MECHANICAL ENGINEERING COLLOQUIUM

UNIVERSITY OF CALIFORNIA UCRIVERSIDE

The Department of Mechanical Engineering

PRESENTS

Dr. Sergio Lucato

Senior Research Scientist
Teledyne Scientific
Thousand Oaks, CA

Friday, November 7, 2014
WCH Room 232
11:10-12:00PM

Materials selection for subsea Oil & Gas equipment

Abstract:
As current offshore oil & gas reservoirs are being depleted, the industry is moving to new developments in water depths in excess of 5,000 ft. These so-called ultra-deep water wells come with a significant set of challenges on all levels of engineering. Not only is the wellhead at the ocean floor under substantial hydrostatic pressure, the produced fluids inside the production equipment is under tremendous pressure and temperature. BP's Macondo incident has demonstrated how faulty materials can result in catastrophic consequences.

With the move to ultra-deep water, the oil & gas industry is at a critical point with regards to available materials. Conventional structural and elastomeric materials are at their very limits and offer little to no safety factor. A shift to new materials is required, bringing with it a host of new challenges.

This presentation will aim to give an overview of offshore production equipment, focusing on the materials for wellhead components. Materials testing and selection are vital to ensuring high reliability over the expected live span in excess of 25 years. Given t he multitude of environmental f actors acting on the equipment, the correct selection of materials is not a trivial task. An introduction into materials selection will be given along with examples on how the subsea and downhole environments influence the decision making.

About the Speaker:
Dr. Sergio L. dos Santos e Lucato is a Senior Research Scientist for Materials and Structures at Teledyne Scientific. He obtained his PhD (Honors, 2002) in Materials Science from the Darmstadt University of Technology, Germany working on experimental and theoretical fracture mechanics of piezoelectric ceramics. Prior to joining Teledyne, he was a Post Doctoral Research Associate at the University of California, Santa Barbara, where he developed and tested high-authority shape morphing structures. Dr. Lucato's primary research areas are in the design and optimization of adaptive structures and in the mechanics of composite structures and materials. He is the program manager for a corporate wide materials design database of dielectrics subjected to extreme environments for lifetime predictions.