aura
Doctoral
Training

The EPSRC-NERC Aura Centre for Doctoral Training in Offshore Wind Energy & the Environment

The Acceleration of Offshore Wind Targets
Annual Conference Programme
16 – 18 January 2024

Welcome from our hosts

I am delighted to welcome you to the 2024 conference of the Aura Centre for Doctoral Training in Offshore Wind Energy and the Environment. The Aura CDT is a leading partnership of the universities of Hull, Durham, Newcastle and Sheffield, supported by joint EPSRC-NERC funding from UK Research and Innovation (UKRI) and over 25 key sector partners. This joint funding has been transformative in enabling transdisciplinary work on real-world challenges facing offshore wind, at the interface of clean energy engineering and environmental sustainability.

Since our last conference, just over a year ago, the CDT has recognised significant achievements. As we welcome our final cohort of students to join the programme, now 68 PhD candidates over the last five years, we also celebrate the success of our first cohort of students as they graduate and move on to careers in industry and academia. The Aura CDT is centred on development of these future leaders and we are extremely proud that their successes have been recognised, with the Aura CDT spotlighted nationally in 2023 by UKRI as part of its inaugural joint research council strategy "Transforming Tomorrow Together" launch.

Over the next three days, our future leaders will showcase a fantastic programme of ongoing research, innovation and solutions for offshore wind renewable energy. I am also delighted to welcome and thank our invited keynotes and talks, from across industry and academia, including representation from the entire NERC ECOWind programme. I am sure you will all benefit from this exciting cross-career stage and multi-disciplinary gathering of experts in offshore wind from academia, industry and government.

I warmly welcome you and I hope that you enjoy the presentations of cutting-edge research undertaken by our students, colleagues and partners.

Professor Rob Dorrell
Director, Aura CDT
Energy & Environment Institute,
University of Hull

Led by:

In partnership with:

Funded by:

UNIVERSITY OF HULL

Durham University

Newcastle University

The University Of Sheffield.

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UKRI Natural Environment Research Council

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Guest speakers and panel members

DR MARIE RENNER

Head of Renewables at EDF UK R&D

Marie leads the innovation and the development of EDF UK Research & Development activities in the renewables area and contributes to defining the vision and strategy of the overall EDF UK R&D activities.

She leads the Renewables R&D Department within EDF UK R&D, and manages part of offshore wind R&D for EDF Group. Previously Marie led projects within EDF Group's Strategy Division on a wide range of topics, including offshore wind and carbon neutrality.

Marie has a PhD in Economics on The Emergence of Carbon Capture and Storage Techniques in the Power Sector. Before joining EDF, Marie worked as a research engineer on projects including a technico-economic evaluation of different business cases involving blockchain and a cost benefit analysis of a French smart grid demonstrator for the French DSO and Governmental Agency.

ANDREW ELMES

Head of Net Zero Business Development, UK&I, Siemens Gamesa Renewable Energy (SGRE)

Andrew represents Siemens Energy's Net Zero portfolio in UK and Ireland.

From a first career as a military engineering officer, Andrew joined Siemens Wind Power in 2007, project managing UK onshore windfarms as well as establishing the company's first UK project and construction teams.

After a brief emigration to Australia, he returned to Siemens in 2015 to manage the port development and preassembly setup for Siemens Gamesa's flagship Port of Hull facility. He then led the wind turbine team to deliver Scottish Power's East Anglia ONE offshore windfarm, on a project that saw the first scale deployment of 66kV electrical design, as well as completing through the outbreak of the CV-19 pandemic.

Andrew lives in Surrey with his wife and 2 young sons.

Guest speakers and panel members

DR ANDREW JENKINS

CEO and founder, Kinewell Energy

Andrew is CEO and founder of Kinewell Energy, providing strategic leadership to the rapidly growing company now recognised as Gamechangers by Renewable UK's Global Offshore Wind Awards. He has over 14 years' engineering experience working within the renewables sector and has over 12 years' experience pioneering offshore wind inter-array cable layout artificial intelligence optimisation software.

Andrew is skilled in understanding complex value-chains and developing collaborative partnerships to deliver value to stakeholders. This has enabled Kinewell Energy to grow at an exceptional rate, doubling roughly every year, and deliver substantial economic benefit to the Northeast of England regional economy for which it won 'Project of the Year' at the Dynamite Awards. The company is also seen as one of the most promising regional businesses poised for future success by the newspaper Business Live. In addition to his professional work, he is a Trustee of the charity The Centre for Search Research and an operational volunteer with Mountain Rescue where he is also training a search dog.

TOM NIGHTINGALE

North East Stakeholder Manager, Equinor

Tom joined Equinor in April 2021 as North East Stakeholder Manager, focusing on Dogger Bank, the world's largest offshore wind farm under construction. Tom represents Equinor's Renewables Division in North East England, working alongside Dogger Bank partners to engage with and build relationships across the community, industry and the supply chain. Tom is also a board member of NOF. Prior to this, Tom has held various marketing, communication and business development roles in the energy supply chain, where he has supported the growth of businesses including TechnipFMC Umbilicals and JDR Cables and helped to attract inward investment to the region. Before joining Equinor, Tom was Marketing & Strategy Director (Flexible Pipe Systems) for Baker Hughes.

As part of the Offshore Wind Sector Deal, Tom represented JDR Cables on the Offshore Wind Industry Council where he was an advocate for the supply chain and increasing UK content. At this time, Tom also worked with NOF to deliver the first Offshore Wind North East conference. Tom has won various awards and accolades for businesses including SubseaUK awards, Offshore Achievement Awards, Northern Powerhouse Export Awards and the Queens Award for Enterprise: International Trade.

Tom lives in Newcastle with his wife and two children and spends his free time exercising, planning his travels and socialising.

Guest speakers and panel members

KIMBERLEY LLOYD

Consultant, Howell Marine Consulting

Kimberley Lloyd is a consultant at Howell Marine Consulting and member of the champion team of the working on the ECOWind programme, coordinating offshore wind research and ensuring that findings deliver impact to industry and policy, with a background in offshore wind applications.

The ECOWind Programme has funding of around £9.5 million provided by The Crown Estate's Offshore Wind Evidence and Change Programme (OWEC) and by the Natural Environment Research Council (NERC).

ECOWind is bringing together experts from science, policy and industry to understand how offshore wind affects ecosystems, and the species and habitats that make them, in order to reduce negative impacts on marine life while tackling climate change. Scientists, policy and industry representatives will work closely together to ensure that research findings can be directly translated into progressive policy measures, which will aim for optimal outcomes for both the climate and marine life.

ECOWIND includes four projects: ACCELERATE, ECOWINGS, PELAgIO, and BOWIE, which investigate the effects of offshore wind on various aspects of the marine environment, covering elements of the ecosystem such as fish, marine mammals, seabirds, and life on the seabed.

VICTORIA METHERINGHAM

Head of Marine Biodiversity Science and Monitoring, Defra Marine and Fisheries Directorate, Department for Environment, Food & Rural Affairs

Victoria is the lead for marine biodiversity research, development and monitoring in Defra which is a UK Government department. Working across wider government and arm's length bodies (ALBs such as Natural England, Cefas, MMO, EA and JNCC) to deliver high standard and timely evidence to assist in the development of marine policy and the monitoring of its effectiveness on the marine environment. Victoria represents Defra on several CDT and wider academic programmes, seeking to influence and develop the next generation of marine professionals and broader working with academia.

Victoria has a BSc (Hons) in Marine Biology and an MSc in Marine, Estuarine and Coastal Science and Management, both from the University of Hull. Being from Hull, Victoria is passionate about promoting the talent from this region.

Guest speakers and panel members

DR NIALL TRACEY

Online Surveyor, GEOxyz

Niall is an online surveyor for GEOxyz, which is a leading provider marine survey and offshore renewable support. His activities focus on collecting geospatial data for clients in the UK and European offshore waters.

He has a background in marine acoustics, and is an alumnus of the Aura CDT programme at Durham University, where he completed his PhD research. During his doctoral studies, Niall developed passive acoustic methods to help monitor sediment transport and is now applying his experience to aid in the transition to a lower carbon future.

NATASCHA ENGEL

Former Labour MP and CEO Palace Yard

Natascha was Labour Member of Parliament for North East Derbyshire from 2005 to 2017. She set up and chaired the Backbench Business select committee from 2010 to 2015 and served as House of Commons Deputy Speaker.

Co-Founder and CEO of Palace Yard, Natascha's policy specialisms are energy, manufacturing, infrastructure and the circular economy. Her deep cross-party networks, her recent experience working with academics and universities to achieve policy impact, as well as her previous role as partner at policy and opinion research firm Public First, have cemented Natascha's reputation as a highly effective cross-party, cross-sector policy specialist who brings industry, academic and business leaders together with senior politicians and policy-makers.

Programme

Tuesday 16th January — Agenda – Day 1

REGISTRATION	
08:30 – 09:00	**Registration (Ground Floor) and refreshments (First Floor, Mezzanine)**
09:00 – 09:15	**Welcome** — **First Floor, Conference Suite** Professor Fiona Matthews, Pro-Vice-Chancellor (Research and Enterprise), University of Hull Professor Rob Dorrell, Director, Aura Centre for Doctoral Training, University of Hull
GUEST SPEAKERS - INDUSTRY AND POLICY & RESEARCH INSTITUTE — **First Floor, Conference Suite**	
09:15 – 09:45	**Guest speaker** Dr Marie Renner, Head of Renewables EDF UK, **A favourable but changing and difficult to master environment for offshore wind**
09:50 – 10:20	**Guest speaker** – Andrew Elmes, Head of Business Development, SGRE, **Luffing up; wind and the energy sector**
10:25 – 10:55	**Guest speaker** – Natascha Engel, Former Labour MP and CEO, Palace Yard **Translating academic research for a policymaking audience**
BREAK	
10:55 – 11:15	Short break to move to parallel sessions, refreshments available (First Floor, Mezzanine)
RESEARCH PRESENTATION SESSION 1	
11:15 – 12:55	Research presentations - parallel sessions
1a	**Theme: Big data, sensors and digitalisation for the offshore environment** — **First Floor, Conference Room 2/3** Dr Koorosh Aslansefat, **Availability evaluation of offshore wind turbines through a combination of Markov regenerative process and dynamic fault tree**, University of Hull Isha Saxena, **Data driven infrastructure planning for offshore wind farms**, Durham University Ben Pickett, **Simulating Storegga: evidence of North Sea tsunamis & modelling a future event**, University of Hull

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	Ewan Norris, **Lead time predictions in an offshore wind blade factory**, University of Sheffield
1b	**Theme: Next generation materials and manufacturing** First Floor, Conference Room 1 Professor Jay Wadhawan, **Critical materials for the offshore wind industry**, University of Hull Anna Weatherburn, **Taking inspiration from nature: designing a biomimetic 3D woven composite for wind turbine blades**, Durham University Jian (Miguel) Ye, **Are superconducting floating wind turbines the future of wind energy?**, University of Sheffield Oliver Morgan-Clague, **Numerical modelling of wind turbine manufacturing**, University of Hull Stella Ezeoye-Ikegwuonu, **Evaluating performance and sustainability of natural-fibre-based composites in different parts of wind turbines**, University of Hull
LUNCH	
12:55 - 13:45	
RESEARCH PRESENTATION SESSION 2	
13:45 – 15:25	Research presentations- parallel sessions, refreshments available
2a	**Theme: Environmental impact, marine biology and aquaculture** First Floor, Conference Room 2/3 Professor Pip Moore, **Commercial and recreational fisheries species abundance, behaviour and landings from areas of scour protection within offshore windfarms,** Newcastle University Ellie Cook, **Cumulative Effects of offshore infrastructure: measuring the scale of change for benthic communities**, University of Hull Ethan Clark, **Spatial mapping of co-location: offshore wind and macroalgae aquaculture**, Newcastle University Gemma Hoyes, **Which method is best?**, Newcastle University Maisy Bradbury, **Flow alteration scour mitigation methods**, University of Hull
2b	**Theme: Physics and engineering of the offshore environment** Detail overleaf **First Floor, Conference Room 1**

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2b	**Theme: Physics and engineering of the offshore environment** **First Floor, Conference Room 1** Dr Ben Lincoln, **Field measurements of enhanced turbulent mixing from tidal flow past wind turbine foundations**, Bangor University Daniel Whitt, **Nanotechnology advancements into hydrogen production and understanding water molecular behaviour in nanocavities**, University of Hull Dax Blackhorse-Hull, **A high gain bipolar DC-DC converter for wind-wave applications**, Durham University Geng Chen, **Unlocking cheaper floating wind turbines: the contribution of vortex induced motion research**, Durham University Victoria Bessonova, **Climate change might make offshore wind farms more accessible**, University of Hull
BREAK	
15:25 – 15:40	Short break to move to parallel sessions, refreshments available (First Floor, Mezzanine)
RESEARCH PRESENTATION SESSION 3	
15:40 – 17:00	Research presentations- parallel sessions
3a	**Theme: Offshore wind energy integration – challenges and impacts** **First Floor, Conference Room 2/3** Aliyu Ibrahim-Nagidi, **Using offshore wind to capture CO2 in the Humber Industrial Cluster**, University of Hull Connor Whiteford, **Development of a method of wireless power transfer for offshore wind**, Durham University Nicholas Wilson, **Energy storage through electrochemical compression of hydrogen**, University of Hull Siti Khadijah Hamzah, **Operational network planning for different multi terminal high voltage direct current offshore systems**, Durham University
3b	**Theme: Big data, sensors and digitalisation for the offshore environment** **First Floor, Conference Room 1** Simon Brealy, **Generalised additive Gaussian processes for wind farm power forecasting,** University of Sheffield Eamonn Tuton, **Predicting the power: digital twin for wind speed & power forecasting**, University of Hull David Goodman, **Physics-informed machine learning for blade loading**, University of Sheffield

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	Harry Burton, **Memristor-based LSTM neuromorphic circuits for offshore wind turbine blade fault detection**, University of Hull
<td colspan="2" style="background:green">**POSTERS AND WINE RECEPTION** (Ground Floor)</td>
17:00 - 18:00	An opportunity to mix with fellow conference colleagues and view posters from our Aura CDT PGRs and discuss their research

Programme

Wednesday 17th January	Agenda – Day 2
REGISTRATION	
12:00 – 12:20	**Registration (Ground Floor)**
LUNCH	
12:20 – 13:20	**Please join us for lunch as Day 2 of our conference opens (First Floor, Mezzanine)**
WELCOME	**(First Floor, Conference Suite)**
13:20 – 13:30	Professor Jim Gilbert, Deputy Director, Aura Centre for Doctoral Training, University of Hull
GUEST SPEAKERS - INDUSTRY AND RESEARCH PROGRAMME	**(First Floor, Conference Room 2/3)**
13:30 – 14:00	**Guest speaker** – Victoria Metheringham, Head of Marine Biodiversity and Environment Science, DEFRA, **The role of science in UK policy development**
14:05 – 14:35	**Guest speaker** – Tom Nightingale, North East Stakeholder Manager, Equinor, **Equinor in the UK and operating Dogger Bank Wind Farm**
14:40 - 15:10	**Guest speaker** – Kimberley Lloyd, Consultant at Howell Marine Consulting and member of the Champion Team of the ECOWind Programme, **ECOWind (Ecological consequences of offshore wind) Programme**
BREAK	
15:10 – 15:30	Short break to move to parallel session, refreshments available (First Floor, Mezzanine)
ECOWind RESEARCH PROGRAMMES	
15:30 – 17:10	Parallel sessions
4a	**ECOWind-ACCELERATE** **First Floor, Conference Room 2/3** Dr Chris Unsworth, **Enhanced seabed mobility around offshore windfarm foundations,** Bangor University Dr Olivia Hicks, **Implications of accelerated seabed mobility for marine top predators**, Bangor University

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	Bridget Sparrow-Scinocca, **Utilising trait-based approaches to understand offshore wind impacts on benthic ecosystem process and services,** Bangor University Olga Taran, **Process modelling of seabed morphodynamics in the turbulent wake of an offshore windfarm,** Bangor University	
4b	**BOWIE and ECOWINGS** **First Floor, Conference Room 1** Jordan Burgess, **Man-made earthquakes: how substrate vibration may influence benthic species,** University of Hull Tom Williams, **The expansion of offshore wind infrastructure across the UKEEZ; A retrospective view from the seafloor,** University of Southampton Hugo Putuhena, **Finding space for offshore wind: balancing net zero targets with the ocean constraints in the UK waters,** University of Southampton Dr Anastasia Frantsuzova, **Expert elicitation on compensatory measures for seabirds,** Biomathematics and Statistics Scotland (BioSS)	
CONFERENCE DINNER TRANSPORT TO THE DEEP FOR THOSE WHO HAVE BOOKED		
18:00	Outside the Aura Innovation Centre Reception	
CONFERENCE DINNER FOR THOSE WHO HAVE BOOKED		
19:00	Welcome Drinks, The Deep, Hull	
19:30	Dinner, The Deep, Hull	

Programme

Thursday 18th January	Agenda – Day 3
REGISTRATION	
08:30 – 09:00	**Registration (Ground floor) and refreshments (First Floor, Mezzanine)**
RESEARCH PRESENTATION SESSION 5	
09:00 – 10:40	Research presentations- parallel sessions
5a	**Theme: Operations, maintenance and human factors** **First Floor, Conference Room 2/3** Professor Will Coombs, **Protecting offshore power transmission cables from external aggression**, Durham University Luke Neal, **Labour and sustainability research across the Hornsea 2 supply chain**, University of Sheffield Callum Rothon, **Benchmarking Object detectors for anomaly detection on wind turbines**, University of Hull Adam Brassington, **How can we use ultrasonic vibrations to detect damage in offshore wind turbine blades?**, University of Sheffield
5b	**Theme: Environmental impact, marine biology and aquaculture** **First Floor, Conference Room 1** Katharine York, **The future of operation and maintenance in offshore wind**, ORE Catapult Enora Lecordier, **Sediment wakes intensity within offshore wind farms using satellite images,** University of Hull Will Burton, **Fuzzy mapping to place offshore wind energy in the UK North Sea system; an AURA CDT perspective**, Durham University Ellie Goodfellow, **Array-scale sediment transport dynamics: potential for interactions between monopiles**, University of Hull Sarah Dickson, **Vessel activity at offshore wind farms and the potential impact on dolphins and porpoises**, Newcastle University

Programme

BREAK	
10:40-11:00	Short break to move to parallel sessions, refreshments available (First Floor, Mezzanine)
RESEARCH PRESENTATION SESSION 6	
11:00 – 12:20	Research presentations- parallel sessions
6a	**Theme: Big data, sensors and digitalisation for the offshore environment First Floor, Conference Room 2/3** Dr Nina Dethlefs, **Conversational AI in offshore wind**, University of Hull Sarah Bee, **When is a structural health monitoring problem a multi-task learning problem?,** University of Sheffield Reuben Tinsdeall, **Digital twin output functions for offshore wind,** University of Sheffield Paul Hambly, **Bearing fault diagnosis using convolutional neural networks**, University of Sheffield
6b	**Theme: Physics and Engineering of the offshore environment First Floor, Conference Room 1** Professor Nikolaos Dervilis, **Performance and health monitoring of wind turbines from single components to populations of wind farms,** University of Sheffield Nilotpal Dhar, **Effect of geometric complexity on floating foundation drag forces,** University of Hull Jordan Fuentes-Holden, **Experimental investigation of tip vortex formation from a wall-mounted blade equipped with active trailing edge surfaces**, Durham University Dr Charlie Lloyd, **Resolving the waves of offshore wind infrastructure in stratified flows,** University of Hull
LUNCH	
12:20 – 13:20	**First Floor, Mezzanine**
GUEST SPEAKERS INDUSTRY AND PANEL	**(First Floor, Conference Suite)**
13:20 – 13:25	Session Introduction - Professor Rob Dorrell, Director, Aura Centre for Doctoral Training, University of Hull

Programme

13:25 – 14:05	**Guest speaker** – Dr Andrew Jenkins, CEO and founder Kinewell Energy, **Accelerating and reducing the cost of offshore wind through advanced mathematics**
14:05-14:35	**Guest speaker** – Dr Niall Tracey – Online Surveyor GEOxyz/ Aura CDT Alumnus, **Unlocking professional growth: my journey with the Aura CDT and its impact on my current role**

<table>
<tr><td colspan="2" style="background:green;color:white">PANEL DISCUSSION   (First Floor, Conference Suite)</td></tr>
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14:35 – 15:40	**TOPIC: What will the offshore wind industry look like in 2040 - what will the needs be?**
	Chair: Professor Jim Gilbert
	Panel members:
	Victoria Metheringham, Head of Marine Biodiversity and Environment Science, DEFRA
	Katharine York, OMCE (Operations & Maintenance Centre of Excellence) Manager for the ORE Catapult
	Dr Andrew Jenkins, CEO and founder, Kinewell Energy
	Dr Niall Tracey, Online Surveyor, GEOxyz / Aura CDT Alumnus

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15:40 – 16:00	**Closing summary and prizes** **First Floor, Conference Suite**
	Professor Rob Dorrell
	Student awards for presentations and posters

PHD CANDIDATE	POSTER TITLE
Nicholas Wilson	Electricity Storage through Electrochemically Compressed Hydrogen
Jian (Miguel) Ye	Is Superconducting Floating Wind Turbines The Future of Wind Energy?
Jenna Zunder	Analytical Modelling of Wind Turbine Wakes
Geng Chen	Riding the Vortex: The Impact of Vortex-Induced Motions on Floating Offshore Wind Turbines
Reuben Tinsdeall	Digital Twin Output Functions for Wind Turbine Monitoring
Ifunanya Stella Ezeoye-Ikegwuonu	Greening the Wind: Powering Tomorrow with Bio-Based Wind Turbines
Aliyu Ibrahim Nagidi	Using Offshore Wind Energy to Capture CO_2
Maisy Bradbury	Collars or Rocks: A Study to Compare the use of Collars and Rock Dumping as Scour Mitigation Methods for Offshore Windfarms
Callum Rothon	A Conceptual Framework for Using Large Language Models to Recommend Repair Actions for Offshore Wind Maintenance
Sarah Bee	Multi-Task NARX Neural Networks for time series predictions
Ben Pickett	Storegga deposits at Howick Burn and their application to Low Frequency, High Magnitude risk assessment of Offshore Wind

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