru Xing et al. | 'One-fluid' formulation of fluid-structure interaction with mooring system |
| Yi Wen et al. | Spatio-temporal analysis of offshore wind field characteristics and energy potential in Southern China |

Peter Scheijgrond
et al.

Developing E-Learning courses for Offshore Renewable Energy sector

Andrew Rawson

Application of Quantitative Route Modelling of Navigation Safety Impacts of Offshore Wind Farms

11:40 Break and Networking

13:00 George Crossley from FabTEST (Chair: Lars Johanning)

13:20 Wind Energy session (Chair: Lars Johanning)

Pawel Manikowski
et al.

Single and multi-objective optimisation of benchmark wind farm optimisation problems

Rachel Nicholls-Lee
et al.

Non-Destructive Examination of Dynamic Subsea Power Cables

Shanshan Cheng

Self-sensory carbon fibre textile-reinforced concrete for offshore floating foundations

14:00 Flash talks (Chair: Paul Harper)

Agung Iswadi et al.

Developing an agenda for biofouling research in Indonesia to support the development of marine renewable energy

John Halpin et al.

The North Sea 3D project – From footage to biomass

Morgane Declerck et al.

A new strategic tool to structure Cumulative Impact Assessment (CIA)

Daniel Wood et al.

Fixed and floating wind turbines

Stephen Watson et al.

The expansion of offshore windfarms: implications for ecosystem services

João Fortes

Complementarity in offshore renewable energy sources off the coast of São Paulo, Brazil.

David Walker et al.

The offshore renewable energy (ORE) sector is increasingly relying on the Internet-of-Things (IoT) and artificial intelligence (AI)

David Mills et al.

IMARDIS - An end-user driven cloud-based data infrastructure supporting the Welsh maritime sector

Gordon Hastie

MASTS Marine Renewable Energy Forum engagement opportunities pitch

14:20 Conference close and prize giving & hand over (Deborah Greaves & Lars Johanning)