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# Interaction of Phase Behavior and Flow Applications: EOR, CCUS/Gas Storage, ML and H2 and All ...



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## ABSTRACT:

Demand for energy has continued to increase owing to worldwide industrial development. From a historical perspective, the significant demand for energy has been met through various energy sources, especially during and after the industrial revolution. Hydrocarbons, or fossil fuels such as oil and gas, have been instrumental during this time frame for multiple reasons, from various market price points to their high energy density and abundance. Producing hydrocarbons, especially from challenging systems trained us, petroleum engineers, how to apply basic principles and as well as concepts from other disciplines to real problems. Now, we have an opportunity to utilize some of these concepts for wider spectrum of problems.

This talk will focus on the applications of the concepts that we learned in the area of interaction phase behavior and flow. Understanding and quantification of the flow in porous media or materials and as well as couplings with the phase behavior is important for many problems across various disciplines. Especially during the last 50 plus years, petroleum engineers mastered in many aspects of the key areas of multiphase multi-component phase behavior and as well as its dynamics under flow conditions. In this presentation, I will give you a cross-section of some of the work that I have done in terms of the application of these concepts to solve problems. Each example that will be covered here was based on a real or a fundamental problem that was tackled during my career. These examples cover a broad base of contributions from complex phase behavior, CCS/EOR, ML to H2 that also reflect my broad research interests.

## BIOGRAPHY:

Dr. Birol Dindoruk is currently American Association of Drilling Engineers Endowed Professor of Petroleum Engineering at University of Houston, previously he was the Chief Scientist of Reservoir Physics and the Principal Technical Expert of Reservoir Engineering in Shell. His technical contributions have been acknowledged with many awards during his career, including SPE Lester C. Uren Award (2014), Cedric K. Ferguson Medal (1994), and Distinguished Membership. In 2017, he was elected as a member of the National Academy of Engineering for his significant theoretical and practical contributions to enhanced oil recovery and CO<sub>2</sub> sequestration. He was one of the Distinguished Lecturers of SPE for 2010-2011 term. Dr. Dindoruk was Data Science and Engineering Analytics Technical Director of the SPE and a member of the Advisory Committee of the SPE Reservoir Dynamics and Description Technical Discipline. He has been active in various editorial positions under SPE and also Elsevier. Currently he is the Editor In Chief for all SPE Journals. Dr. Dindoruk is well-known for his extensive work on thermodynamics of phase behavior/EOS development and experimental work, interaction of phase behavior and flow in porous media, enhanced oil recovery and CO<sub>2</sub> sequestration, and correlative methodologies. Recently, Dr. Dindoruk has also been working in the area of data analytics, artificial intelligence, and machine learning and focusing on effective incorporation of data sciences into the oil and natural gas industry practices and energy systems. In recent years, he has authored/co-authored various articles for hydrogen, geothermal systems and adsorptive storage. Dindoruk has 28 years of industrial experience, holds a BSc Degree from Technical University of Istanbul in Petroleum Engineering, MSc Degree from The University of Alabama in petroleum engineering and also a PhD from Stanford University in Petroleum Engineering and Mathematics, and an MBA from University of Houston.