

A photograph of an offshore wind farm with several white wind turbines on tall poles in the ocean under a blue sky with scattered clouds. The turbines are arranged in a line, receding into the distance.

Offshore wind power:  
Publicly funded  
R&D projects



Developing people. Engineering the future.



# Wölfel publication list of publicly funded R&D projects offshore wind power

Based on his academic work and research at the Technical University of Darmstadt, Professor Horst Peter Wölfel established Wölfel Beratende Ingenieure in 1971. Today, such an enterprise would be recognized as a „high-tech start-up“ and a „spin-off“ from the Technical University of Darmstadt.

Wölfel thus boasts a long-standing history of research and development across its core fields of dynamics and vibration, structural mechanics, and monitoring. In the wind energy sector, the company has been engaged in research for over a decade, focusing on structural monitoring as well as active and passive vibration damping, among other areas.

Prominent research collaborators include numerous major universities and both national and international research institutions. Below is a selection of research projects related to structural monitoring for onshore and offshore wind turbines.

## **Projects in 2024:**

1. NUBER, Andreas; BORGELT, Jakob; COLLMANN, Mareike; DREGER, Dennis; FRIEDMANN, Herbert; KOHLMEIER, Marin; SCHOSSIG, Tobias; RÖMGENS, Niklas; TSIAPOKI, Stavroula; WERNITZ, Stefan: *Untersuchung des Tragverhaltens von Offshore-Grout-Verbindungen unter Wasser*. In: *Schiff&Hafen* (2024), No. 5, pp. 36-42.

## **Projects in 2023:**

2. NUBER, Andreas; BORGELT, Jakob; COLLMANN, Mareike; DREGER, Dennis; FRIEDMANN, Herbert; KOHLMEIER, Martin; SCHOSSIG, Tobias; TSIAPOKI, Stavroula; WERNITZ, Stefan: *Grout-WATCH - Untersuchung des Tragverhaltens von Offshore-Grout-Verbindungen unter Wasser an Tragstrukturen mit dynamischen Wechsellasten*. In: Projekträger Jülich (Ed.): *Tagungsband der Statustagung* (2023), pp. 151–168.

### **Projects in 2022:**

3. KREMLING, Stefan; NUBER, Andreas: *KKS-Gründung - Korrosionsmonitoring und aktiver kathodischer Korrosionsschutz von Offshore-Gründungsstrukturen: Teilvorhaben FEM-Simulation und Integration eines Korrosionsmonitoring zur Bewertung der strukturellen Eigenschaften*. Duration of the project: 01.11.2018 to 30.06.2022. Hanover, 2022.

### **Projects in 2020:**

4. LENDVE, Shardul B.; ENSS, Georg C.; TSIAPOKI, Stavroula; EBERT, Carsten; ASMUSSEN, Jörg: *Probabilistischer Ansatz zur Detektion von Strukturveränderungen an Monopile-Gründungsstrukturen mit Messdaten aus einem Structural Health Monitoring System*. In: *Stahlbau* 89 (2020), No. 6, pp. 542-550.

### **Projects in 2018:**

5. FRIEDMANN, Herbert; HÄCKELL, M.; KOHLMEIER, M.; HUHNER, Holger: *Großversuche und Feldmessungen als Voraussetzung für die Entwicklung von SHM-Systemen für Tragstrukturen von Offshore-Windenergieanlagen*. In: *Mitteilungen des Instituts für Grundbau und Bodenmechanik* (2018), No. 104, pp. 427-442.
6. HÄCKELL, Moritz; NUBER, Andreas; FRIEDMANN, Herbert; ALDOGHAIM, Eyad; EBERT, Carsten; KOHLMEIER, Martin: *Crux - Knackpunkt - Structural Health Monitoring einer Monopile-Grout-Verbindung im Großversuch*. In: VDI (Ed.): *Baudynamik 2018*. 1st edition. Düsseldorf: VDI Verlag, 2018 (VDI Reports, 2321).
7. KOHLMEIER, M.; SPILL, S.; HÄCKELL, M.; SCHENK, A.; FRIEDMANN, Herbert: *Physikalische Modellversuche an Monopile-Tragstrukturen mit Grout-Verbindungen zur Bewertung von Structural-Health-Monitoring-Systemen*. In: *Mitteilungen des Instituts für Grundbau und Bodenmechanik* (2018), No. 104, pp. 405-426.

### **Projects in 2017:**

8. FRIEDMANN, Herbert; EPPLER, Jens; HÄCKELL, Moritz; HUHNER, Holger; KOHLMEIER, Martin; WEIHNACHT, Bianca: *QS-M-Grout - Qualitätssicherung und Structural Health Monitoring von Grout-Verbindungen an Unterwasser-Tragstrukturen von Offshore-Windenergieanlagen*. In: *Forschungszentrum Jülich GmbH* (Ed.): *Statustagung Maritime Technologien: Tagungsband der Statustagung 2017*. Jülich, 2017.
9. FRIEDMANN, Herbert; HÄCKELL, Moritz; KRAEMER, Peter: *Development of a vibration-based structural health monitoring system for offshore foundations*. In: VDI (Ed.): *Schwingungen von Windenergieanlagen 2017*. 1st edition. Düsseldorf: VDI Verlag, 2017 (VDI Reports, 2301).
10. HÄCKELL, Moritz; FRIEDMANN, Herbert; FEULNER, Michael: *Detecting Damage in Grouted-joints of Wind Turbine Support Structures —Application to*

*a Large-scale Experiment. In: CHANG, Fu-Kuo; KOPSAFTOPOULOS, Fotis (Ed.): Structural health monitoring 2017: Real-time material state awareness and data-driven safety assurance. Lancaster, Pennsylvania, U.S.A.: DEStech Publishing Inc, 2017.*

11. NUBER, Andreas; FRIEDMANN, Herbert; HÄCKELL, Moritz; WÖLFEL, Bernd; KRAEMER, Peter: *Offshore Foundation Monitoring – from R&D to an Industrial Application. 7. GIGAWIND Symposium, 2. März 2017 (7. GIGAWIND Symposium). Hannover, 2. März 2017.*

### **Projects in 2016:**

12. FRIEDMANN, Herbert; EPPLER, Jens; KOHLMEIER, Martin; WEIHNACHT, Bianca; WINKEL, Gerlinde: *UnderwaterINSPECT - Technologien zur zuverlässigen und effizienten Prüfung von Unterwasser-Tragstrukturen an Offshore-Windenergieanlagen. In: Projektträger Jülich (Ed.): Statustagung Maritime Technologien: Tagungsband der Statustagung 2016. Jülich: Forschungszentrum Jülich GmbH Zentralbibliothek Verlag, 2016 (Schriftenreihe Projektträger Jülich, 8).*
13. KRAEMER, Peter; FRIEDMANN, Herbert; MAHOWALD, Jean; WÖLFEL, Bernd: *Experimental validation of stochastic subspace algorithms for structural health monitoring of offshore wind turbine towers and foundations. In: ndt.net (Ed.): 8th European Work- shop On Structural Health Monitoring (EWSHM 2016). Nantes, France: ndt.net, 2016.*
14. KRAEMER, Peter; FRIEDMANN, Herbert; EBERT, Carsten; MAHOWALD, Jean; WÖLFEL, Bernd: *Experimental validation of stochastic subspace algorithms for structural health monitoring of offshore wind turbine towers and foundations. In: 8th European Workshop On Structural Health Monitoring (EWSHM 2016), 2016.*
15. SPILL, Severin; KOHLMEIER, Martin; KRAEMER, Peter; FRIEDMANN, Herbert: *Messtechnische und numerische Untersuchungen an einvibrierten, lateral beanspruchten Stahlrohrpfählen. In: J.Stahlmann (Ed.): Messen in der Geotechnik 2016 (2016), pp. 291-308.*

### **Projects in 2015:**

16. KRAEMER, Peter; FRIEDMANN, Herbert: *Vibration-based structural health monitoring for offshore wind turbines - Experimental validation of stochastic subspace algorithms. In: Wind and Structures 21 (2015), Nr. 6, pp. 693–707.*



# What moves Wölfel?

Vibrations, structural mechanics and acoustics – this is the Wölfel world. Here we are experts, this world is our home. More than 130 employees daily do their best for complete satisfaction of our customers. For more than five decades we support our customers with engineering services and products for the analysis, prognosis and solution of tasks in the fields of vibrations and noise.

Are vibrations really everywhere? Yes! That's why we need a wide variety of solutions! Whether it is engineering services, products or software – there is a specific Wölfel solution to every vibration or noise problem, for example

- simulation-based seismic design of plants and power stations
- measurement of acoustic emissions of wind turbines
- universal measuring systems for sound and vibrations
- expert reports on noise immission control and air pollution forecasts
- dynamic occupant simulations for the automotive and aviation industry
- and many other industry-specific Wölfel solutions

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