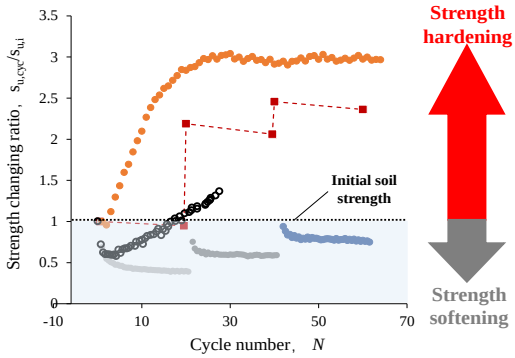
Special Session:

Physical modelling for life-cycle foundation management

Norway E-39 floating bridge foundation (www.globalmaritime.com)

Offshore wind infrastructure (https://tethys.pnnl.gov/)

High-speed railway foundations (www.chinadailyhk.com)



Changing soil strength due to long-term loading

Organisers

Dr. Zefeng Zhou; Norwegian Geotechnical Institute, Norway (Zefeng.zhou@ngi.no)

Dr. Zefeng Zhou is a Senior Researcher at NGI with over 12 years of experience in offshore engineering across oil, gas, and renewables. He specialises in offshore geotechnics, whole-life geotechnical design, and anchoring systems, with 40 peer-reviewed journal papers. Over the past five years, he has led or contributed to over five major projects funded by EU Horizon, the Australian Research Council, and Norway's Research Council, totalling over €8M research funding. His work has earned top honours, including the ICE Telford Gold Medal, OMAE2024 Best Paper Award, and BGA Fleming Award. He is serving as Associate Editor for ASME JOMAE.

Dr. Ci Wang; Fugro, Belgium (Ci.wang@fugro.com)

Dr. Ci Wang, a Senior Geotechnical Engineer at Fugro, has over 15 years experience working in offshore, nearshore, and onshore projects. She holds a PhD in offshore geotechnical engineering focusing on offshore plate anchors and developing a novel permeable plate anchor for rapid capacity gain from soil consolidation, suitable for floating wind and solar foundations. She has valuable research experience in single gravity, centrifuge, and field testing, with test results published in prestigious geotechnical publications. She has extensive industrial connections in Norway, Australia, New Zealand, Hong Kong, South-east Asia, and the United Kingdom.

Prof. Conleth O'Loughlin; COFS at University of Western Australia, Australia
(conleth.oloughlin@uwa.edu.au)

Prof. Conleth O'Loughlin is a Professor at the University of Western Australia and Director of the National Geotechnical Centrifuge Facility. His research focuses on physical modelling, foundation systems, and soil–structure interaction. He has led major multi-institutional programmes with over AU$37 million in funding, effectively translating academic research into industry practice. Prof. O'Loughlin has published more than 200 peer-reviewed papers and received numerous prestigious international awards. He is the former Chair of the International Journal of Physical Modelling in Geotechnics, Associate Editor for Géotechnique Letters, and serves on the organising committees of several leading international geotechnical conferences.

Prof. Jason T. DeJong; University of California, Davis, US (jdejong@ucdavis.edu)

Prof. Jason T. DeJong is a Professor of Civil and Environmental Engineering at the University of California, Davis, and Director of the Center for Geotechnical Modeling. His research focuses on soil characterization, bio-mediated and bio-inspired geotechnics, earthquake engineering, and geotechnical sustainability. He has led research projects with over US$40 million in funding, resulting in over 250 publications. Prof. DeJong chairs the ISSMGE TC102 In Situ Testing Committee and serves as a technical advisor on various infrastructure projects. His contributions have been recognized with awards from ASCE, ICE, and ASTM, and he is an ASCE Fellow.

Prof. Michael C R Davies; University of Sussex, UK (Michael.Davies@sussex.ac.uk)

Professor Michael Davies is an emeritus professor at the University of Sussex having previously served Deputy Vice-Chancellor. He was formerly Dean of Engineering at the University of Auckland, Dean of Engineering at the University of Dundee, and lecturer at Cardiff University. At both Cardiff and Dundee he founded research groups and established Geotechnical centrifuge facilities. Professor Davies' research interests range from ground improvement and soil reinforcement to slope stability, earthquake engineering and constitutive modelling of soils. He is a past Chair of the British Geotechnical Association and Vice-President of the International Society for Soil Mechanics and Geotechnical Engineering.

Session Description

Geotechnical foundations - onshore and offshore - are expected to perform reliably over operational lifespans of 20 to 30 years or more. During this period, foundation behaviour can evolve significantly due to operational and environmental loading, including monotonic, cyclic, dynamic, and episodic actions. These interactions affect capacity, stiffness, and overall system performance, making it essential to understand the time-dependent nature of soil–structure interaction for foundation management.

Such insight is critical for optimising design, managing operational risks, informing recertification and life extension strategies, and planning decommissioning. However, full-scale testing to assess long-term performance is often impractical due to cost, complexity, and extended timescales. Physical modelling - particularly centrifuge testing and advanced 1g experiments - provides an efficient, accelerated, and repeatable means of simulating foundation behaviour.

This session explores how physical modelling supports the life-cycle management of foundations by revealing key mechanisms such as consolidation, changing soil properties, and evolving failure modes. Contributions are welcome that demonstrate advanced modelling strategies, innovative instrumentation, or integration with theoretical and numerical frameworks for performance-based, predictive geotechnical design.

By bringing together researchers and practitioners, the session aims to advance the role of physical modelling in managing long-term foundation performance across diverse geotechnical environments, promoting more resilient and cost-effective engineering solutions.

Key topics include:

- New technologies for physical modelling of time-dependent soil–structure interaction
- Physical modelling to unlock novel mechanisms in foundation behaviour under lifetime loading conditions
- Experimental modelling for foundation installation & decommissioning
- Integration of physical and numerical modelling to support whole-life geotechnical design