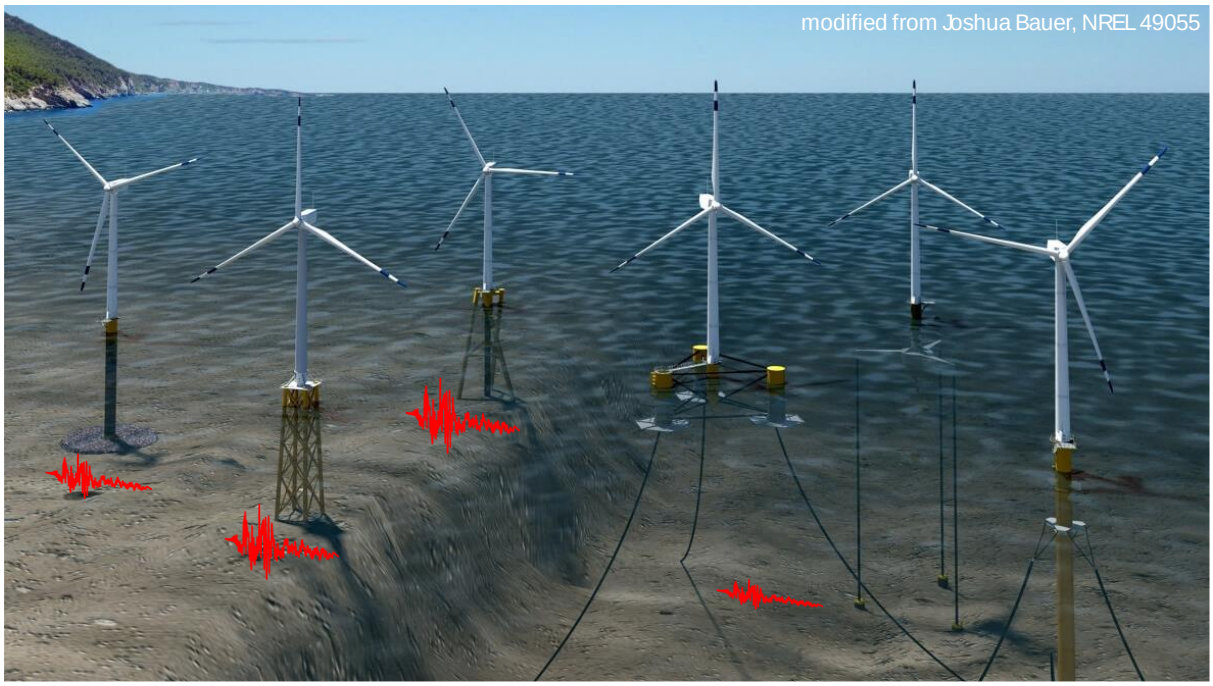
Special Session:

Seismic behaviour of offshore foundations from dynamic centrifuge testing



Organisers

Domenico Gaudio; Sapienza University of Rome, Rome, Italy (domenico.gaudio@uniroma1.it)

Domenico Gaudio is currently Assistant Professor in Geotechnics at the Department of Structural and Geotechnical Engineering, Sapienza University of Rome. His research activities focus on dynamic soil-structure interaction, with particular reference to the centrifuge and numerical modelling of offshore foundations and long-span bridges. Before acting as Untenured Assistant Professor (2021-2024) at Sapienza, he also worked at Politecnico di Milano (2018) on the numerical modelling of flow-like landslides. He was then appointed as Research Associate (2019-2020) and Academic Visitor (2023) at the University of Cambridge, as well as Visiting Researcher at TU Delft in the framework of the GeoLab project (2024).

Gopal Santana Phani Madabhushi; University of Cambridge, Cambridge, UK (mspg1@cam.ac.uk)

Gopal Madabhushi is Professor of Civil Engineering and Head of the Geotechnical and Geo-Environmental Group at the University of Cambridge, UK, and the Director of the Schofield Centre. His expertise extends from dynamic centrifuge to FE modelling of earthquake engineering problems. He was awarded the TK Hsieh award in 2005, 2010 and 2013, the BGA medal in 2010, the Shamsher Prakash Research Award in 2006, Medical Innovations Award in 2007 the IGS-AIMIL Biennial award in 2008 and the Bill Curtin Medal in October 2009. He has 130+ Journal Publications and 260+ papers in International conferences and workshops.

Miguel Angel Cabrera; Delft University of Technology, Delft, The Netherlands (M.A.Cabrera@tudelft.nl)

Miguel’s research is in the area of geotechnical engineering with a focus on complex, multiphase, geophysical and environmental flows, and soil-fluid-structure interaction. His interests lie in linking the fundamental understanding of such physical processes with the current and future challenges of the natural and built environment. Miguel's PhD focused on the simulation of granular flows in rotating

systems. From 2016 to 2022 Miguel was appointed as Assistant and then Associate Professor at Universidad de los Andes, Colombia. Since August 2022, Miguel joined the section of Geo-Engineering at TU Delft, working in the physical modelling of land instabilities and soil-structure interaction.

Session Description

This special session collects the latest findings from dynamic centrifuge testing of offshore foundations, with a particular focus on their seismic behaviour. Offshore energy infrastructure, such as wind turbines, is increasingly being deployed in regions with significant seismic risk. Understanding how foundations respond to earthquake-induced loading is critical to ensuring their long-term structural stability.

The session will highlight recent advances in centrifuge modelling techniques adopted to investigate soil-structure interaction under dynamic conditions. These techniques allow researchers to replicate earthquake loading, along with the coseismal wind and marine wave thrusts, at a reduced scale while maintaining realistic stress conditions, thus offering valuable insight into the nonlinear and complex response of offshore foundations.

Key aims of this session include:

- Presenting cutting-edge experimental results from the latest centrifuge tests;
- Exploring new methodologies for reproducing both the coseismal wind thrust and marine loads in offshore environments;
- Evaluating the performance of different foundation types under seismic loading, including monopiles, suction caissons, and gravity-based structures;
- Discussing implications for the design of offshore wind turbines in seismically active regions.

By bringing together researchers and practitioners, this session aims to foster discussion on how to integrate experimental findings into design practices and numerical modelling approaches. The insights gained will contribute to developing more resilient, safe, and cost-effective offshore structures. Case studies, innovative testing methods, and comparative analysis with numerical simulations are especially encouraged.