Supergen Offshore Renewable Energy

ANNUAL ASSEMBLY 2022

Professor Deborah Greaves OBE

Director of the Supergen ORE Hub

Professor of Ocean Engineering, University of Plymouth

UKRI Engineering and Physical Sciences Research Council

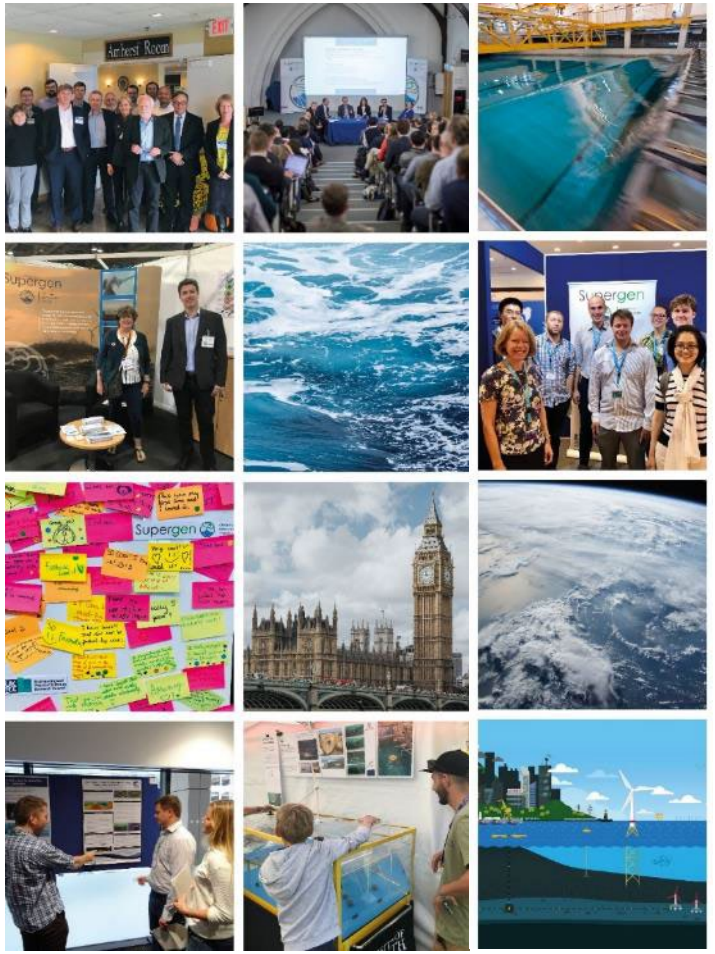
Supergen ORE Hub Fourth Annual Assembly: Context

With the upscaling of the UK Government's ambitious targets to increase significantly the deployed capacity of offshore renewables within the next decade, including:

- increasing the deployment of offshore wind from 30GW to 40GW
- delivering 1GW of floating offshore wind by 2030
- a newly announced £20m de Minimis of ring-fencing for tidal stream development
- supporting up to double the capacity of renewable energy in the next Contracts for Difference (CfD) auction
- EPSRC Marine Wave Energy Research

...the need for increased research and innovation within Offshore Renewable Energy has never been more pressing.

Aligned with the outcomes of COP26, including a commitment by 40 world leaders to increase the uptake of clean technologies within five high-carbon sectors, including electricity, by imposing worldwide standards and policies, offshore renewable energy research and development will play a vital role in mitigating climate change.



What is the Supergen ORE Hub?

WAVE

WIND

TIDE

Structure – Our Management Group

- Bringing together shared skills and expertise, allowing transfer of fundamental knowledge, shared learning and use of resources for interdisciplinary research.
- Each Partner University brings a combination of research and technical expertise.

Supergen ORE Hub Director
Prof. Deborah Greaves
University of Plymouth

+9 Co-Directors

University of Aberdeen
The University of Edinburgh
University of Exeter
University of Hull
Manchester 1824 The University of Manchester
University of Oxford
University of Plymouth
University of Southampton
University of Strathclyde
The University of Warwick

Supergen ORE Hub Objectives

The Supergen Offshore Renewable Energy Hub provides **research leadership to <u>connect</u>** academia, industry, policy and public stakeholders, **<u>inspire</u> innovation** and maximise societal value in offshore wind, wave and tidal energy.

Inspire

- Execute, publish and inspire distinctive and ambitious world class research through the core programme
- Facilitate a programme of co-ordinated UK led research through the flexible fund
- Become a ‘beacon for equality, diversity and inclusion (EDI)'
- Support development of early career researchers (ECR)

Connect

- Be a respected voice for policy makers and a trusted partner for industry
- Have strong international collaboration
- Take a whole systems approach to ORE

£3,100,000
invested into research through our Flexible and ECR funding rounds

182
Early Career Researchers in our network

80+
Publications associated with the Hub

55
Funded research projects through our Flexible and ECR funding rounds

Industry Advisory Board

A wide group of stakeholders from across all ORE disciplines, representing Research, Industry, Government, Academia and Innovation.

UK Marine Energy Council

Department for Business, Energy & Industrial Strategy

CATAPULT Offshore Renewable Energy

MARINE POWER SYSTEMS

DNV·GL

SIMEC ATLANTIS ENERGY

THE CROWN ESTATE

Ørsted

renewableUK

wave energy SCOTLAND

MHI VESTAS OFFSHORE WIND

SIEMENS Gamesa RENEWABLE ENERGY

OW OCEAN WINDS

Fred. Olsen

bp

EDF

Scottish Government Riaghaltas na h-Alba gov.scot

CARBON TRUST

LOC MARINE & ENGINEERING CONSULTANTS

Industry Advisory Board

Our Advisory Board brings together a group of **29 experts within industry and government** to provide the Hub with essential insight and dialogue beyond the academic sector.

The Advisory Board comprises of representatives from the Department for Business, Energy and Industrial Strategy, ORE Catapult, Carbon Trust, RenewableUK, Original Equipment Manufacturers (OEMs), utilities, developers and other sector leaders, covering all sectors and disciplines.

- Working groups include: Equality, Diversity and Inclusion; O&M in offshore wind; Health and Safety; Floating Offshore Wind; Policy and Economics; and Energy Systems Integration
- Activities conducted by the IAB include: reviewing Flexible Funding applications; establishing working groups for different disciplines in ORE; helping with/ participating in workshops (e.g. Health and Safety and At Sea Component Testing workshops); and support to secure project funding (e.g. PREDICT project with University of Aberdeen and Ørsted)

Supergen ORE Hub - in numbers

- Membership of network: **698** (483 academic/216 industry – 629 UK / 69 Overseas)
- ECR Research Fund: **32** projects at a total of **£135,000** invested
- Flexible Funding: **30** projects at a total of **£3m** invested
- **3** x ORE cross-Supergen projects at a total of **£50,000** (6 projects funded in total)
- Industry match funding/support secured through Flexible Fund projects - **£2.79m**
- **30** Universities funded - (**30 PI and 61 Co-I**) - Overall 78% Male – 22% Female

	Call 3 - Apr 21		Call 2 - Mar 20		Call 1 - Apr 19		EPSRC Grant Awards - 18/19*	
	% Female	% Male	% Female	% Male	% Female	% Male	% Female	% Male
PI	38%	63%	8%	92%	30%	70%	14%	83%
Co-I	33%	67%	17%	83%	15%	85%	21%	77%

- **89** papers published (Hub Funded) with further **26** papers co-funded in 2020/21
- Additional funds secured – **20** Letters of support provided - **£3.7m** of additional funds confirmed.

Core Research

Find out more:
https://supergen-ore.net/about

Core and Flexible Fund Research

Find out more:
www.supergen-ore.net/flexible-funding

Core, Flexible Fund and ECR Research

Find out more at
www.supergen-ore.net/impact

Supergen Home - Supergen ORE

supergen-ore.net

Supergen Offshore Renewable Energy

Join our newsletter | Research Landscape

Home | About | Impact | Funding | Research Landscape | ORE Facilities | ECR Community | News & Events

Welcome to the Supergen ORE Hub

We provide research leadership to connect academia, industry, policy and public stakeholders, inspire innovation and maximise societal value in offshore wind, wave and tidal energy.

Find out more




Supergen Home - Supergen ORE | Research Landscape - Supergen | Home - Supergen ORE Landscap

landscape.supergen-ore.net

Supergen

Offshore Renewable Energy

Hide panel

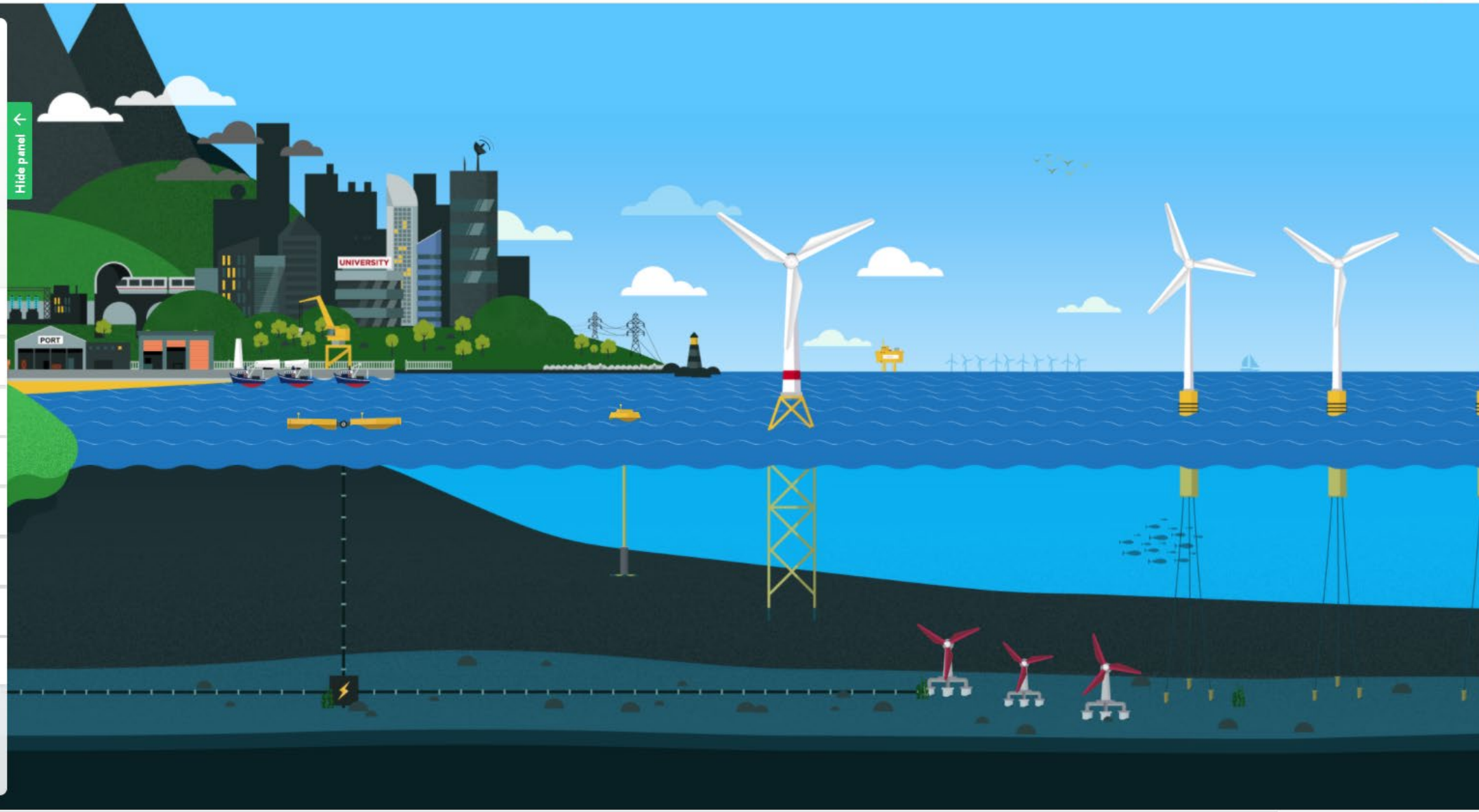
Select a research theme below to highlight current research challenges on the virtual landscape, then select a number to discover more information about current research challenges within each theme.

Themes

- A Resource and Environment Characterisation
- B Fluid-structure Seabed Interaction
- C Materials and Manufacturing
- D Sensing, Control and Electromechanics
- E Survivability, Reliability and Design
- F Operations, Management, Maintenance and Safety
- G Environmental And Ecosystem Aspects
- H Marine Planning and Governance

UKRI Engineering and Physical Sciences Research Council

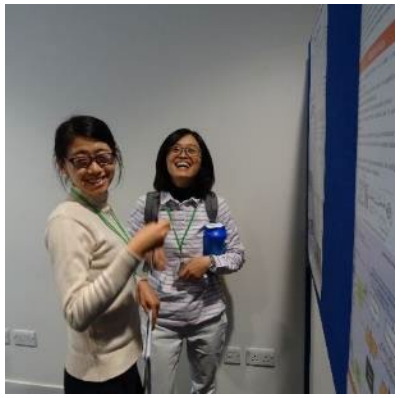
The Supergen ORE Hub is part of the wider Supergen Programme funded by the Engineering and Physical Sciences Research Council.



ECR Network

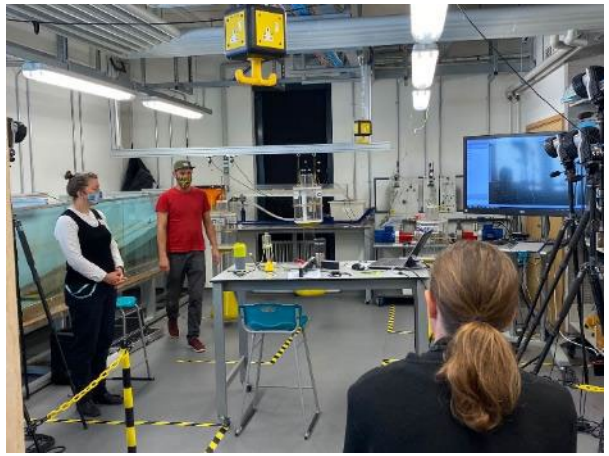
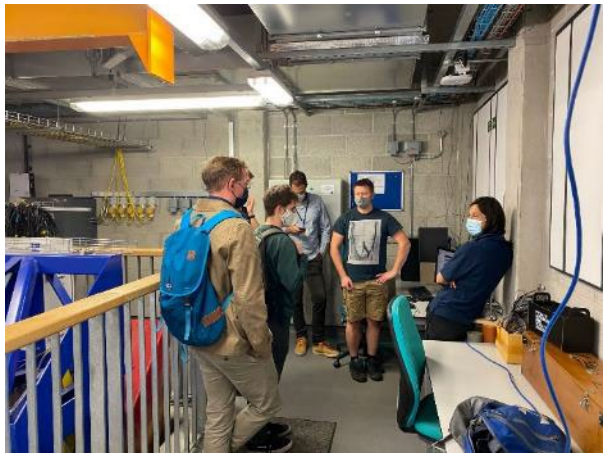
- **182 members** of our ECR Network, with an ECR Committee
- Highlighted events include:
  - Four ECR Forums: Plymouth, Glasgow, virtual (2021, 2022)
  - Workshops on Fellowship applications, career development, research topics
  - ECR Cross-hub webinars – *sharing of current ECR projects & wellbeing and working from home*
  - ECR masterclasses - Advanced Experimental Fluid Mechanics for ORE & Advanced Theoretical and Computational Fluid Mechanics for ORE
- New report for COP26: Strategic priorities for net zero energy research – a perspective from Supergen early career researchers
- Cross Supergen ECR Forum ahead of COP26 (1 Sept 2021)
- Awarded four rounds of ECR Research Funding
  - 32 projects at a total of £135,000 invested
  - Designed to be a flexible fund for ECRs to support small activities in developing ECR career skills and/or research.

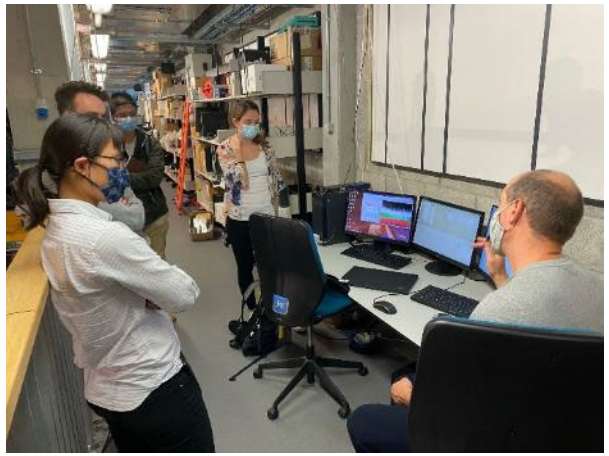
Join the network: **www.supergen-ore.net/ecr-community**

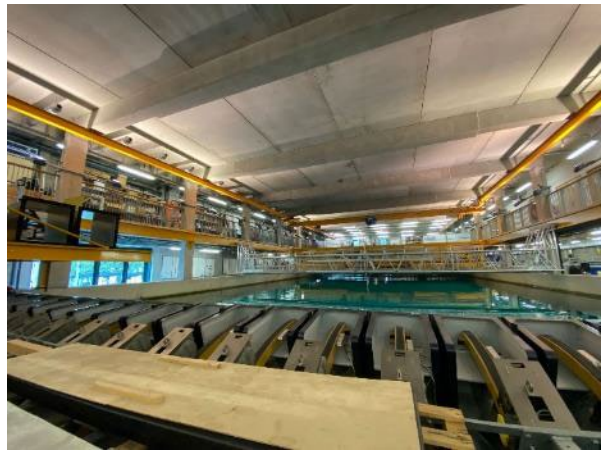


COAST Laboratory – ECR Masterclass

Held at the University of Plymouth during EWTEC 2021

Equality, Diversity and Inclusion (EDI)

Equality, Diversity and Inclusion in Engineering

- Scoping study which determines the current state of EDI in engineering with a focus on ORE industry and academia – Authored by *Dr Stefi McMaster, Aura (University of Hull), and the Supergen ORE Hub*

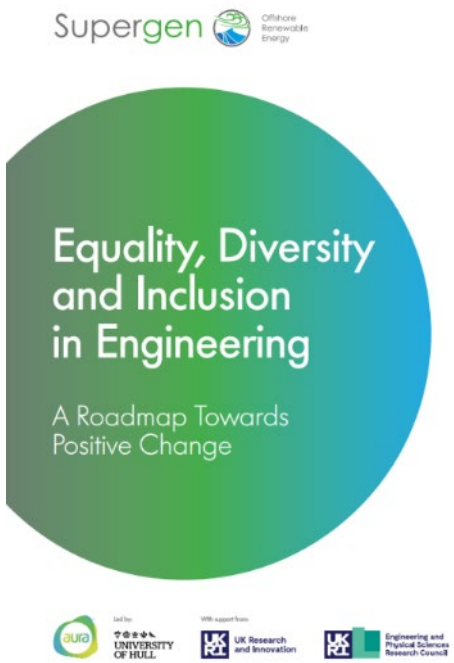
EPSRC Supergen Programme survey

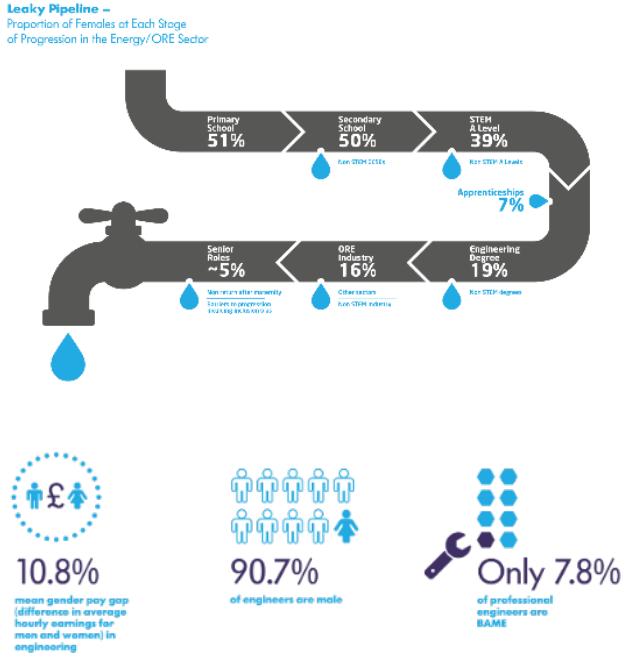
- Joint EPSRC Supergen Programme survey about the Impact of COVID-19 on ED&I and research.

Supergen ORE Hub joins OWIC EDI working group

Outreach activities: Einstein's Field *(Green Man Festival 2019, 2021)* | Voyage of Discovery *(2021)* | International Women's Day *(2021)* | ORE Public talk *(2021)*

Read more about our impact and outreach at **www.supergen-ore.net/impact**





Highlighted workshops & events

- ORJIP workshop at Marine Energy Wales Conference: *De-risking consenting of tidal arrays – are we nearly there yet*? (Jan 2021)
- International Women's Day – online campaign (March 2021)
- Foundations for Ireland/UK Floating Wind (March 2021)
- Health and Safety Executive joint workshop: *Health and Safety Research in Offshore Renewables Workshop* (May 2021)
- G7 Floating Offshore Wind (FLOW) Conference (June 2021)
- Sustainable Earth Institute conference – EDI marketplace session and presentation (June 2021)
- RenewableUK's Futures Forum - Net Zero Sessions (July 2021)
- Aura CDT Conference in Offshore Wind Energy and the Environment (Sept 2021)
- RenewableUK's UK Wind Week Reception (Oct 2021)
- Celtic Sea Developer Alliance at the Houses of Parliament (Nov 2021)

Cross-Supergen programme activities

- Workshop: Offshore Renewable Energy Transmission & Storage - Technology & Pathways *(27 October 2020)*
- Workshop: Co-Design of Offshore Renewables with Network & Storage Vectors - Future systems *(6 November 2020)*.
- Joint Workshop with ORCA Hub: *Robotics for Offshore Renewable Energy: Surveying, Inspection and Maintenance* (Feb 2021)
- 3 x ORE cross-Supergen projects funded at a total of £50,000 (6 projects funded in total)
- Supergen Maritime Decarbonisation Workshop *(25 Jan 2021)*
- Supergen Net Zero conference and Supergen Net Zero ECR Forum *(Sept 2021)*
- COP26 live-stream: Net zero energy systems? A Supergen 'Fishbowl' Conversation *(4 Nov 2021)*
- ECR briefing paper: Strategic priorities for net zero energy research – a perspective from Supergen early career researchers
- 3 x Supergen ECR webinars (focussing on working from home, well-being, and sharing research)
- EPSRC blogs: *Early career researchers delivering net zero energy research* and *What might energy systems look like in a net zero world?*

International engagement

14th EWTEC 2021 | PLYMOUTH 5th–9th SEPTEMBER 2021

- Proud to be a bronze sponsor of the European Wave and Tidal Energy Conference (EWTEC 2021), holding two side events and exhibiting.
- Delivering invited talks in the US, China, Australia, and Europe.
- "Centre to Centre" bids submitted to the EPSRC proposing strategic relationships with groups in the US and China.
- Successful outline and final stage applications to the Innovate UK Bilateral UK and US offshore wind R&D programme
- New collaboration ongoing between University of Aberdeen and UMass Amherst and UMass Dartmouth Natural Capital team to work on the impacts of renewable developments on fisheries industry
- FCDO India Energy Transition project – Delivery of elements of the India offshore wind prosperity fund programme

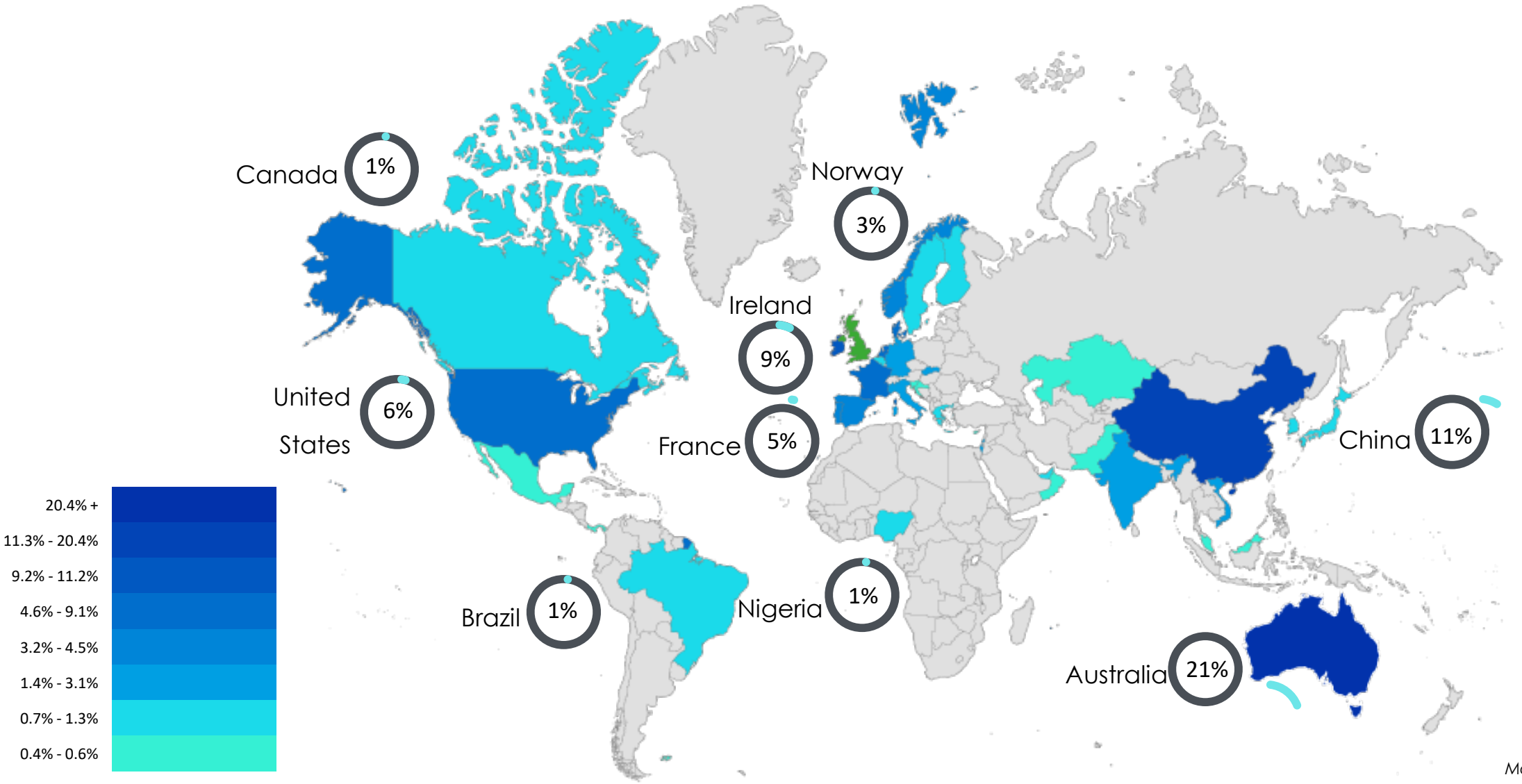
NEW YORK STATE OF OPPORTUNITY. | NYSERDA

POWER-US
PARTNERSHIP FOR OFFSHORE WIND ENERGY RESEARCH
Accelerating Discovery, Innovation, and Job Creation

University of Massachusetts Amherst

International collaborations on publications from 2017 – 2021

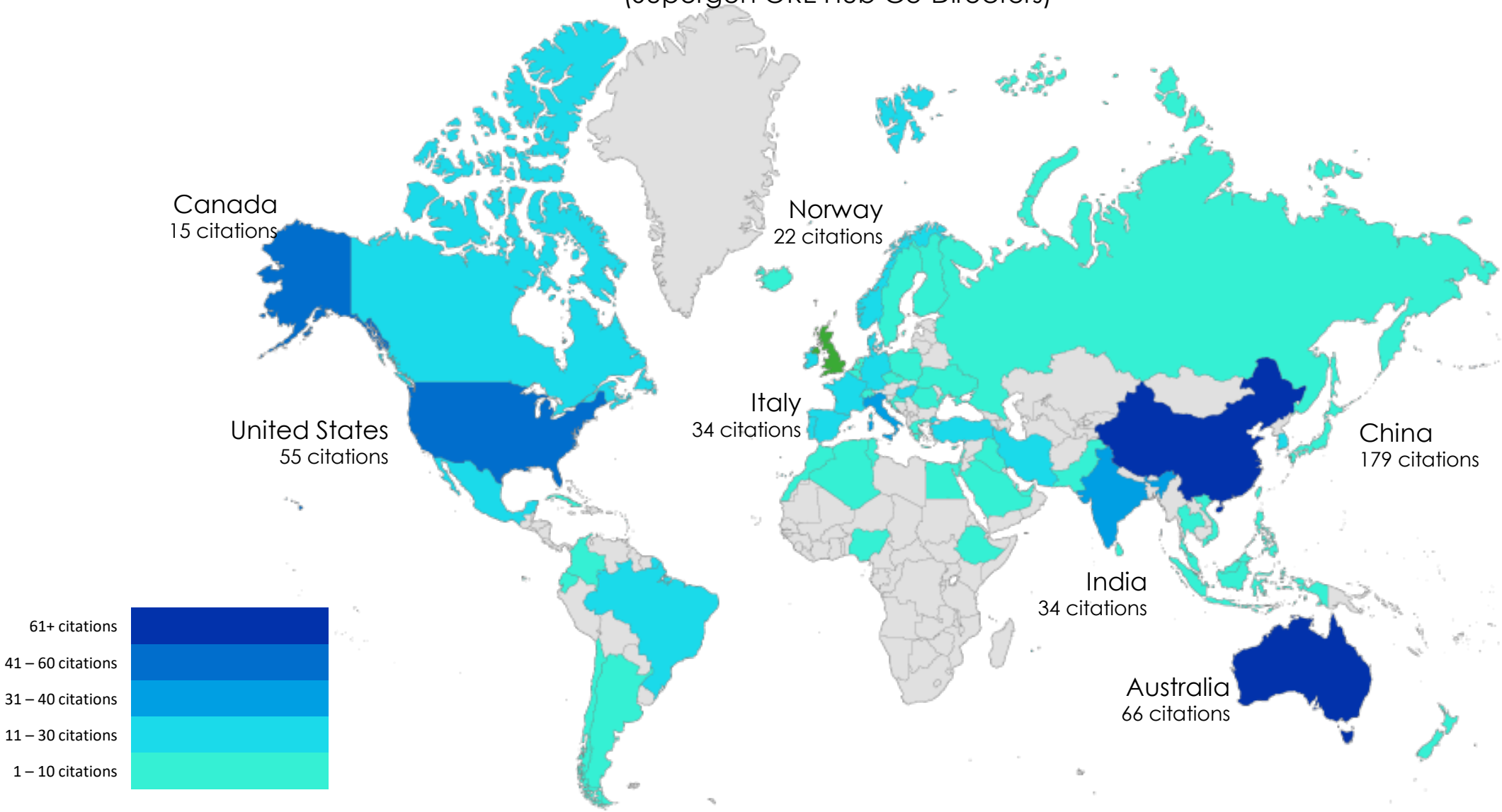
(Supergen ORE Hub Co-Directors)



Map credit: Vemaps.com

International citations of Supergen ORE Hub publications

(Supergen ORE Hub Co-Directors)



Map credit: Vemaps.com

Impact - Projects

Predicting seasonal movement of marine top predators using fish migration routes and autonomous platforms (PREDICT)

Lead: University of Aberdeen, Ørsted

Initially facilitated by Supergen ORE Hub, project will improve understanding of fish migrations as prey availability leading to better predictions of locations and seasons where seabirds and mammals will have increased probability of interaction with windfarms

Outcome - De risk asset projects, sites and pipeline, improve stakeholder management and reputation and improve and demonstrate sustainability

Impact - Enhanced environmental mitigation assessments for Offshore Wind sector developers

1495 UNIVERSITY OF ABERDEEN

Ørsted

University of the Highlands and Islands
Oilthigh na Gàidhealtachd agus nan Eilean

Impact - Projects

Influencing European and Global Policy on Offshore Renewables

Lead: University of Edinburgh

Through Supergen ORE Hub WP1 the University of Edinburgh have developed cross-collaborative relationships, influencing policy makers worldwide. Due to this engagement a consistent modelling approach has been developed for the first time between these UK, European and global energy systems modelling teams

Outcome - Future deployment scenarios have now been generated for offshore renewables at a UK, European and global scale consistently using the European SET plan offshore renewable cost targets. These resultant deployment scenarios provide the basis by which researchers will quantify the domestic and international socioeconomic benefits associated with offshore renewable deployment up until 2050

Impact – Providing UK, European and global scale policy makers with a clearer view of how offshore renewables could contribute to future net zero energy systems.

iea International Energy Agency

Joint Research Centre JRC

CATAPULT Energy Systems

Impact - Projects

Tidal Stream Energy – Designing for Performance

Lead: University of Oxford

This technology development and demonstration project has shown at large laboratory scale how innovative design processes can be used to increase the performance of arrays of closely spaced tidal turbines, by up to around 20%, leading to significant potential reduction in Levelized Cost of Energy of around 10%.

Outcome - Using Computational Fluid Dynamics based design methods, developed and designed rotors for high-performance side-by-side operation

Impact – Industry and academia benefitting from the potential for cost reduction through the use of this technology. Design has also been noted in UK and US briefing notes:

- UK Parliament POSTNOTE “Marine Renewables”, No. 625, June 2020.
- US ARPA-E SHARKS Program FOA, DE-FOA-0002334, 2020.

High performance 1.2m diameter test turbines operating side-by-side during testing at FloWave.

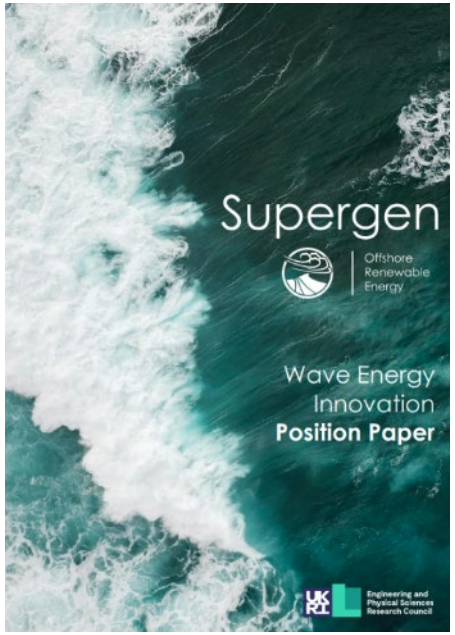
Impact - Wave Energy Workshop and Roadmap

In 2019, we published the Wave Energy Innovation Position Paper and Wave Energy Road Map, which resulted in EPSRC investment in marine wave energy. This work contributed to the POST Parliamentary Briefing on Marine Energy and was carried forward into the September 2020 call for evidence on the potential of marine energy projects in Great Britain and in turn into the Government's Energy white paper.

Impact

- Wave Energy Innovation Report
- Wave Energy Road Map - Realising the potential of Wave Energy in the next 10 to 15 years
- Contributing to the EPSRC launch of the £7.5 million Marine Wave Energy Call for proposals
- Contribute to POST Parliamentary Briefing on Marine Energy
- Evidence cited in Energy White Paper and contributed to UK Government 10 point plan for a green industrial revolution benefitting UK marine energy industry

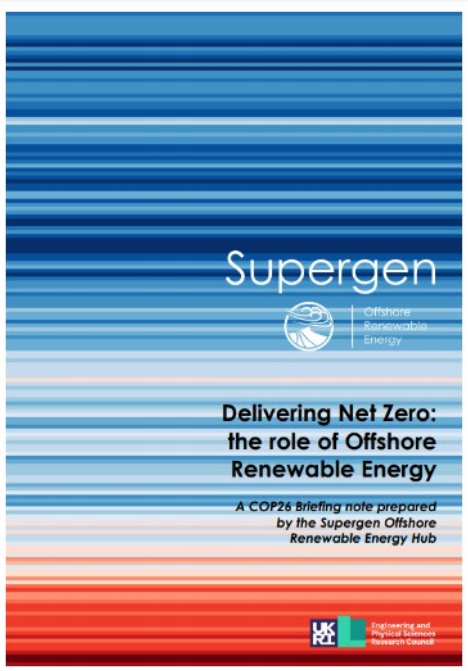
Reports can be accessed from
www.supergen-ore.net/impact



Recent Supergen ORE Hub Policy Papers

Value of innovative ORE deployment to the UK economy

The role of offshore renewable energy in delivering net zero



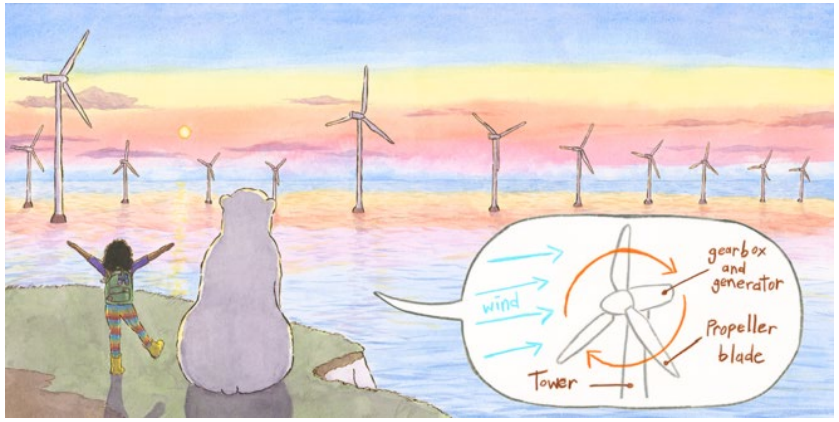
Road Map and Innovation Position Paper for Wave Energy

Access all our papers and reports at
www.supergen-ore.net/impact

Supergen ORE Hub at COP26

- Launch of *Gaia's Energy Adventure!* - our children's adventure book (180 copies sold in total)
- Green Zone exhibition stand on the COP Universities Network stand
- Launch of Supergen ORE Hub video - *The role of offshore renewable energy research in mitigating climate change*
- Live stream of Supergen Fishbowl conversation: What might energy systems look like in a net zero world?
- Featured as research supporting the race to net zero (University of Plymouth publication featuring an overview of the hub and our EDI work)
- Launch of COP26 Briefing Note: The role of Offshore Renewable Energy in delivering Net Zero

Read more about our COP26 activities at
www.supergen-ore.net/cop26-engagement



Future plans, events and opportunities to get involved

- Marine Energy Wales conference *(22-23 March 2022)*
- Wind Energy and Wildlife Impacts *(4-8 April 2022)*
- All Energy *(11-12 May 2022)*
- OMAE *(5-12 June 2022)*
- PRIMaRE Conference *(6-7 July 2022)*
- 5th Annual Assembly *(Oxford - Sept 2022)*
- RUK's Global Offshore Wind *(29-30 Sept 2022)*
- ICOE & Ocean Energy Europe (*18-20 Oct 2022)*
- 6th Annual Assembly *(Southampton - March 2023)*
- At-sea Capability Testing for Offshore Renewables (ACTOR) SoN
- Tidal Benchmarking Study – Workshops
- Health and safety roadmap with HSE
- Insights for Industry workshops

Keep up-to-date with news and events at
www.supergen-ore.net/news-and-events

SpotMe event platform

All delegates will have received a unique link to access the platform, and information on how to download the EventSpace App – which is useful for both virtual and in person attendees.

Key areas of the platform include:

- Personalise your profile for networking
- Access the up-to-date agenda and catch up on content
- View early career researcher posters and leave comments and questions
- View a full list of speakers & biographies
- View the delegate list
- Access pre-recorded videos
- Research Theme discussion boards - we are welcoming additional comments from the ORE community on the latest developments within each of the research themes

Programme for the next two days

Wednesday 19 January 2022

- **09:30 – 10:45 Policy session** – *Making it happen: Contribution of offshore renewable energy policy to net zero GHG 2050 and perspectives on COP26*
- 10:45 – 11:30 Break
- **11:30 – 12:45 Industry Session** – *Research and innovation priorities, and opportunities for collaboration between industry and academia*
- 13:00 – 14:00 Break
- **14:00 – 15:15 Parallel sessions:** Themes B & C
- 15:15 – 15:45 Break
- **15:45 – 17:00 Parallel sessions:** Themes D & A/G

Thursday 20 January 2022

- **09:00 – 10:15 EDI session** - *Equality, Diversity and Inclusion (EDI) in offshore renewable energy academia and industry - what has been effective so far?*
- 10:15 – 10:45 Break
- **10:45 – 12:00 Update on EPSRC Marine Wave Energy Programme**
- 12:00 – 12:45 Break
- **12:45 – 14:00 Parallel sessions**: Themes E & F
- 14:00 - 14:30 Break
- **14:30 - 15:45 International Session** – *Latest developments in international offshore renewable energy research*
- **15:45 – 16:00 Closing address**

Stay in touch

www.supergen-ore.net

@SupergenORE / #SupergenORE2022

www.linkedin.com/company/supergenore

supergenorehub@plymouth.ac.uk

Keep up-to-date with news and events by joining our mailing list
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Supergen Offshore Renewable Energy

FOURTH ANNUAL ASSEMBLY

UKRI Engineering and Physical Sciences Research Council