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Dear IOWTC participants, authors and committee members,

We are pleased to welcome you to the Third International Offshore Wind Technical Conference (https://event.asme.org/IOWTC), an online event on February 16-17, 2021. This conference replaces the in-person event that was planned for October 18 – 21, 2020 in Boston, USA. The conference follows on the successful past conferences held in San Francisco (2018) and in Malta (2019). We have 26 technical papers and an additional 6 technical presentations of very high-quality representing advances to the state-of-the-art in several topics relevant to the field of offshore wind energy. We are also especially honored to welcome our keynote speakers, Prof. Dr. Mario Garcia-Sanz, Program Director for Advanced Research Projects Agency, US Department of Energy, and Dr. Leif Delp, Head of Floating Offshore Wind Technology, Equinor ASA, Norway.

We would like to express our sincere appreciation to our Gold sponsors MARIN and Principle Power.

This conference would not have been made possible without our very loyal organizing committee, comprise of: Daniel Barcarolo, Michael Borg, Erik-Jan De Ridder, Konstantinos Gryllias, Gus Jeans, Jason Jonkman, Sam Kanner, Alex Koltsidopoulos-Papatzimos, Arjen Koop, Daniel Micalef, Amir R. Nejad, Senol Ozmutlu, Flavia Rezende, Amy Roberston, Kevin Tian, and Nathan Tom. They served as topic and session organizers, ensuring all the papers are peer-reviewed on time. This conference could not happen without this group. We are also very grateful for the volunteer support and all the reviewers.

We also acknowledge the great support from ASME staff Jamie Hart, Kim Williams and Stacey Cooper.

The presentations will be uploaded prior to the conference and you will have access to them as soon as you register. Please make sure you watch them prior to the actual session to maximize your experience. Only a quick summary of the presentations will be presented during the session, which will focus entirely on Q&A with the authors.

We hope you enjoy the presentations and the live interactions and look forward to seeing you virtually in February and meeting you in person at the Fourth IOWTC in 2022.

Sincerely,

Krish Thiagarajan Sharman (Conference Chair)
Dominique Roddier (Technical Program Chair)
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Session Description</th>
<th>Presenter</th>
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</thead>
</table>
| 8:00AM   | Welcome       | Keynote by Professor Mario Garcia-Sanz  
"Unveiling ATLANTIS: Control Co-Design of Floating Offshore Wind" |                                    |
| 8:45AM   | Break         |                                        |                                    |
| 9:00AM   | Session Title | Session Description                                                                 | Presenter                          |
|          | IOWTC2021-3503 | A Reduced Order Mathematical Model for the Current-Induced Motion of a Floating Offshore Wind Turbine | Everton L. de Oliveira            |
|          | IOWTC2021-3536 | Modeling the Dynamics of Freely-Floating Offshore Wind Turbine Subjected to Waves With an Open-Source Overset Mesh Method | Romain Pinguet                    |
|          | IOWTC2021-3501 | Numerical Research on the Interaction of Multidirectional Random Waves With a Large-Scale Offshore Wind Turbine Foundation | Xinran Ji                          |
|          | IOWTC2021-3511 | Study of Motion Performance of a Floating System With Four Moonpools and Twin Vawts | TAN Lei                            |
|          | IOWTC2021-3561 | Concept for a Wind-Yawing Shallow-Draft Floating Turbine                               | Jim Papadopoulos                   |
| 9:50AM   | Break         |                                        |                                    |
| 10:00AM  | Session Title | Session: Aero-Hydro and Model tests  
Presentations focusing on aero-hydro dynamics modeling and performance, including model testing. |                                    |
|          | IOWTC2021-3537 | Investigation of Nonlinear Difference-Frequency Wave Excitation on a Semisubmersible Offshore-Wind Platform With Bichromatic-Wave Cfd Simulations | Lu Wang                            |
|          | IOWTC2021-3558 | Verification Study on Cfd Simulation of Semi-Submersible Floating Offshore Wind Turbine Under Regular Waves | Yu Wang                            |
|          | IOWTC2021-3515 | A Cfd Study for Floating Offshore Wind Turbine Aerodynamics in Turbulent Inflow         | Yang Zhou                          |
|          | IOWTC2021-3508 | Experimental Validation of a Wave Elevation Observer on a Floating Wind Turbine Model  | Di Carlo, Simone                   |
|          | IOWTC2021-3542 * | The Focal Experimental Program                                                          | Robertson, Amy                     |
| 10:50AM  | Break         |                                        |                                    |

*All Times Eastern Standard*
11:00AM  |  11:50AM  | **Session: Mooring and Cable Systems**  
| Presentations focusing on the mooring and cable systems of a FOWT |

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<tbody>
<tr>
<td>IOWTC2021-3553</td>
<td>Mooring Fatigue Verification of the Windcrete for a 15 Mw Wind Turbine</td>
<td>Trubat, Pau</td>
</tr>
<tr>
<td>IOWTC2021-3565</td>
<td>Implementation and Verification of Cable Bending Stiffness in Moordyn</td>
<td>Matthew Hall</td>
</tr>
<tr>
<td>IOWTC2021-3524</td>
<td>Prevention of Offshore Wind Power Cable Incidents by Employing Offshore Oil/gas Common Practices</td>
<td>David McLaurin</td>
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**End of Day 1**  

*All Times Eastern Standard*
### Wednesday, February 17, 2021

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<tr>
<th>Time</th>
<th>Session</th>
<th>Description</th>
<th>Presenter</th>
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</thead>
<tbody>
<tr>
<td>8:00AM</td>
<td>Welcome</td>
<td>Welcome Keynote by Dr. Leif Delp &quot;Executing large scale commercial floating offshore wind projects&quot;</td>
<td></td>
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<tr>
<td>8:45AM</td>
<td>Break</td>
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<td></td>
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<tr>
<td>9:00AM</td>
<td>Session Title</td>
<td><strong>Session: Turbine design and modeling</strong>&lt;br&gt;Presentations focusing on the design and performance of wind Turbines</td>
<td></td>
</tr>
<tr>
<td>9:00AM</td>
<td>IOWTC2021-3527</td>
<td>Wind Turbine Anomaly Detection Based on Bi-Directional Long Short-Term Memory Neural Network</td>
<td>Gryllias, Konstantinos</td>
</tr>
<tr>
<td>9:00AM</td>
<td>IOWTC2021-3518</td>
<td>Numerical Design of a Floating Offshore Wind Turbine Large Scale Model for Control Purposes</td>
<td>Taruffi, Federico</td>
</tr>
<tr>
<td>9:00AM</td>
<td>IOWTC2021-3516</td>
<td>Simplified Aerodynamic Loading Model for Idling and Parked Conditions for Floating Wind Systems Design</td>
<td>Armando Alexandre</td>
</tr>
<tr>
<td>9:00AM</td>
<td>IOWTC2021-3533</td>
<td>Functional Requirements for the Weis Toolset to Enable Controls Co-Design of Floating Offshore Wind Turbines</td>
<td>Jason Jonkman</td>
</tr>
<tr>
<td>9:00AM</td>
<td>IOWTC2021-3522</td>
<td>Evaluation of Deep-Water Floating Wind Turbine to Power an Isolated Water Injection System</td>
<td>Salles, Mauricio</td>
</tr>
<tr>
<td>9:00AM</td>
<td>IOWTC2021-3567</td>
<td>Performance Analysis of Tacholess Rotation Speed Estimation Methods for Condition Monitoring of Gearboxes of Offshore Wind Farm</td>
<td>Peeters, Cédric</td>
</tr>
<tr>
<td>9:50AM</td>
<td>Break</td>
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<tr>
<td>10:00AM</td>
<td>Session Title</td>
<td><strong>Session: Structural Design</strong>&lt;br&gt;Presentations focusing on the structural aspects of FOWTS</td>
<td></td>
</tr>
<tr>
<td>10:00AM</td>
<td>IOWTC2021-3532</td>
<td>A Multi-Dimensional Approach for Determination of Stress Concentration Factors in Offshore Jacket Structures</td>
<td>Kris Hectors</td>
</tr>
<tr>
<td>10:00AM</td>
<td>IOWTC2021-3552</td>
<td>A Comparison of Time Domain Seismic Analysis Methods for Offshore Wind Turbine Support Structures: Superelement Approach Versus Integrated Approach</td>
<td>William Collier</td>
</tr>
<tr>
<td>10:00AM</td>
<td>IOWTC2021-3554</td>
<td>Scour Effects on the Structural Integrity of Offshore Wind Turbine Monopiles</td>
<td>George E. Varelis</td>
</tr>
<tr>
<td>10:00AM</td>
<td>IOWTC2021-3531 *</td>
<td>Digifloat: Digifloat: Creating the 1st Digital Twin of a Fowt</td>
<td>Bruce Martins</td>
</tr>
<tr>
<td>10:50AM</td>
<td>Break</td>
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</table>
### Session: Design basis requirements

Presentations focusing on the inputs to the design of FOWTS

<table>
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<tr>
<th>Presentations</th>
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<tr>
<td>Investigation of the Capacity Factor of Weather-Routed Energy Ships Deployed in the Near-Shore</td>
<td>Roshamida Binti Abd Jamil</td>
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<tr>
<td>Noaa-Cfsr Offshore Wind Validation</td>
<td>Claudia Pizzigalli</td>
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<tr>
<td>Geo-Hazards to Floating Offshore Wind Farms in the U.S. Pacific Waters</td>
<td>Dr. Tayebeh Tajalli Bakhsh</td>
</tr>
<tr>
<td>Large-Scale Model Investigation for Monopile Decommissioning of Offshore Wind Turbines – Overpressure and Vibratory Pile Extraction</td>
<td>Nils Hinzmann</td>
</tr>
<tr>
<td>Latest Updates to the Abs Floating Offshore Wind Turbine Guide</td>
<td>Yu, Qing</td>
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*Note* Presentation only, no manuscript in proceedings

End of Day 2

**All Times Eastern Standard**
Principle Power
Globalizing floating wind

Floating wind: ready for deployment

Deep water offshore wind holds a great promise for North America as it will create local jobs, revitalize coastal communities and enhance energy independence, all while accelerating the energy transition.

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Keynote Speakers

Professor Mario Garcia-Sanz

**Keynote Topic:** "Unveiling ATLANTIS: Control Co-Design of Floating Offshore Wind"

**Biography:** Prof. Mario Garcia-Sanz is currently a Program Director at ARPA-E, with the U.S. Department of Energy. He is an expert on control systems, and a veteran of the European wind energy industry. He has straddled academia and industry, having held appointments at the University of Manchester, Oxford University, NASA Jet Propulsion Laboratory, the European Space Agency, the Public University of Navarra, CEIT research center and Case Western. He worked as a Senior Advisor for many European wind energy companies, electrical utilities, and corporations, and holds over 20 patents, published over 250 research papers, and written three books. He has been the principal investigator of over 50 industry research projects. At ARPA-E he proposed and developed the ATLANTIS Program on floating offshore wind, the SHARKS Program on tidal and riverine energy, and is leading the efforts on grid technology with the NODES Program and microgrid research.

Leif Delp

**Keynote Topic:** "Executing large scale commercial floating offshore wind projects"

**Biography:** Leif Delp is head of Floating Offshore Wind Technology at Equinor.
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With ‘Better Ships, Blue Oceans’ we set course to make ships cleaner, smarter and safer and to contribute to a sustainable use of the seas.

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1-1 3rd International Offshore Wind Technical Conference

IOWTC2021-3511
Study of Motion Performance of a Floating System With Four Moonpools and a VAWT
Lei Tan — Nihon University
Satsuya Moritsu — Nihon University
Tomoki Ikoma — Nihon University
Yasuhiro Aida — Nihon University
Koichi Masuda — Nihon University

IOWTC2021-3522
Evaluation of Deep-Water Floating Wind Turbine to Power an Isolated Water Injection System
Khalid S. Khan — University of São Paulo
Isabelle V. M. dos Santos — University of São Paulo
Guilhemme B. dos Santos — University of São Paulo
Mauricio B. C. Salles — University of São Paulo
Renato M. Monaro — University of São Paulo

IOWTC2021-3545
Investigation of the Capacity Factor of Weather-Routed Energy Ships Deployed in the Near-Shore
Roshamida Abd Jamil — Ecole Centrale de Nantes
Jean-Christophe Gilloteaux — Ecole Centrale de Nantes
Philippe Lelong — MELTEMUS
Aurélien Babarit — Ecole Centrale de Nantes

1-2 Floating Concepts

IOWTC2021-3508
Experimental Validation of a Wave Elevation Observer on a Floating Wind Turbine Model
Simone Di Carlo — Politecnico di Milano
Alessandro Fontanella — Politecnico di Milano
Alan Facchinetti — Politecnico di Milano
Sara Muggiasca — Politecnico di Milano
Federico Taruffi — Politecnico di Milano
Marco Belloli — Politecnico di Milano

IOWTC2021-3561
Concept for a Wind-Yawing Shallow-Draft Floating Turbine
J. M. Papadopoulos — Northeastern University
C. Qiao — Northeastern University
A. T. Myers — Northeastern University
IOWT2021-3564
Potential Geo-Hazards to Floating Offshore Wind Farms in the US Pacific
  Tayebeh Tajalli Bakhsh — RPS Ocean Sciences
  Kent Simpson — RPS Energy
  Tony LaPiere — RPS Energy
  Mahmud Monim — RPS Ocean Sciences
  Jason Dahl — University of Rhode Island
  Malcolm Spaulding — University of Rhode Island
  Jill Rowe — RPS Ocean Sciences
  Jennifer Miller — Bureau of Ocean Energy Management
  Daniel O’Connell — Bureau of Ocean Energy Management

1-3 Mooring and Foundation Design

IOWT2021-3501
Numerical Research on the Interaction of Multidirectional Random Waves With a Large-Scale Offshore Wind Turbine Foundation
  Xinran Ji — Hainan University
  Daoru Wang — Hainan Academy of Ocean and Fisheries Sciences

IOWT2021-3553
Mooring Fatigue Verification of the WindCrete for a 15 MW Wind Turbine
  Pau Trubat — UPC-Barcelona-Tech
  Climent Molins — UPC-Barcelona-Tech
  Daniel Alarcon — UPC-Barcelona-Tech
  Valentin Arramounet — INNOSEA
  Mohammad Youssef Mahtouz — USTUTT

1-5 Aero-Hydro Modeling

IOWT2021-3503
A Reduced-Order Mathematical Model for the Current-Induced Motion of a Floating Offshore Wind Turbine
  Everton L. de Oliveira — University of Sao Paulo
  Celso P. Pesce — University of Sao Paulo
  Bruno Mendes — University of Sao Paulo
  Renato M. M. Orsino — University of Sao Paulo
  Guilherme R. Franzini — University of Sao Paulo

IOWT2021-3515
A CFD Study for Floating Offshore Wind Turbine Aerodynamics in Turbulent Wind Field
  Yang Zhou — University of Strathclyde
  Qing Xiao — University of Strathclyde
  Yuanchuan Liu — Ocean University of China
  Atilla Inciik — University of Strathclyde
  Christophe Peyrard — Universite Paris-Est
  Decheng Wan — Shanghai Jiao Tong University
  Sunwei Li — Tsinghua University
IOWTC2021-3518
Numerical Design of a Floating Offshore Wind Turbine Large Scale Model for Control Purposes

  Federico Taruffi — Politecnico di Milano
  Simone Di Carlo — Politecnico di Milano
  Sara Muggiasca — Politecnico di Milano
  Alessandro Fontanella — Politecnico di Milano

IOWTC2021-3533
Functional Requirements for the WEIS Toolset to Enable Controls Co-Design of Floating Offshore Wind Turbines

  Jason Jonkman — National Renewable Energy Laboratory
  Alan Wright — National Renewable Energy Laboratory
  Garrett Barter — National Renewable Energy Laboratory
  Matthew Hall — National Renewable Energy Laboratory
  James Allison — University of Illinois at Urbana-Champaign
  Daniel R. Herber — Colorado State University

IOWTC2021-3536
Modeling the Dynamics of Freely-Floating Offshore Wind Turbine Subjected to Waves With an Open-Source Overset Mesh Method

  Romain Pinguet — Aix Marseille University
  Sam Kanner — Principle Power Inc.
  Michel Benoit — Aix Marseille University
  Bernard Molin — Aix Marseille University

IOWTC2021-3537
Investigation of Nonlinear Difference-Frequency Wave Excitation on a Semisubmersible Offshore-Wind Platform With Bichromatic-Wave CFD Simulations

  Lu Wang — National Renewable Energy Laboratory
  Amy Robertson — National Renewable Energy Laboratory
  Jason Jonkman — National Renewable Energy Laboratory
  Yi-Hsiang Yu — National Renewable Energy Laboratory
  Arjen Koop — Maritime Research Institute Netherlands
  Adria Borràs Nadal — IFP Energies nouvelles
  Haoran Li — Norwegian University of Science and Technology
  Wei Shi — Dalian University of Technology
  Romain Pinguet — Principle Power, Inc.
  Yang Zhou — University of Strathclyde
  Qing Xiao — University of Strathclyde
  Rupesh Kumar — University of Ulsan
  Hamid Sarlak — Technical University of Denmark

IOWTC2021-3546
Integrated Modeling and Coupled Analysis of a New Hybrid Platform Combined With WEC Under Real Metocean Condition

  Swarnadip Dey — National Institute of Technology Durgapur
  Atul Krishna Banik — National Institute of Technology Durgapur
  Arghya Pramanik — National Institute of Technology Durgapur
  Sravya Anke — National Institute of Technology Durgapur
IWOTC2021-3558
Verification Study of CFD Simulation of Semi-Submersible Floating Offshore Wind Turbine Under Regular Waves

Yu Wang — Texas A&M University
Hann-Ching Chen — Texas A&M University
Guilherme Vaz — WavEC-Offshore Renewables
Simon Mewes — University of Duisburg-Essen

IWOTC2021-3565
Implementation and Verification of Cable Bending Stiffness in MoorDyn

Matthew Hall — National Renewable Energy Laboratory
Senu Srinivas — National Renewable Energy Laboratory
Yi-Hsiang Yu — National Renewable Energy Laboratory

1-6 Structural Analysis

IWOTC2021-3532
A Multidimensional FEA Approach for Determination of Hot Spot Stresses in Offshore Jacket Structures

Kris Hectors — SIM vzw
Hasan Saeed — Ghent University
Wim De Waele — Ghent University

IWOTC2021-3552
A Comparison of Time Domain Seismic Analysis Methods for Offshore Wind Turbine Structures: Superelement Approach Versus Integrated Approach

William Collier — DNV GL
Laurens Alblas — DNV GL
Jiang Hai Wu — DNV GL

IWOTC2021-3554
Scour Effects on the Structural Integrity of Offshore Wind Turbine Monopiles

George E. Varelis — Intecsea
Jun Ai — Intecsea
Prasad Kane — Intecsea
Hossam Ragheb — iMecha
Elie Dib — Intecsea

1-7 Metocean

IWOTC2021-3547
NOAA-CFSR Offshore Wind Validation

Claudia Pizzigelli — Saipem Spa
Giancarlo Giovanetti — Saipem Spa
Lisa Pedinelli — Università delle Marche
Roberto Padilla-Hernandez — IMSG-NOAA/NCEP/EMC
1-10 Offshore Wind Turbine Drivetrains

IOWTC2021-3527
An Improved 2DCNN With Focal Loss Function for Blade Icing Detection of Wind Turbines Under Imbalanced SCADA Data
   Dandan Peng — KU Leuven
   Chenyu Liu — KU Leuven
   Wim Desmet — KU Leuven
   Konstantinos Gryllias — KU Leuven

IOWTC2021-3567
Performance Analysis of Tacholess Rotation Speed Estimation Methods for Condition Monitoring of Gearboxes of Offshore Wind Farm
   Cédric Peeters — Vrije Universiteit Brussel
   Jérôme Antoni — INSA-Lyon
   Quentin Leclère — INSA-Lyon
   Jan Helsen — Vrije Universiteit Brussel
Project Development Track
(TRK-2)

2-2 Design and Operational Challenges

IOWTC2021-3516
Simplified Aerodynamic Loading Model for Non-Production Conditions for Floating Wind Systems Design
   Armando Alexandre — Naval Energies
   Raffaele Antonutti — Naval Energies
   Theo Gentils — Naval Energies
   Laurent Mutrley — Naval Energies
   Pierre Weyne — Naval Energies

IOWTC2021-3524
Prevention of Offshore Wind Power Cable Incidents by Employing Offshore Oil/Gas Common Practices
   David McLaurin — Intecsea (Worley)
   Alan Aston — Intecsea (Worley)
   John Brand — Intecsea (Worley)

2-3 REFOS

IOWTC2021-3539
Large-Scale Model Investigation for Monopile Decommissioning of Offshore Wind Turbines: Overpressure and Vibratory Pile
   Nils Hinzmann — Technische Universität Braunschweig
   Patrick Lehn — Technische Universität Braunschweig
   Jörg Gattermann — Technische Universität Braunschweig
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Thank you for attending IOWTC 2021!