



22 04 2024 FOWTEC

Floating Offshore Wind Technical Symposium
Venue: Terminal de cruceros de Getxo 3



Agenda

10.00 – 10.10 Opening Speeches – Saitec and Tecnalía

10.10 – 10.40 Keynote Speech

• **Jason Jonkman, NREL**

Engineering Modeling to Advance Floating Wind Technology

- The development of innovative and optimized floating offshore wind turbine technology is not be possible without accurate, validated, physics-based engineering design competence and tools. This presentation will summarize the work at the National Renewable Energy Laboratory (NREL) to develop, verify, validate, and apply physics-based engineering tools—OpenFAST for individual turbines and FAST.Farm for full wind farms—that enable the wind energy community to design advanced wind technology that will lower wind cost of energy.

10.40 – 11.40 Session 1 – *Innovations in FCA and Implementation of Control Strategies in Floating Offshore Wind:*

• **Javier López-Queija/Research Scientist in the Offshore Renewable Energy department/Tecnalia**

Simulation framework for control and system design optimisation

- *Control and system design simulation framework*
- *Control- and system design optimisation-oriented models*
- *Control co-design methodology*

• **Josu Jugo/Assistant Professor in the Electricity and Electronics department/UPV**

Testing control algorithms oriented to Control Co Design for FOWT

- *State of the test of different control algorithms, as PID or NMPC*
- *Use of optimisation techniques for CCD of FOWT*
- *Description of Future research direction, testing new control schemes, adapting new sensor information as LIDAR*

• **Adrien Hirvoas/Research Engineer/France Energies Marines**

Analysis of the Zephyros Floating Wind Turbine Based on a Fully Coupled Model and In-Situ Data

- *Aero-servo-hydro-elastic model development based on limited data*
- *Calibration and validation of the model*
- *Comparison between simulation results and in-situ data*
- *Development of machine learning approaches*

11.40 – 12.00 *Coffee Break*

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12.00 – 13.00 Session 2 – *Advanced methods for Wave Tank Testing proof of concepts*

- **Miren Sanchez Lara/Senior Researcher in Marine Renewable Energy/Tecnalia**

Challenges around the experimental tank testing of FOWTs

- *Why tank testing is necessary.*
- *Main challenges:*
 - *Challenge 1: Scaling Issues-Conflict of laws*
 - *Challenge 2: Modelling Issues-Coupled aero-hydrodynamic loads, Mooring system, etc.*
 - *Challenge 3: Experimental Facilities and Calibration Methods.*
- *Conclusions*

- **Raúl Guanche/Civil engineer/ IH Cantabria**

On the importance of coupled testing of floating offshore wind platforms: the wind turbine and mooring system challenge

- *Coupled testing: Wind turbine control and floating platform interaction analysis through SIL (Software in the loop)*
- *Mooring system and power export cable modelling at laboratory scale*

- **Julio Oria Escuredo/R+D+i Technician/CEHIPAR**

Some physical modeling tools for FOWT testing

- *Hexapod capabilities and opportunities*
- *Simulation of towing to installation site operations*
- *Forced oscillation / forced excitation tests for hydrodynamic characterization.*
- *Drag tests for current coefficients.*

- **Mareike Leimeister/Research Associate at Fraunhofer Institute for Wind Energy Systems IWES/Fraunhofer IWES**

Relevance of considering structural flexibility in model tests of FOWT systems

- *With growing size of wind turbines, the inclusion of flexibility effects becomes more and more important.*
- *It would be challenging to consider aero-elasticity in model tests of FOWT systems.*
- *Simulation-based sensitivity study for assessing if and to which degree structural flexibility needs to be considered.*

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13.00 – 13.30 Case Study

• **Eylon Ortíz De Murua**

DemoSATH, from numerical models to operational offshore prototype

- *Internal methodology for numerical model construction*
- *From numerical model to real prototype*
- *Monitoring of DemoSATH*

13.30 – 13.45 Industry talk

• **José I. Hormaeche**

Basque Supply Chain capabilities and key projects within Floating Wind

- *Strengths of the floating wind value chain in the Basque Country.*
- *Floating Wind Basque Country" technological development strategy.*
- *Main pilot and demonstration projects underway.*

13.45 – 14.00 Closing Speech –Saitec

14.00 – 15.00 *Networking Lunch*

15.00 – 18.00 Offshore visit to BIMEP (incl. transits)

- DemoSATH project
- HarshLab project

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BIMEP visit

VENUE: Terminal de cruceros de Getxo 3

TIME: 15:00 PM - 18:00 PM

DemoSATH project

details:

- 1st grid-connected FOWT in Spain
- Turbine: 2 MW wind turbine
- Base of the structure: 30 m. x 64 m.
- Installation: 2 miles off the coast in BIMEP
- Sea deep: 85 m.
- Mooring: Hybrid mooring lines (chains and fibre)
- Commissioning: Q3 2023

RWE

Kansai Electric Power
power with heart



Green energy

Location:



saitec offshore technologies

tecna: a
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE



BIMEP visit

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TIME: 15:00 PM - 18:00 PM

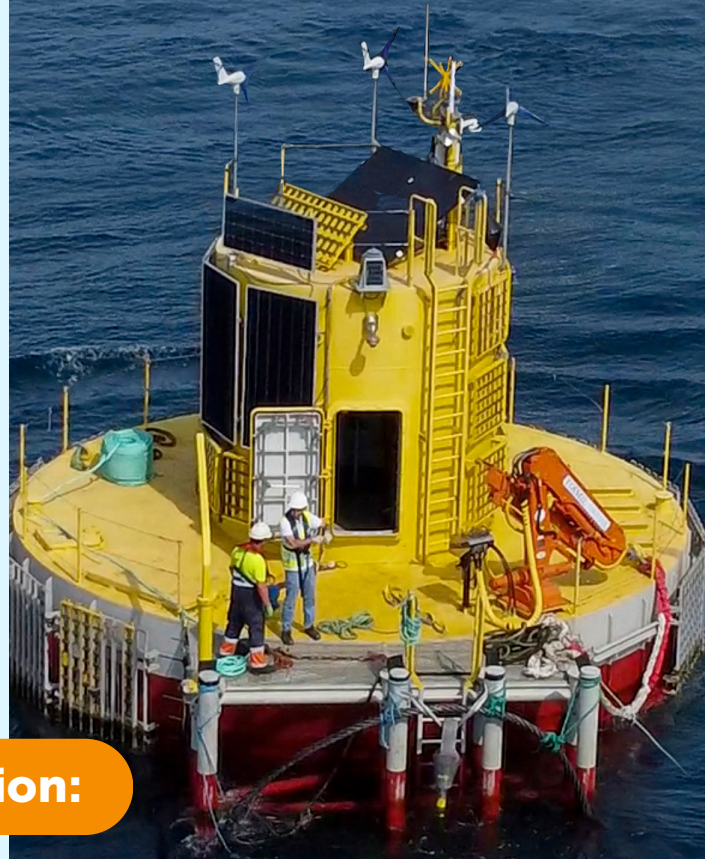
HarshLab project

details:

HarshLab is a unique floating laboratory for testing developments for the offshore industry in a real environment and under controlled conditions.

Equipment, new materials and coating can be evaluated in a wide variety of conditions ranging from atmospheric to seabed.

Location:



Presenters

keynote speech: Engineering Modeling to Advance Floating Wind Technology



Jason Jonkman

Principal Engineer | National Wind Technology Center (NWTC)

Jason Jonkman, Ph.D. is a principal engineer at the National Renewable Energy Laboratory (NREL). He is the lead developer of the OpenFAST and FAST.Farm multi-physics engineering tools for designing and analyzing land-based and offshore fixed and floating wind turbines and wind farms. Dr. Jonkman supports several International Energy Agency (IEA) Wind Tasks on wind energy model verification and validation. He is also a member of the International Electrotechnical Commission (IEC) working group to develop design requirements for floating offshore wind turbines. Dr. Jonkman earned a Ph.D. in Aerospace Engineering Sciences from the University of Colorado-Boulder.

Industry talk: Basque Supply Chain capabilities and key projects within Floating Wind – Basque Energy Cluster



José I. Hormaeché

General Manager of the Basque Energy Cluster

Jose I. Hormaeché has been the General Manager of the Basque Energy Cluster since March 2013. This non-profit organization, established in 1996, aims to enhance the competitiveness of the Basque industrial sector in the energy field through collaboration in various areas such as technology, international promotion, talent, and innovation. The cluster comprises over 200 member companies across the energy supply chain. Prior to his current role, Hormaeché served as the Managing Director of the Basque Energy Agency from 2006 to 2013, where he played a key role in defining energy strategies. He also worked for GAMESA Group from 1998 to 2006, holding various positions including Chief Operating Officer of Gamesa Eólica. Earlier in his career, he spent several years at ROBOTIKER, a Technology Center in the Basque Country. Hormaeché holds a degree in Civil Engineering with a specialization in "Hydraulics and Energy" and a Master in Business Administration with a specialization in Marketing.

Case Study – DemoSATH, from numerical models to operational offshore prototype



Eylon Ortíz De Murua

Loads & Metocean Engineer

Eylon Ortiz de Murua holds two master's degrees, one in Marine Technology (M-TECH) from Ecole Centrale de Nantes, and the other in Renewable Energies in the Marine Environment (REM) from the University of the Basque Country in collaboration with Strathclyde University, Ecole Centrale de Nantes, and the Norwegian University of Science and Technology. Two years ago, he joined Saitec Offshore Technologies, specifically in the Subsea team, where he has been involved in various tasks such as coupled model analysis for calibration and certification, as well as meteoceanic and wind resource analysis.

Presenters

Sesion 1: Innovations in FCA and Implementation of Control Strategies in Floating Offshore Wind



Javier López-Queija

Research Scientist in the Offshore Renewable Energy department

Dr. Javier López-Queija is a Research Scientist in the Offshore Renewable Energy department at TECNALIA in the field of advanced control strategies and numerical modelling tools for floating offshore wind turbine simulation. In recent years, he has dedicated a growing research activity in projects related with the control of FOWTs, developing his Ph. D. thesis and resulting in several publications in relevant international journals and scientific conferences. This activity has been done in collaboration with other research agents of the Basque Country, as the University of the Basque Country and Nautilus Floating Solutions. Last research projects are related in the development of control-based co-design methodologies and the development of advanced control strategies for load reduction.



Josu Jugo

Assistant Professor in the Electricity and Electronics department UPV

Dr. Josu Jugo is Assistant Professor in the Electricity and Electronics department from University of the Basque Country (UPV / EHU) in the field of Automatic Control since 1996. In recent years, he has dedicated a growing research activity in projects related with the control of Wind Turbines, collaborating with several thesis and resulting in several publications in relevant intentional journals and scientific conferences. This activity has been done in collaboration with other research agents of the Basque Country, as TECNALIA. Last research projects are related in the development of control-based co-design methodologies.



Adrien Hirvoas

Research Engineer at FEM

Dr. Adrien Hirvoas is currently a research engineer in applied mathematics at France Energies Marines, with a specific focus on marine renewable energy. He is a Graduate Engineer from the French Institute of Advanced Mechanics, majoring in structures and materials, and holds a Master of Science from the University Blaise Pascal of Clermont-Ferrand. Furthermore, Adrien Hirvoas holds a PhD in applied mathematics from Grenoble Alpes University in collaboration with IFP Energies Nouvelles. He joined the France Energies Marines team in 2021 and has since been working on various R&D projects, bringing together academics and private companies in the floating offshore wind energy sector.

Presenters

Sesion 2: Advanced methods for Wave Tank Testing proof of concepts



Miren Sanchez Lara

Senior Researcher in Marine Renewable Energy

Miren Sánchez Lara holds two Master's degrees: one in Industrial Engineering with a focus on Mechanical Design from the University of Basque Country (UPV-EHU) in 2011, and another in Numerical Simulation in Engineering from the Polytechnic University of Madrid (UPM) in 2016.

She has been a senior researcher at TECNALIA Research & Innovation since November 2011, specializing in offshore renewable energy. Additionally, she worked part-time at NAUTILUS Floating Solutions S.L. from 2018 to 2019, contributing as a design engineer for floating offshore wind turbine structures.

With over twelve years of experience, she is proficient in designing and calculating offshore structures according to international standards. Her expertise extends to hydrodynamic characterizations, stability calculations, naval architecture, and techno-economic assessments of offshore wind and wave energy platforms.

She collaborates with the Master in Renewable Energy in the Marine Environment program at the University of Basque Country and has contributed to numerous R&D projects. She has authored/co-authored more than 15 papers and conference presentations and holds two patents related to offshore energy technologies.



Julio Oria Escuredo

R+D+i Technician

Julio Oria is naval architect by the Polytechnic University of Madrid (UPM). He has been dedicated to physical model testing for the last 10 years at the INTA – CEHIPAR facilities. Nowadays, he is part of the ship dynamics laboratory team, carrying out seakeeping tests campaigns of ships and off-shore platforms. It should be noted that he is involved in the FOWT DAMP National I+D Project which consists in the study of different damping elements of FOWTs.



Raúl Guanche

Head of Offshore Engineering and Ocean Energies Research Group at IHCantabria

The individual is a highly accomplished figure in the field of Civil Engineering, specializing in offshore engineering and marine renewable energies. As a Ramon y Cajal Fellow and Head of the Offshore Engineering and Marine Renewable Energies Research Group at IHCantabria, they have led numerous research projects and fostered collaborations between the public and private sectors. Their work has focused on fluid-structure interaction, particularly in offshore wind applications, and has resulted in significant engineering achievements such as the development of innovative technologies like floating met masts and unmanned wet submarine mid tension connections. They have also spearheaded the development of various techno-scientific products that have been successfully transferred to industry, alongside holding multiple patents related to wave energy, offshore wind, and laboratory techniques. Their research is marked by a strong emphasis on interdisciplinary integration, and they actively contribute to knowledge dissemination through teaching activities at several universities.



Mareike Leimeister

Research Associate at Fraunhofer Institute for Wind Energy Systems IWES

Mareike Leimeister is an Offshore Wind Engineer with special interest in floating offshore renewable energy systems. She studied B.Sc. Renewable Energies (Stuttgart University), holds M.Sc. in Offshore Engineering (TU Delft) and Technology – Wind Energy (NTNU), and graduated in 2020 as Dr.Eng. from the Renewable Energy Marine Structures Centre for Doctoral Training (University of Strathclyde), focusing on reliability-based optimization of floating wind turbine support structures. Since 2017, she is a research associate at the Fraunhofer Institute for Wind Energy Systems IWES. She deals with global turbine dynamics and works on numerical modeling, load analyses, and optimization of floating wind turbine systems. Furthermore, she coordinates and works on joint research projects, such as AFLOWT (an Interreg North-West Europe project) or BLOW (a Horizon Europe project) on supporting an accelerated market uptake of floating wind technology, offshore test sites, and floating wind turbine demonstrators.