ASME IOWTC 2023

5th International Offshore Wind Technical Conference

Program

December 18-19, 2023

https://event.asme.org/IOWTC

ASME SETTING THE STANDARD

University of Exeter

WELCOME TO IOWTC 2023!

Dear IOWTC participants, authors, and committee members,

On behalf of the Ocean, Offshore and Artic Engineering (OOAE) Division of the ASME, welcome to the 5th ASME International Offshore Wind Technical Conference IOWTC2023!

We are honoured to have you all here, for an opportunity to reflect and share the progress, whilst the offshore wind sector continues its extraordinary journey. What was once a frontier of research and enthusiasts is not an established offshore wind industry. Looking to the horizon the first floating wind projects have been completed and operated and we can share and hopefully advance many of the achievements and technology innovations here.

This conference is a celebration of collaboration, knowledge-sharing, and the pursuit of engineering excellence through a truly international community. It is worthwhile to take a moment to reflect on the scale and speed of proposed offshore wind developments. The ambitious goal of deploying 235GW of offshore wind energy globally within the next decade is nothing short of revolutionary. With 16.5GW of floating installations taking centre stage, we are on the brink of unlocking a new era of sustainable energy generation.

The 2022 UK's Energy Security Strategy has underscored the urgency of this build-out by increasing offshore wind targets to 50GW, including 5GW of floating installations, by 2030. This ambitious endeavour calls for innovative solutions, cutting-edge technology, and multidisciplinary collaboration on a global scale, to be able to build infrastructure at an unprecedented scale and speed.

IOWTC2023 is a platform where thought leaders, researchers, site developers, policymakers, technology companies, investors, and asset owners from across the globe come together to explore the state-of-the-art offshore wind technology developments and research. This conference is your gateway to the present and hear about the latest developments, invaluable partnerships, and the opportunity to shape the future of offshore wind through personal interactions and a joint enthusiasm. Let us not forget, the political targets, the planning, engineering design, manufacture, installation and operation of these offshore wind assets are delivered by people like yourselves!

You will see from the program that we have an exciting line-up of papers and presentations. As ever, the program is only possible because of many volunteers, serving as conference technical program chairs, session chairs, and of course all authors and reviewers. A great thank you to all – your efforts are much appreciated. Special thanks also go to all ASME staff, the Exeter event team and Dr Aleksandra Zawalna-Geer who have worked tirelessly, making these two days a success. We would also like to thank our sponsoring organisations for providing their generous financial support.

We hope you enjoy your stay in Exeter and that you have time to enjoy the organised technical tours. I invite you all to engage, collaborate, and push the boundaries of what is possible. Ideas of today might well be the engineering reality of the future.

Prof. Philipp Thies
Dept. of Engineering
University of Exeter
Local Organizing Chair

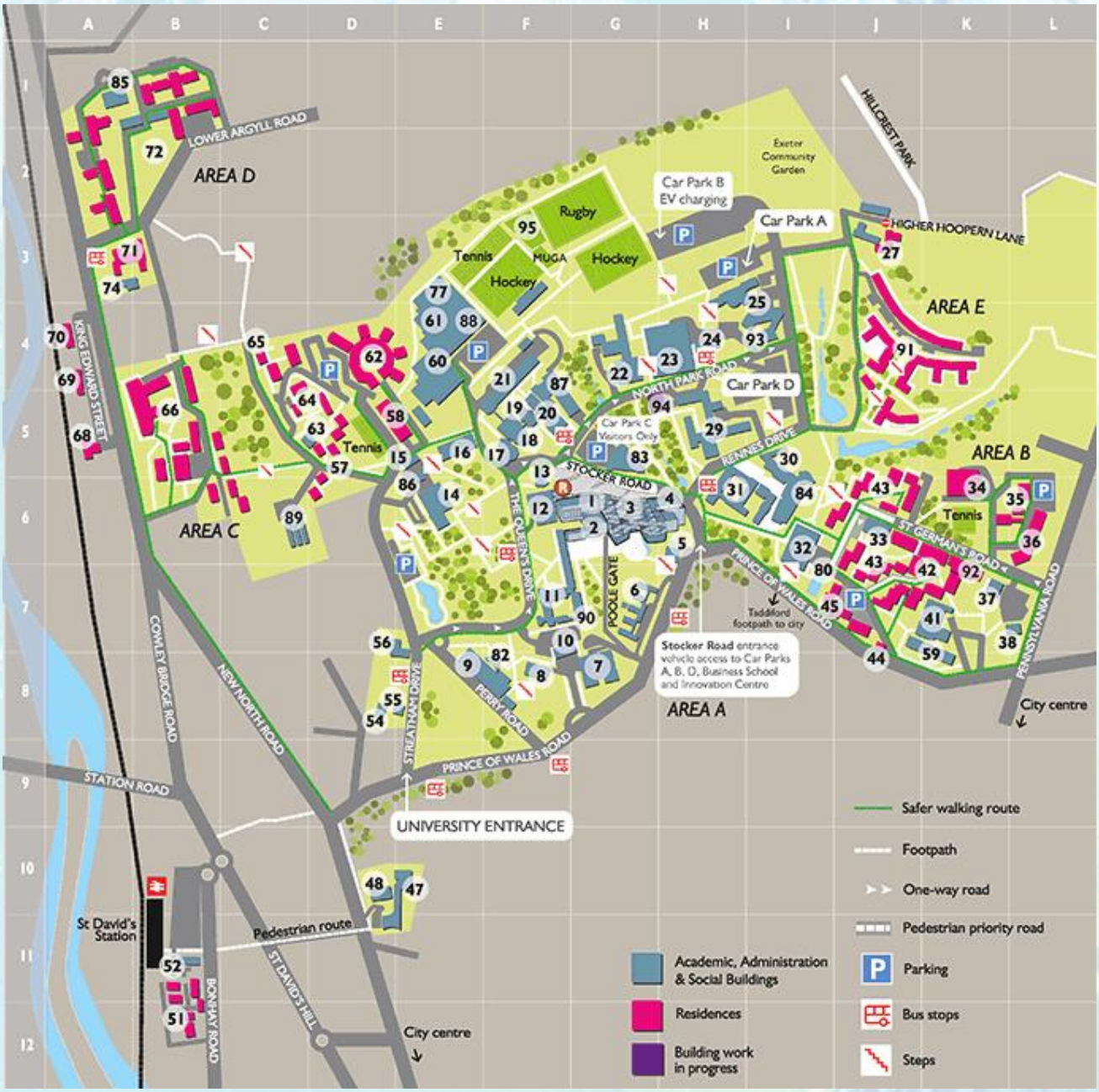
Amy Robertson
National Wind Technology Center
National Renewable Energy Laboratory
Organizing Co-Chair

Prof. Andrew Myers
Dept. of Civil & Environmental Engineering
Northeastern University
Organizing Co-Chair

CONTENTS

CONFERENCE INFORMATION

- IOWTC 2023 will be held at Streatham Campus of University of Exeter
- 18 -19 December 2023 Technical sessions, keynote speeches, exhibits, coffee/tea breaks and lunches will take place in Peter Chalk Centre (17, 5F on the campus map below)
- The welcome reception (17th Dec 2023) and the conference banquet (18th Dec 2023) will be organised in Reed Hall (14, 6E on the campus map below)
- For directions, parking and the campus information please visit University of Exeter website

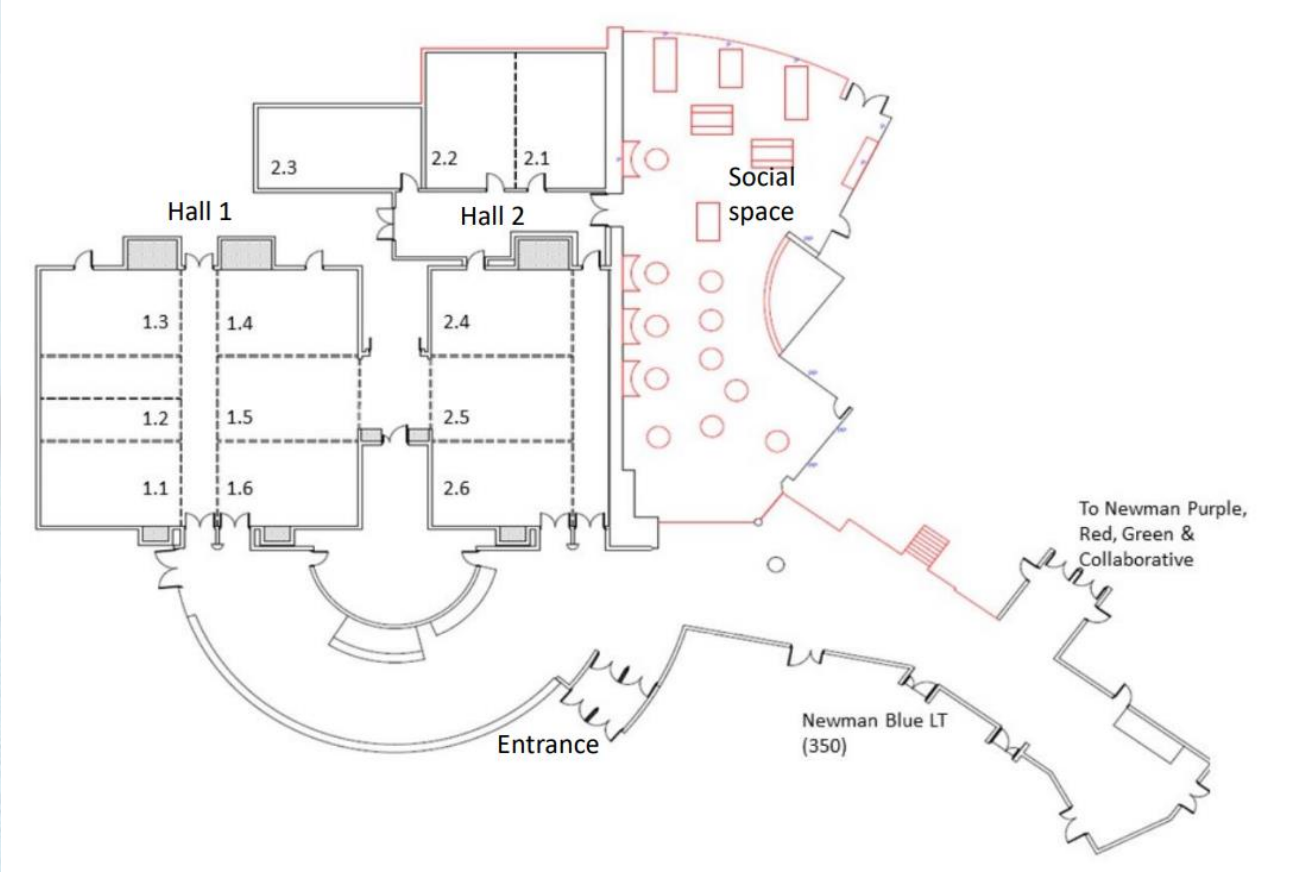


Peter Chalk Centre

The centre provides a modern, fully-equipped conference venue in the biggest campus of the university. The campus was built around a country estate overlooking the city with views to the sea on the clear days, and is surrounded by a botanic garden.

- Scientific sessions - Newman Lecture Theatres (adjacent to the centre)
- Exhibits - Hall 1 and Hall 2
- Coffee/tea breaks and lunches - Social space
- Registration on 18th December will be available near to the entrance

Address: University of Exeter, Streatham Campus, Peter Chalk Centre, Exeter EX4 4QQ (17, 5F on the campus map)



Reed Hall

A stunning grade II listed building, Reed Hall is Event Exeter's all-year round venue – a hidden treasure nestled amidst enchanting landscaped gardens.

- 17th December 2023 Welcome Reception (5 – 7 PM) – registration on the site available
- 18th December 2023 Conference Banquet (8 – 10 PM) - a selection of 3 courses from the festive menu

Address: University of Exeter, Streatham Campus, Reed Hall, Streatham Dr, Exeter EX4 4QR (14, 6E on the campus map)

REGISTRATION INFORMATION

Online registration open to 19th December 2023
17 December 2023, 5.00 – 7.00 PM, Reed Hall, Welcome Reception
18-19 December 2023, 8.30 AM – 4.00 PM, Peter Chalk Centre (near the entrance)

BADGE REQUIRED FOR ADMISSION

All conference attendees must wear the official ASME IOWTC 2023 badge at all times in order to gain admission to technical sessions, exhibits, and other conference events. Without a badge, you will not be permitted to attend any conference activities.

ASME COMPLIMENTARY MEMBERSHIP

Any attendee that pays a non-member conference registration fee will receive a four-month ASME membership free of charge. ASME will activate this complimentary membership for qualified attendees approximately four weeks after the conclusion of the conference.

SESSION ROOM EQUIPMENT

Each session room is equipped with a screen, LCD projector and laptop. Speakers should have a copy of their presentation loaded onto a memory stick. It is recommended that authors/speakers bring all visual aids with them.

CONFERENCE PAPERS ELECTRONIC ACCESS

All Full Conference Registrants will receive online access to papers and presentations made at the 2023 IOWTC. Access will be granted using your registration email address. Papers that were not presented on site in Exeter will not be published in the conference proceedings and cannot be cited or indexed. You will be provided with an individual link to the online papers via email. In the event you do not receive the email, send a request to: conferencepubs@asme.org.

EXHIBIT HOURS

Visit our exhibitors during the conference open hours in the Halls in Peter Chalk Centre on Monday (18th) and Tuesday (19th) between 10.00 AM and 4.00 PM.

CONFERENCE LUNCHES

Conference lunches will be held from **12:30 PM to 1:30 PM** on Monday and **12:00 PM to 1:00 PM** Tuesday in the **Peter Chalk Centre's Hall 2**. Please join your fellow attendees for a good meal and a great networking opportunity.

COFFEE/TEA BREAKS

Coffee/Tea Breaks will be served in the **Peter Chalk Centre's Hall 2** on Monday at **8.30 AM**, **10.30 AM** and **3 PM**, and on Tuesday at **8.30 AM, 10 AM and 3.20 PM**

IOWTC 2023 WECOME RECEPTION

The welcome reception will be hosted on **Sunday, 17th December 2023** between **5.00 and 7.00 PM** in **Reed Hall** at the Streatham Campus.

IOWTC 2023 CONFERENCE BANQUET

The Conference Banquet will be hosted on **Monday, the 18th** between **8.00 and 10.00 PM** in **Reed Hall**. A selection of three festive courses will be served in the ball room of this grade II listed building.

EMERGENCY INFORMATION

If you are experiencing a health emergency, please dial 999. Campus Security Team is available 24 hours a day, 365 days a year. Emergency: +44 (0)1392 722 222, Routine: +44 (0)1392 723 999. You can also contact the team at e.patrol@exeter.ac.uk or report something by clicking **here**.

WI-FI INFORMATION

Connecting to the UoE_Guest Wi-Fi Network. Select UoE_Guest from the list of available networks and connect. Once you have connected to UoE_Guest, depending on your device, you may be automatically redirected to the login page. Follow all instructions provided for successful registration. Please note you will be given a 10 minutes grace period to complete the process. For more information on Wi-Fi connection, please click **here**.

EXETER TRANSPORT

The recommended hotels (page 9) are in close proximity (15-25 min walk) to the Conference venue.

Ample bus or taxi services are available:

1. Bus – UNI line please check **here** and **here**
2. Taxi – **Apple Taxi** are a University approved taxi supplier in Exeter +44 (0)1392 666 666

OC7 PROJECT LAUNCH MEETING

The **National Renewable Energy Laboratory (NREL)** will host the launch meeting for a new IEA Wind Task, called the OC7 project (Offshore Code Comparison Collaboration), on **December 20, 2023**, at the **Peter Chalk Centre** from **2.00 PM to 6.00 PM**. The task aims to advance offshore wind modelling capabilities to align with evolving offshore wind system designs, optimizing cost-efficiency and risk reduction. Project members, prospective participants, and industry stakeholders are invited to attend and provide feedback on the project's objectives.

Exeter

The city of Exeter is located on the River Exe in **Devon**, South West England. Exeter is a city rich in historical and cultural sites including 19th Century University, ruins of the Rougemont Castle built in 11th Century, old Roman City walls, and the cathedral with its popular annual **Christmas Market**. It is surrounded by natural beauty close to the sea, and granitic tors and ancient woodlands of the Dartmoor National Park.

Accommodation options:

Hotel	Rating	From the venue	Discount?	Discount code
Queens Court Hotel	Fabulous	0.8 km		
The Telstar	Very Good	0.8 km	10%	IOWTC2023
Mercure Exeter	Good	1 km		
The Farmers Union	Good	0.8 km		
City Gate	Very Good	1.1 km		
The Turks Head	Fabulous	1.3 km		
Hotel Indigo	Fabulous	1.3 km		
Mill on the Ex	Fabulous	1.4 km		
Southernhay House Hotel	Fabulous	1.4 km		
Leonardo Hotel	Very Good	1.3 km	15%	IOWTC2023
Holiday Inn Express	Very Good	1.6 km	35%	Voucher

Transport:

1. Flights:

London - Heathrow, Gatwick
Bristol - mainly European airports
Exeter - very limited number of flights
London (Stansted, Luton) - limited to European airports, budget airlines, a significant distance to the conference venue with less land transport options

2. Trains:

Eurostar (Eurotunnel from Paris, Brussels) https://www.eurostar.com/uk-en
Great Western Railways GWR - https://www.gwr.com/ - **reduced fares for registrants** – up to 80%. This option is great when travelling from London Gatwick or London Heathrow. The train journey takes only 2 hours. There are two train stations in Exeter, and the Exeter St Davids is the closest to the conference venue and all recommended accommodation options.

3. Buses:

National Express https://www.nationalexpress.com/en
Megabus https://uk.megabus.com/

SCHEDULE AT A GLANCE

	UTC +0 (GMT)		
17 Dec 2023	5.00 – 7.00 PM	Welcome Reception	Reed Hall
18 December 2023	8.30 – 9.00 AM	Coffee/tea time	Peter Chalk Centre, Hall 2
	9.00 – 9.30 AM	Opening Ceremony	Peter Chalk Centre, Blue Newman Lecture Theatre
	9.30 – 10.00 AM	Keynote – Dr Michael Blair	Peter Chalk Centre, Blue Newman Lecture Theatre
	10.00 – 10.30 AM	Keynote – Sam Strivens	Peter Chalk Centre, Blue Newman Lecture Theatre
	10.30 – 11.00 AM	Coffee/tea break	Peter Chalk Centre, Hall 2
	10.00 AM – 4.00 PM	Exhibits	Peter Chalk Centre, Hall 1
	11.00 AM – 12.30 PM	Offshore Project Summaries	Peter Chalk Centre, Blue Newman Lecture Theatre
	11.00 AM – 12.30 PM	Anchors	Peter Chalk Centre, Purple Newman Lecture Theatre
	11.00 AM – 12.30 PM	Metocean Modelling	Peter Chalk Centre, Red Newman Lecture Theatre
	12.30 – 1.30 PM	Lunch	Peter Chalk Centre, Hall 2
	1.30 – 3.00 PM	Transport and Installation	Peter Chalk Centre, Blue Newman Lecture Theatre
	1.30 – 3.00 PM	Numerical Modelling	Peter Chalk Centre, Purple Newman Lecture Theatre
	1.30 – 3.00 PM	Control	Peter Chalk Centre, Red Newman Lecture Theatre
	3.00 – 3.30 PM	Coffee/tea break	Peter Chalk Centre, Hall 2
	3.30 – 5.00 PM	Moorings and Cables	Peter Chalk Centre, Blue Newman Lecture Theatre
	3.30 – 5.00 PM	Offshore Wind Design	Peter Chalk Centre, Purple Newman Lecture Theatre
	3.30 – 5.00 PM	O&M	Peter Chalk Centre, Red Newman Lecture Theatre
	8.00 – 10.00 PM	Conference Banquet	Reed Hall

	UTC +0 (GMT)		
	8.30 – 9.00 AM	Coffee/tea break	Peter Chalk Centre, Hall 2
	9.00 – 9.30 AM	Keynote – Prof. Martin Siegert	Peter Chalk Centre, Blue Newman Lecture Theatre
	9.30 – 10.00 AM	Keynote – Prof. Richard Zhu	Peter Chalk Centre, Blue Newman Lecture Theatre
	10.00 – 10.30 AM	Coffee/tea break	Peter Chalk Centre, Hall 2
	10.00 AM – 4.00 PM	Exhibits	Peter Chalk Centre, Hall 1
	10.30 AM – 12.00 PM	Hydrodynamics	Peter Chalk Centre, Blue Newman Lecture Theatre
	10.30 AM – 12.00 PM	Farm-Level Analysis	Peter Chalk Centre, Purple Newman Lecture Theatre
	10.30 – 12.00 PM	Design and Digital Twins	Peter Chalk Centre, Red Newman Lecture Theatre
	12.00 – 1.00 PM	Lunch	Peter Chalk Centre, Hall 2
	1.00 – 2.30 PM	Measurements and Monitoring	Peter Chalk Centre, Blue Newman Lecture Theatre
	1.00 – 2.30 PM	Floating Dynamics	Peter Chalk Centre, Purple Newman Lecture Theatre
	1.00 – 2.30 PM	Moorings and Cables 2	Peter Chalk Centre, Red Newman Lecture Theatre
	2.30 – 3.00 PM	Coffee/tea break	Peter Chalk Centre, Hall 2
	3.00 – 4.00 PM	Closing Ceremony/Awards	Peter Chalk Centre, Blue Newman Lecture Theatre
20 Dec 2023	9.00 AM – 2.00 PM	Technical Visit - COAST	COAST, Plymouth
	9.00 AM – 5.00 PM	Technical Visit - DMaC	DMaC, Penryn/Falmouth
	12.30 – 3.30 PM	Technical Visit - MetOffice	MetOffice, Exeter
	2.00 – 6.00 PM	OC7 Launch Meeting	Peter Chalk Centre, Hall 1

WELCOME REMARKS

Monday, 18th December 2023

9.00 – 9.30 AM

Blue Newman Lecture Theatre, Peter Chalk Centre

IOWTC 2023 CONFERENCE CHAIR

Prof. Philipp Thies
Deputy Head of Engineering
Local Organizing Chair

IOWTC 2023 TECHNICAL PROGRAM CO-CHAIR

Dr Amy Robertson
National Wind Technology Center
National Renewable Energy Laboratory
Organizing Co-Chair

Prof. Andrew Myers
Department of Civil & Environmental Engineering
Northeastern University
Co-Founder, T-Omega Wind, Inc
Organizing Co-Chair

KEYNOTE SPEAKERS

Dr Michael Blair

Senior Technical Manager, Marine, The Crown Estate

Engineering challenges associated with the spatial optimisation of future UK offshore wind.

Biography: Dr Michael Blair leads the Marine Engineering team at The Crown Estate. He is responsible for the technical data, evidence, tools and processes which inform spatial optimisation of the seabed (including wind farm site selection) around England, Wales and Northern Ireland. This role involves widespread engagement and collaboration with developers, academics and industry researchers.
Michael is a Chartered Engineer (MIET) with a background in wind farm development, formerly specialising in wind resource assessment and layout design.

Professor Martin Siegert FRSE

Vice President and Deputy Vice-Chancellor Cornwall

Global climate heating - lessons from COP28.

Biography: Professor Martin Siegert is responsible for the strategic development of the operations in Cornwall. He oversees a diverse academic community including mining and renewable energy, climate, ecology and sustainability, and human health and culture. Activity in Cornwall is focused upon supporting the region's impact and aspirations – from exploring the potential of space, to finding solutions to climate change and biodiversity loss.
Cornwall campuses include the renowned Environment and Sustainability Institute (ESI) on our Penryn campus and our Truro campus, at the Royal Cornwall Hospitals NHS Trust, the location of our European Centre for Environment and Human Health. Together, these two institutes bring in more than £16m of research income into Cornwall every year, which has been evaluated to create three additional jobs for every academic member of staff.
Professor Siegert is a Polar scientist who uses airborne and ground-based geophysics to explore the subglacial environment of Antarctica, and to understand how the ice sheet has changed in the past and how it may change in future. He has published over 250 scientific papers and recently edited the second edition of Antarctic Climate Evolution, which details the history of the continent over the past 60 million years.
Professor Siegert joined Cornwall Operations in November 2022 from Imperial College London, where he was Co-Director of the Grantham Institute for Climate Change. Prior to that he was Head of the School of Geosciences and Assistant Principal for Climate Change and Energy at the University of Edinburgh.

Sam Strivens

Head of Floating Offshore Wind and Maritime Decarbonisation, Carbon Trust

Offshore wind political, sector and climate priorities, a summary of the past 12 months.

Biography: Sam directs Floating Offshore Wind and Maritime Decarbonisation activities within Carbon Trust's Policy and Innovation department. This includes overseeing a portfolio of activities including the Floating Wind JIP programme and representing Carbon Trust on a number of international and R&D advisory boards.

Sam comes from a maritime operations background with experience as Master of crew transfer vessels and vessel management for offshore windfarms around the UK. Sam has an MSc in Marine Renewable Energy from the University of Plymouth where his research focus was on the installation phase of floating offshore wind turbine platforms. Sam also holds a BSc. (Hons) in Exploration and Resource Geology from the University of Cardiff, Wales and MCA Master 200 certification.

Professor Richard Zhu

Director of Guangdong State Laboratory for Offshore Wind Power, Dean at the South China Institute of Industrial Technology at Zhejiang University

Technological and Engineering Innovations in China's Offshore Wind Industry Evolution.

Biography: Richard Zhu (朱嵘华), Professor at Zhejiang University, presently holds several positions including the Director of Guangdong State Laboratory for Offshore Wind Power, Dean at the South China Institute of Industrial Technology at Zhejiang University.

Before embracing academia, he held executive positions in the industry, notably as Vice President and Chief Scientist of Ming Yang Smart Energy, a publicly listed wind power company.

Professor Zhu's innovative contributions to the field are reflected in his approximately 200 international technical patents. His extensive research interests are offshore wind power engineering technology, offshore structural design, and the development of advanced offshore equipment and related fields.

TECHNICAL SESSIONS

Offshore Project Summaries

Monday, 18th, 11.00 AM – 12.30 PM
Blue Newman Lecture Theatre, Peter Chalk Centre
Chair: **Amy Robertson** – The National Renewable Energy Laboratory

Offshore Wind Funding Opportunity Overview - NOWRDC & Innovate UK Joint Solicitation
Technical Presentation: IOWTC2023 - 120750
Kori Groenveld – National Offshore Wind R&D Consortium

Nextfloat: An Efficient Structure for Large Floating Offshore Wind Turbine
Technical Presentation: IOWTC2023- 119494
Marc Cahay – Technip Energies
Lucy Milde – X1-Wind

The Demosath Project. the Demonstrator for the Sath Technology
Technical Presentation: IOWTC2023- 119472
Juan Peña Lasso – Saitec Offshore Technologies
Marc Batlle Martín – Saitec Offshore Technologies
Raul Campos Puente – Saitec Offshore Technologies

Openfast Modeling of the T-Omega Wind Floating Offshore Wind Turbine System
Technical Paper Publication: IOWTC2023- 119410
Jason Jonkman – The National Renewable Energy Laboratory
Lu Wang – The National Renewable Energy Laboratory
Jason Jonkman – The National Renewable Energy Laboratory
Jim Papadopoulos – T-Omega Wind Inc
Brent Morrison – T-Omega Wind Inc
Andrew Myers – T-Omega Wind Inc

Anchors

Monday, 18th, 11.00 AM – 12.30 PM
Purple Newman Lecture Theatre, Peter Chalk Centre
Chair: **Matthew Hall** – National Renewable Energy Laboratory

Javelin Anchor Adapted for Floating Offshore Wind
Technical Paper Publication: IOWTC2023- 119172
Stephane Kovacs – University of Exeter
Philipp Thies - University of Exeter
Lars Johanning - University of Plymouth
Alun Jones - Reflex Marine Ltd.
Mark Spring - Reflex Marine Ltd.
Philip Strong - Reflex Marine Ltd.

Comparison of Simulation Approaches for Shared Anchor Analyses
Technical Paper Publication: IOWTC2023- 119376
Katherine Coughlan – University of Massachusetts Amherst Ericka Lozon – National Renewable Energy Laboratory
Matthew Hall – National Renewable Energy Laboratory
Sanjay Arwade – University of Massachusetts Amherst
Michael Davis – University of Massachusetts Amherst
Bruce Martin – Principle Power, Inc.

Parametric Study on Taut Multiline Anchors for Floating Offshore Wind Turbines
Technical Paper Publication: IOWTC2023- 119521
Krishnaveni Balakrishnan – University of Massachusetts Amherst
Sanjay Arwade – University of Massachusetts Amherst
Don Degroot – University of Massachusetts Amherst

Metocean Modelling

Monday, 18th, 11.00 AM – 12.30 PM
Red Newman Lecture Theatre, Peter Chalk Centre
Chair: **Sanjay Arwade** – University of Massachussets Amherst

Hurricanes and Offshore Wind Turbines: Environmental Conditions and Archetype Designs
Technical Presentation: IOWTC2023- 119522
Sanjay Arwade – University of Massachussets Amherst

Storm Characteristics for Monopile Wind Turbine Foundation Design
Technical Paper Publication: IOWTC2023- 119312
Erin Bachynski-Polić – Norwegian University of Science and Technology

Characterizing the Wind Resource at Deeper, More Exposed Offshore Wind Sites
Technical Presentation: IOWTC2023- 120697
Wribhu Ghosh – Celtic Sea Power Limited

A Comparison of the Influence of Using Empirical or Mathematically Pre-Defined Wave Energy Spectra for Tower Base Bending Fatigue Calculations
Technical Paper Publication: IOWTC2023- 119314
Prokopios Vlachogiannis – IDCORE
Christophe Peyrard – EDF R&D
Ajit Pillai – University of Exeter
David Ingram – University of Edinburgh
Maurizio Collu – University of Strathclyde

Transport and Installation

Monday, 18th, 1.30 - 3.00 PM
Blue Newman Lecture Theatre, Peter Chalk Centre
Chair: **Philipp Thies** – University of Exeter

Offshore Wind Feeder Vessel Voyage Simulations
Technical Paper Publication: IOWTC2023- 119444
Adriana Torres Rodriguez – MARIN USA Inc
Jorrit-Jan Serraris– MARIN
Arjan Voogt– MARIN USA Inc

Application of Uncrewed Surface Vessels Throughout the Life Span of Fixed and Floating Offshore Wind Farms
Technical Paper Publication: IOWTC2023- 119456
Paul Newman – University of Exeter
Ian Ashton – University of Exeter
Philipp R. Thies – University of Exeter
Lars Johanning – University of Plymouth
Nassif Berrabah – EDF Energy
Ajit Pillai – University of Exeter

Enhancing Safety and Efficiency in Offshore Wind Transportation and Installation With C-Dart Technology
Technical Presentation: IOWTC2023- 119581
Marcus Gay – Blackfish Engineering
Tim Warren – Blackfish Engineering (Presenting author)
Liam Warren – SKUA Marine

Fabrication, Transport and Installation of Floating Wind Turbines
Technical Presentation: IOWTC2023- 120747
Alan Crowle – University of Exeter
Philipp R. Thies – University of Exeter

Numerical Modelling

Monday, 18th, 1.30 - 3.00 PM
Purple Newman Lecture Theatre, Peter Chalk Centre
Chair: **Erin Bachynski-Polić** – Norwegian University of Science and Technology

Spatial Grid Resolution Effects on Dynamics of Offshore Wind Turbines
Technical Paper Publication: IOWTC2023- 119170
Hasan Imani – Sharif University of Technology
Madjid Karimirad – Queen's University Belfast (Presenting author)

Coupling Bladed With External Finite-Element Mooring Libraries
Technical Paper Publication: IOWTC2023- 119346
Armando Alexandre – DNV
Francesc Fabregas Flavia – DNV
Jingyi Yu – DNV
Steven Parkinson – DNV
Ali Bakhshanderhrostar – DNV (Presenter)

Sequentially Coupled Analysis for a Semi-Submersible Floating Offshore Wind Turbine
Technical Paper Publication: IOWTC2023- 119502
Karim Raed Hussein – Offshore Renewable Energy Catapult
Dylan Duncan – Offshore Renewable Energy Catapult

Coupled Numerical Simulation of Floating Offshore Wind Turbine Platforms: Investigating the Effects of Wave and Wind Loading Using a High-Fidelity Sph-Based Model
Technical Paper Publication: IOWTC2023- 119634
Bonaventura Tagliafierro – Universitat Politecnica de Catalunya
Madjid Karimirad – Queen's University Belfast
Malin Göteman – Uppsala University
Iván Matínez-Estévez – Universidade de Vigo
Salvatore Capasso – University of Salerno
José Domínguez – Universidade de Vigo
Alejandro Crespo – Universidade de Vigo
Giacomo Viccione – University of Salerno
Altomare Corrado – Universitat Politecnica de Catalunya
Dan Negrut – University of Wisconsin

Control

Monday, 18th, 1.30 - 3.00 PM
Red Newman Lecture Theatre, Peter Chalk Centre
Chair: **Jason Jonkman** - The National Renewable Energy Laboratory

Wind Turbine Gust Control Using Lidar-Assisted Model Predictive Control
Technical Paper Publication: IOWTC2023- 119579
Yiza Srikanth Reddy – Kyungpook National University
Sung-Ho Hur– Kyungpook National University

Impact of Viscous Damping Linearization on Fowt Control Design
Technical Paper Publication: IOWTC2023- 119507
Francesc Fabregas Flavia – DNV
Ian Browne – DNV
Armando Alexandre – DNV
Aristeidis Chatzopoulos – DNV

Aero-Hydrodynamic Studies of a 15 Mw Semi-Submersible Fowt to Assess the Suitability of the Inclusion of a Damper System
Technical Paper Publication: IOWTC2023- 119381
Yu Gao – University of Exeter
Lars Johanning – University of Plymouth
Ajit C Pillai – University of Exeter
Chenyu Zhao – University of Exeter

Moorings and Cables

Monday, 18th, 3.30 – 5.00 PM
Blue Newman Lecture Theatre, Peter Chalk Centre
Chair: **Marc Cahay** – Technip Energies

Floating Offshore Wind Turbine Mooring System Design: Cost, Risk and Failure Implications
Technical Paper Publication: IOWTC2023- 119331
Sam Weller – TTI Marine Renewables Ltd
Jack Paterson – ORE Catapult
Tom Mackay – TTI Marine Renewables Ltd
Ben Yeats – TTI Marine Renewables Ltd

Comparison of a Scaled Physical Model and Numerical Model of Dynamic Power Cable for a Floating Wind Turbine
Technical Presentation: IOWTC2023-119516
Anna Holcombe – University of Plymouth
Emma Edwards – University of Plymouth
Tom Tosdevin – University of Plymouth
Scott Brown – University of Plymouth
Robert Rawlinson-Smith - University of Plymouth
Shanshan Cheng - University of Plymouth
Rachel Nicolls-Lee – Flotation Energy
Martyn Hann – University of Plymouth

Streamlined Loads Analysis of Floating Wind Turbines With Fiber Rope Mooring Lines
Technical Paper Publication: IOWTC2023- 119524
Matthew Hall – National Renewable Energy Laboratory
Brian Duong – National Renewable Energy Laboratory
Ericka Lozon – National Renewable Energy Laboratory

Mechanical Testing for Dynamic Submarine Power Cables – Review and Case Study
Technical Presentation: IOWTC2023-119116
Philipp Thies – University of Exeter
Georgios Georgallis - FULGOR SA, Hellenic Cables

Offshore Wind Design

Monday, 18th, 3.30 – 5.00 PM
Purple Newman Lecture Theatre, Peter Chalk Centre
Chair: **Andrew Myers** – Northeastern University

Initial Global Design for Three-Column Semi-Submersible Hulls of a 15-Mw Floating Wind Turbine
Technical Paper Publication: IOWTC2023- 119504
Shuaishuai Wang – Norwegian University of Science and Technology
Torgeir Moan – Norwegian University of Science and Technology

Framework for Multi-Level Optimisation of Offshore Wind Jacket Foundations
Technical Paper Publication: IOWTC2023- 119296
Martin Bjerre Nielsen – Wood Thilsted
Paulius Bučinskas – Wood Thilsted
Dylan Andrew Japhta – Wood Thilsted
Chris Galbraith – Wood Thilsted
Hovick Boughosyan – Wood Thilsted

Conceptual Design of a Tension Leg Platform With 22.3 Mw Vertical Axis Wind Turbine **Technical Paper Publication**: IOWTC2023- 119353
Edward Huang – FPS Engineering Technology
Brandon L. Ennis – Sandia National Laboratories, Wind Energy Computational Sciences
Kevin R. Moore – Sandia National Laboratories, Wind Energy Computational Sciences
Xiaohong Chen – ABS
Qing Yu – ABS
Arulmary R – Thellatral Inc.

Analytical Gradients of Diffraction Forces for Design Optimization of Floating Wind Turbines
Technical Presentation: IOWTC2023- 120502
Peter Rohrer – Norwegian University of Science and Technology

O&M

Monday, 18th, 3.30 – 5.00 PM
Red Newman Lecture Theatre, Peter Chalk Centre
Chair: **Ajit Pillai** – University of Exeter

Addressing the New Challenges for O&M of Floating Wind Turbine Systems
Technical Paper Publication: IOWTC2023- 119220
Mareike Leimeister – Fraunhofer Institute for Wind Energy Systems IWES
David Baumgärtner – Fraunhofer Institute for Wind Energy Systems IWES
Thilo Grotebrune – Ludwig-Franzius-Institute for Hydraulic, Estuarine and Coastal Engineering
Andt Hildebrandt – Ludwig-Franzius-Institute for Hydraulic, Estuarine and Coastal Engineering
Jonas Kaczenski – Fraunhofer Institute for Wind Energy Systems IWES

Comparison of O&M Cost of Different Scenarios for a 1gw Floating Offshore Wind Farm
Technical Paper Publication: IOWTC2023- 119433
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Nigel Ready - Frazer-Nash Consultancy
David Garcia Cava - The University of Edinburgh
Ali Mehmanparast - University of Strathclyde
Philipp Thies - University of Exeter

Numerical analysis of serviceability of the damaged offshore wind turbine jacket foundation subjected to ship collision
Technical Presentation: IOWTC2023
Richard Zhu – Zhejiang University

Informing Asset Life Extension: Probabilistic Fatigue Life Reassessment of Offshore Wind Turbine Structural Components Using a Bayesian Belief Network
Technical Paper Publication: IOWTC2023- 118963
Chenyu Zhao – University of Exeter
Lars Johanning – University of Plymouth

Hydrodynamics

Tuesday, 19th, 10.30 AM – 12.00 PM
Blue Newman Lecture Theatre, Peter Chalk Centre
Chair: **Erin Bachynski-Polić** – Norwegian University of Science and Technology

Overview of the OC7 Project
Technical Presentation: IOWTC2023- 119388
Amy Robertson – National Renewable Energy Laboratory

Methodologies for the Quick Estimation of Hydrodynamic Coefficients: A Comparative Study
Technical Presentation: IOWTC2023- 119491
Ander Aristondo – Tecnalia Research & Innovation
Maria Alonso – Tecnalia Research & Innovation
Ander Tena – Tecnalia Research & Innovation
Javier López – Tecnalia Research & Innovation
Eider Robles – Tecnalia Research & Innovation

Wave-Induced Vortex Formation in the Wake of Piles With Marine Biofouling
Technical Presentation: IOWTC2023-119133
Constantin Schweiger – TU Braunschweig
Clemens Krautwald – TU Braunschweig
David Schürenkamp – TU Braunschweig
Christian Windt – TU Braunschweig
Nils Goseberg – TU Braunschweig

Heave Plate Hydrodynamic Coefficients for Floating Offshore Wind Turbines – a Compilation of Formulations
Technical Paper Publication: IOWTC2023- 119414
Amy Robertson – National Renewable Energy Laboratory
Krish Sharman – University of Massachusetts Amherst
Matthew Turner – National Renewable Energy Laboratory
Lu Wang – National Renewable Energy Laboratory

Farm-Level Analysis

Tuesday, 19th, 10.30 AM – 12.00 PM
Purple Newman Lecture Theatre, Peter Chalk Centre
Chair: **Jason Jonkman** - The National Renewable Energy Laboratory

Efficient Modeling of Floating Wind Arrays Including Current Loads and Seabed Bathymetry
Technical Paper Publication: IOWTC2023- 119447
Matthew Hall – National Renewable Energy Laboratory
William West – National Renewable Energy Laboratory
Stein Housner – National Renewable Energy Laboratory
Ericka Lozon – National Renewable Energy Laboratory

Wake Effects on Multiline Anchors for Floating Offshore Wind Turbines
Technical Paper Publication: IOWTC2023- 119512
Krishnaveni Balakrishnan – University of Massachusetts Amherst
Sanjay Arwade – University of Massachusetts Amherst
Don Degroot – University of Massachusetts Amherst

Maximisation of Wind Farm Power Production Using the Teaching Learning Based Optimisation Algorithm
Technical Paper Publication: IOWTC2023- 119580
Raj Kiran Balakrishnan – Kyungpook National University
Sung-Ho Hur – Kyungpook National University

Design and Digital Twins

Tuesday, 19th, 10.30 AM – 12.00 PM
Red Newman Lecture Theatre, Peter Chalk Centre
Chair: **Andrew Myers** – Northeastern University

On the Use of Response Conditioned Focused Wave and Wind Events for the Prediction of Design Loads
Technical Paper Publication: IOWTC2023- 119497
Tom Tosdevin – University of Plymouth
Emma Edwards – University of Plymouth
Anna Holcombe – University of Plymouth
Scott Brown – University of Plymouth
Edward Ransley – University of Plymouth
Martyn Hann – University of Plymouth
Deborah Greaves – University of Plymouth

Hierarchical Bayesian Model Updating of a 6 Mw Offshore Wind Turbine for Parameter Estimation and Uncertainty Quantification
Technical Presentation: IOWTC2023- 119408
Bridget Moynihan – Tufts University
Eleonora Maria Tronci – Northeastern University
Babak Moaveni – Tufts University
Ross Mcadam – Ørsted
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Eric Hines – Tufts University

Development of a Methodology to Generate a Digital Twin of a Floating Offshore Wind Turbine Platform
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Julio García-Espinosa – Escuella Técnica Superior de Ingenieros Navales
Andrés Pastor-Sánchez – International Centre for Numerical Methods in Engineering
Daniel Di-Capua – Technical University of Catalonia

Comparative Dynamic Structural Analysis of Floating Wind in Deep Atlantic Conditions
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Criostoir Reville - Malachy Walsh & Partners
Aengus Connolly – Wood Plc

Measurements and Monitoring

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AI-Based Structural Defects Detection of Offshore Wind Turbines for Automatical Operation and Maintenance
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Xue Jiang – Zhejiang Ocean University
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Lin Cui – National Ocean Technology Centre
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Anna Haensch – Tufts University
Eric Hines – Tufts University

Pore-Pressure Measurement Underneath the Foundation of a Floating Offshore Wind Turbine at Large Scale
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Christian Windt – Technische Universität Braunschweig
Matthias Kudella - Coastal Research Center
Stefan Schimmels - Coastal Research Center
Nils Goseberg - Technische Universität Braunschweig, Braunschweig, Germany

Identification of the Fabrication Quality Class of Wind Turbine Tower Sections Using 3d Laser Scanning
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Anil Pervizaj – Vestas Wind Systems A/S
Søren Bøgelund Madsen – Vestas Wind Systems A/S
Andrew Myers – Northeastern University

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Technical Paper Publication: IOWTC2023- 119302
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Emma Edwards – University of Plymouth
Tom Tosdevin – University of Plymouth
Anna Holcombe – University of Plymouth
Scott Brown – University of Plymouth
Deborah Greaves – University of Plymouth
Martyn Hann – University of Plymouth (Presenting Author)

Numerical Investigation of a Spar Type Floating Offshore Wind Turbine Platform Under Extreme Waves
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Srineash V K – Indian Institute of Technology Bombay
Manasa Ranjan Behera – Indian Institute of Technology Bombay

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Technical Paper Publication: IOWTC2023- 119449
Edward Huang – FPS Engineering Technology
Zhaoxiang Tang – Genesis, Technip Energies
Rathinam Periyaiah – Genesis, Technip Energies

Stochastic High-Resolution Spatiotemporal Simulation of Offshore Wind Speed With Multiple-Point Geostatistics Using Observational, Modeling, Geospatial, and Remote Sensing Data
Technical Presentation: IOWTC2023- 119661
Eleonora Maria Tronci – Northeastern University
Adel Asadi – Tufts University
Babak Moaveni – Tufts University

Moorings and Cables 2

Tuesday, 19th, 1.00 - 2.30 PM
Red Newman Lecture Theatre, Peter Chalk Centre
Chair: **Matthew Hall** – The National Renewable Energy Laboratory

Mooring Lines Safety Format Requirements for Floating Offshore Wind Turbines – a Reliability-Based Design Approach
Technical Paper Publication: IOWTC2023- 119493
Hadi Amlashi – University of South-Eastern Norway
Zhiyu Jiang – University of Agder
Madjid Karimirad – Queen's University of Belfast

Mooring Force Estimation for Floating Offshore Wind Turbines With Augmented Kalman Filter: A Step Towards Digital Twin
Technical Paper Publication: IOWTC2023- 119374
Kobe Hoi-Yin Yung – University of Strathclyde
Qing Xiao – University of Strathclyde
Atilla Incecik – University of Strathclyde
Peter Thompson – Arup Hong Kong

Turbulent Wind Simulation Duration's Impact on Mooring Fatigue Damage for Floating Offshore Wind Turbines **Technical Paper Publication**: IOWTC2023- 119345
Alistair Lee – Principle Power Inc
Bradley Ling – Principle Power Inc
Bruce Martin – Principle Power Inc

Comparison of Fatigue Characteristics of Polyester and Nylon Mooring Lines for Shallow Water Floating Offshore Wind Turbines
Technical Paper Publication: IOWTC2023- 119409
Samer Saleh – University of Massachusetts Amherst
Richard Akers – Maine Marine Composites LLC
Bonjun Koo – Technip Energies
Ahmed Alshuwaykh – University of Massachusetts Amherst
Tomas Lopez – University of Massachusetts Amherst
Henry Yau – University of Massachusetts Amherst
Krish Thiagarajan – University of Massachusetts Amherst

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EXHIBITORS

The exhibitions will be located in Peter Chalk Centre, Hall 1 on Monday and Tuesday 10 AM – 4 PM

The **Dynamic Marine Component (DMaC)** test facility is a purpose built test rig that aims to replicate the forces and motions experienced by marine components in offshore applications. The test facility is based within the Renewable Energy Research Group of the University of Exeter at Penryn Campus, Cornwall.

https://renewable.exeter.ac.uk/facilities/dmac/

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SESSION ORGANISERS

Monday, 18th December

Offshore Project Summaries
Session Chair: **Amy Robertson**
11.00 AM – 12.30 PM
Blue Newman Lecture Theatre, Peter Chalk Centre

Anchors
Session Chair: **Matthew Hall**
11.00 AM – 12.30 PM
Purple Newman Lecture Theatre, Peter Chalk Centre

Metocean Modelling
Session Chair: **Sanjay Arwade**
11.00 AM – 12.30 PM
Red Newman Lecture Theatre, Peter Chalk Centre

Transport and Installation
Session Chair: **Philipp Thies**
1.30 - 3.00 PM
Blue Newman Lecture Theatre, Peter Chalk Centre

Numerical Modelling
Session Chair: **Erin Bachynski-Polić**
1.30 - 3.00 PM
Purple Newman Lecture Theatre, Peter Chalk Centre

Control
Session Chair: **Jason Jonkman**
1.30 - 3.00 PM
Red Newman Lecture Theatre, Peter Chalk Centre

Moorings and Cables
Session Chair: **Marc Cahay**
3.30 – 5.00 PM
Blue Newman Lecture Theatre, Peter Chalk Centre

Offshore Wind Design
Session Chair: **Andrew Myers**
3.30 – 5.00 PM
Purple Newman Lecture Theatre, Peter Chalk Centre

O&M
Session Chair: **Ajit Pillai**
3.30 – 5.00 PM
Red Newman Lecture Theatre, Peter Chalk Centre

Tuesday, 19th December

Hydrodynamics
Session Chair: **Erin Bachynski-Polić**
10.30 AM – 12.00 PM
Blue Newman Lecture Theatre, Peter Chalk Centre

Farm-Level Analysis
Session Chair: **Jason Jonkman**
10.30 AM – 12.00 PM
Purple Newman Lecture Theatre, Peter Chalk Centre

Design and Digital Twins
Session Chair: **Andrew Myers**
10.30 AM – 12.00 PM
Red Newman Lecture Theatre, Peter Chalk Centre

Measurements and Monitoring
Session Chair: **Sanjay Arwade**
1.00 - 2.30 PM
Blue Newman Lecture Theatre, Peter Chalk Centre

Floating Dynamics
Session Chair: **Amy Robertson**
1.00 – 2.30 PM
Purple Newman Lecture Theatre, Peter Chalk Centre

Moorings and Cables 2
Session Chair: **Matthew Hall**
1.00 - 2.30 PM
Red Newman Lecture Theatre, Peter Chalk Centre

TECHNICAL VISITS

All technical visits are organised on Wednesday, 20th December 2023.
To book a technical visit, please contact a.zawalna-geer@exeter.ac.uk, (+44) 1326 259 377

We keep the right to cancel individual technical visit if the number of registrants is insufficient to run it. If it is the case, the registrant will be refunded the money for the visit or will be offered alternative site from the list below (subject to availability).

1. COAST

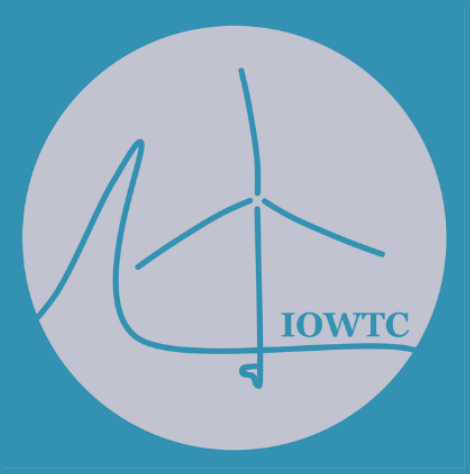
Location – University of Plymouth, Plymouth (*1h bus journey from the Streatham Campus, Exeter*)
Summary - A tour of the COAST lab (a demonstration of the new UKFOWTT wind generator and physical modelling of a floating offshore wind concept), followed by a tour of the Babbage Engineering Building (a demonstration of the new wind tunnel, autonomous vehicles test laboratory, composite engineering laboratory etc). Lunch included.
Time – *10:00-13:00, 20th December 2023 (09:00 departure from the Streatham Campus, Exeter, 14:00 return to the campus)*
Cost – *£35*

2. Met Office

Location – Met Office, Exeter (*tour start/end at Met Office reception)*
Summary - The Met Office is the UK's national meteorological service, and a global centre of excellence in weather and climate science. Since its foundation in 1854, the Met Office has pioneered the science of meteorology and its application. To this day, they continue to push the boundaries of both science and technology to meet the demands of today and the future, providing critical data, information and insights to help the public, policymakers and businesses make better decisions to stay safe and thrive. Headquartered in Exeter, this visit will provide participants with a tour of on-site facilities, such as the National Meteorological Library, Observations Research & Development Enclosure (weather permitting), Supercomputer Halls and Operations Centre, combined with a presentation on our ocean models and some of their most pioneering applications.
Required: Details of the names, affiliations and nationalities (including details of any dual nationalities, if held). On the day – passports required (photo ID for UK residents).
Time – *13:00-15:30, 20th December 2023 (minibus/taxi will leave the Streatham Campus at 12:30)*
Cost – *£5*

3. DMaC

Location - A&P, Falmouth (*2h bus journey from the Streatham Campus*)
Summary – The trip will involve a visit to the Penryn Campus for a presentation by Professor Philipp Thies. He will be introducing the DMaC test facility and the different types of testing the rig is capable of, including Reliability testing, Comparative testing, Prototype/Functional testing, Validation/Performance testing and relevant case studies on component testing. After lunch at the beautiful Penryn Campus, The trip will take you to the historic Falmouth Docks, gateway to the third deepest Natural Harbour in the world, where the DMaC test rig is located. At the facility, Ed Hartgill the DMaC Project Engineer will explain and show all aspects of the DMaC machine, participants will be able to see how and what size samples the machine can test, the range of movement, the flexibility of the control and datalogging systems, with two demonstrations, including the test to failure of a sample mooring line.
Time – *11:00-15:00, 20th December 2023 (09:00 departure from the Streatham Campus, Exeter)*
Cost – *£50*



Thank you for attending!

Visit our website for information on IOWTC in coming years!

https://event.asme.org/IOWTC

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