

## STEEL STRUCTURES FOR OFFSHORE ENERGY INFRASTRUCTURE

YUNER HUANG<sup>\*</sup>, SPYROS A. KARAMANOS<sup>†</sup>

<sup>\*</sup> University of Edinburgh  
William Rankine Building, King's Buildings, Edinburgh, EH9 3FG  
Yuner.huang@ed.ac.uk  
<http://www.eng.ed.ac.uk/about/people/dr-yuner-huang>

<sup>†</sup> University of Thessaly  
Pedion Areos, Volos 38334, Greece  
skara@mie.uth.gr  
<http://karamanos.mie.uth.gr/>

### ABSTRACT

The offshore environment provides rich energy resources, such as offshore wind energy, wave energy, tidal energy, as well as oil & gas. Exploitation of these energy resources requires reliable and cost-efficient structural solutions. However, offshore energy infrastructures are subjected to complex loading scenarios. In particular, extreme loading conditions are expected to occur more frequently due to climate change. Dedicated research on offshore energy infrastructure is required to exploit offshore energy while ensuring structural integrity and reducing the cost of the infrastructure. In recent years, innovative solutions in structural components and systems have been developed, such as floating offshore platforms, the use of high-strength steel for offshore structures, or the production and use of mechanically-lined (bi-material) steel pipes. State-of-the-art experimental and numerical methodologies are proposed and adopted in this emerging research field. Furthermore, the use of innovative tools based on machine learning (ML) and artificial intelligence (AI) opens new opportunities for research and development, towards developing cost-efficient systems for the exploitation of offshore energy resources.

This invited session aims at bringing together experts on structural solutions made of steel for the production, storage and transmission of offshore energy resources, to showcase recent advances in this challenging field. The session invites contributors working on (but not limited to) offshore renewable energy structures, oil and gas offshore structural systems and pipelines, mooring systems, turbine structures, and material engineering for offshore applications.