

## UME Seminar

### Technological challenges for deep-water steel pipeline construction; a structural mechanics perspective

Pr. Spyros A. Karamanos, University of Thessaly

Date and Time: 19th of March (3:30 – 4:30 pm)

#### Abstract

The construction of steel hydrocarbon pipelines in deep sea is a technological challenge. Recent scientific and engineering advancements allow for the design and installation of pipelines at depths that exceed 2,000 meters. The present lecture is motivated by the recent developments in natural gas exploitation and production in East Mediterranean. In that region, major gas pipelines are designed for installation in water depths that may reach 3,000 meters, to transmit the produced natural gas to the European market.

The first part of the lecture presents the basic parameters of offshore pipeline structural design and the corresponding limit states from a holistic point-of-view, from line pipe production at the pipe mill to the installation process in deep water. The second part of the lecture summarizes recent state-of-the-art research at the University of Thessaly on two topics related to the structural integrity of offshore pipelines, namely: (a) the effect of line pipe manufacturing process on the collapse strength of deep offshore pipelines, and (b) the structural performance of bi-material pipes (also called “lined pipes”), a rather new, very efficient solution for mitigating internal corrosion of the pipeline.

#### About the speaker

Spyros A. Karamanos is Professor of Structural Mechanics in Mechanical Engineering, at the University of Thessaly, Volos, Greece. He received his five-year Diploma in Civil Engineering from the National Technical University of Athens, Greece, in 1989 with highest honors, and his M.Sc. (1991) and Ph.D. (1993) degrees in Structural Engineering & Mechanics, from The University of Texas at Austin, USA. During the period 2016-2019, he was Professor and Chair of Structural Engineering, The University of Edinburgh, Scotland, UK, in parallel to his professorship in Greece. During 2020-2022, he was the Chairman of the Department of Mechanical Engineering, and during 2023-2024, he was the Vice Rector for International Relations, Outreach and Lifelong Education of the University of Thessaly.

His research and professional interests include Structural Mechanics, Numerical Methods and Finite Elements, Structural Stability, Inelastic Behavior, Analysis and Design of Metal Structures against Fatigue, Earthquake Engineering and Structural Dynamics. He specializes in structural mechanics and integrity of energy infrastructure systems, focusing on buckling and fatigue of pipelines and offshore structures, mainly tubular components and systems, using computational and experimental methods. His research has been funded primarily by European research projects, with the participation of European steel and pipeline industry, also directly by industrial partners. He has published 95 papers in refereed journals and more than 170 papers in conference proceedings.

