







# WELCOME TO THE FIFTH FORWIND WIND PHYSICS SYMPOSIUM!

Wind energy research is advancing into new territory. Offshore clusters are growing into vast energy landscapes, turbine dimensions continue to push technological limits, and we only begin to understand the complexity of interactions between atmosphere, ocean, and technology fully. Research into these processes - across scales from the individual rotor blade to entire farm clusters - is essential for reliable energy yield, stable grid integration, and the durability of tomorrow's offshore infrastructure.

ForWind contributes to this transformation with application-oriented research that bridges fundamental physics and industrial practice. The launch of the Living Lab 70 GW Offshore Wind and the second funding phase of the Collaborative Research Centre 1463 Offshore Megastructures mark two major steps in strengthening our role at the intersection of science and application.

The 2025 Wind Physics Symposium offers insight into current questions shaping the field. One focus lies on the focus on wind turbine flow interaction to test innovative concepts and develop advanced control strategies. Another examines large-scale effects that emerge when multiple offshore farms operate as interconnected clusters. A third highlights the potential of inflow and wake sensing to capture complex flow phenomena and provide data for validation, forecasting, and control.

Researchers from ForWind and Fraunhofer IWES, together with colleagues from industry-related research, will present current findings and foster exchange between academia and application. The research will be presented in the following three sessions:



Session 1:
Wind turbine flow
interaction



Session 2: Large scale effects of offshore wind farm clusters



Session 3: Inflow and wake sensing











10:05

09:30 Registration and Coffee

10:00 Welcome - Prof. Dr. Martin Kühn, ForWind - University of Oldenburg

> Introduction to the Living Lab 70GW Offshore Wind -Prof. Dr. Kerstin Avila, ForWind - University of Oldenburg

10:25 SESSION I - Dr. Stephan Barth, ForWind - University of Oldenburg

## WIND TURBINE FLOW INTERACTIONS

On the effectiveness of dynamic induction control under different inflow wind directions

Dr. Vlaho Petrović, ForWind - University of Oldenburg

Robust and self-calibrating inflow estimation - A field test

David Onnen, ForWind - University of Oldenburg

Challenges of vortex induced vibrations on wind turbine towers

Dr. Matthias Arnold, Enercon

State of the art of vortex induced vibration research on wind turbines

Dr. Johannes Nicolaas Theron, Fraunhofer IWES

Exploring the dynamic stall experimentally: Detailed insights by using a 2D active

grid and high-speed PIV in a wind tunnel

Simon Meckelnborg, ForWind - University of Oldenburg

Coherent structures excited by platform motion in the wake of a floating wind turbine

Thomas Messmer, ForWind - University of Oldenburg

12:25 Lunch (optional wind tunnel tour)

13:30 SESSION II - Prof. Dr. Kerstin Avila, ForWind - University of Oldenburg

# LARGE SCALE EFFECTS OF OFFSHORE WIND FARM CLUSTERS

Simulating the Offshore Wind Expansions impact on yield and wind farm efficiency in the North Sea by 2050

Dr. Lukas Vollmer, Dr. Martin Dörenkämper, both Fraunhofer IWES

Validating mesoscale wind farm parametrizations with offshore wind farm SCADA data

Dr. Balthazar Sengers, Fraunhofer IWES

Mitigating wind farm cluster wakes by vertical staggering

Annika Gaiser, ForWind - University of Oldenburg

Performance and cluster wake effects of low specific rating turbines

Johannes Paulsen, ForWind - University of Oldenburg

The global blockage effect: A comparative study between LES and lidar

Jorrit Meijer, ForWind - University of Oldenburg

Coupling LES simulations to an aeroelastic turbine code to study coastal effects on offshore flow

Sonja Steinbrück, Fraunhofer IWES & ForWind - University of Oldenburg

15:30 Coffee break

16:00 SESSION III - Prof. Dr. Martin Kühn, ForWind - University of Oldenburg

#### INFLOW AND WAKE SENSING

Synergy of comprehensive meteorological-oceonographic, operational measurement campaigns in the Trident Cluster

Janna Seifert, ForWind - University of Oldenburg, Dr. Thomas Badewien, ICBM - University of Oldenburg, et al.

Next generation lidar - WindRanger 25k

Dr. Christoph Bollig, Abacus Laser

Wind field reconstruction using single doppler lidar: A lagrangian approach

Dr. Ignace Ransquin, ForWind - University of Oldenburg

Statistical characterization and modeling of turbine inflow and wake

Dr. Jan Friedrich, ForWind - University of Oldenburg

17:20 Closing - Prof. Dr. Kerstin Avila, Prof. Dr. Martin Kühn, ForWind - University of Oldenburg











Registration and travel directions for the

## FORWIND WIND PHYSICS SYMPOSIUM

**Registration** for the Wind Physics Symposium is possible until September 19<sup>th</sup>, 2025 by E-Mail to: manuel.siebert@forwind.de

The participation is offered **free-of-charge** for professionals from the wind energy community. As the number of participants is limited, please register as soon as possible. Catering will be provided, so we ask for a binding registration. The event will be held in person at the ForWind WindLab. Online participation is not possible.

#### How to get here:

ForWind – Center for Wind Energy Research of the Universities of Oldenburg, Hannover and Bremen Oldenburg University, Wechloy Campus, Building W33 – WindLab Küpkersweg 70 26129 Oldenburg

#### By bus

Line 306 "Universität" bus stop "Uni / Campus Wechloy" (~5 min. walk via Wechloy Campus)
Line 310 "Wehnen/Famila-Center" or lines 350/S35 "Westerstede" bus stop "Pophankenweg" (10 min. walk via Küpkersweg)
All busses stop at Oldenburg Hauptbahnhof (Central Station). On the North side of the station is the ZOB (Central Bus Terminal), where both lines depart.

## By train

Train station Oldenburg-Wechloy (~12 min. walk via Carl-von-Ossietzky-Straße)
Train station Oldenburg Hauptbahnhof (Take bus 306 or 310 from ZOB station next to Hauptbahnhof)

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