# Analysis Led Design of Subsea Systems

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**Abstract:** Designing subsea systems for ultra-deep water has required a game-changing approach involving multi-physics modeling and numerical simulations. The complexities of these next generation subsea systems necessarily require predictive methods that forecast dynamic system operations while performing system reliability studies through sensitivity methods involving subsystem reliability. Such a design process is called Analysis Led Design. This presentation will focus on development of reduced order models for analysis led design of a subsea architecture focusing on pipeline flow. The calibration of these models using equivalent fluid parameters based on the specific flow regime will be covered. Using these equivalent parameters, transient multi-phase fluid flow can be estimated.

**Biography:** Dr. Matthew Franchek is the founding director of the University of Houston Subsea Engineering Program. He received his Ph. D. in Mechanical Engineering from Texas A&M University in 1991 and started his career at Purdue University as an assistant professor in Mechanical Engineering. He was promoted to an associate professor with tenure in 1997 and then to full professor in 2001. While at Purdue, he initiated and led two industry supported interdisciplinary research programs: an Automotive Research Program and an Electro-Hydraulic Research Program. From 2002 to 2009 he served as Chair of Mechanical Engineering at UH while simultaneously initiating the UH Biomedical Engineering undergraduate program. After his term as Department Chair, Dr. Franchek worked with Houston area companies to create the nation's first subsea engineering program. His expertise is in model based methods for diagnostics and control of pipeline flow, artificial lift, and power distribution.