



PEA

PETROLEUM ENGINEERS ASSOCIATION



5 DAYS ONLINE TRAINING ON PETROLEUM DATA ANALYTICS

Application of AI & ML in Petroleum Engineering



PROF. SHAHAB D. MOHAGHEGH



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DESCRIPTION

Artificial Intelligence has revolutionized many industries. This technology is the main contributor to the digital transformation of the upstream petroleum industry. Today, the realistic incorporation of Artificial Intelligence in our industry which is known as Petroleum Data Analytics (PDA) is an important competitive differentiation in the upstream oil and gas industry.

In this version of the short course, realistic and practical applications of Artificial Intelligence are covered in conventional resources in the oil and gas industry. The course includes high-level coverage of the technical foundations of Artificial Intelligence so that the presentation of the applications and case studies would make technical sense.

For conventional resources, Artificial Intelligence provides new and novel approaches to build comprehensive and coupled “reservoir + surface operations” simulation models to be used in reservoir management and field development planning, as well as many other areas.



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The major distinguishing factors of Petroleum Data Analytics when compared to traditional methods are:

- Avoidance Of Assumptions, Interpretations, Preconceived Notions, And Biases,
- Lack Of Inclusion Of Significant Approximations And Simplifications,
- Completely Automated History Matching Of The Coupled, "Reservoir + Surface Operations" Simulation Model For The Full Field,
- Generation Of Accurate And Fast Subsurface Models For Practical Reservoir Management, And
- Performing Comprehensive And Practical Field Development Planning (Fdp), Production And Recovery Optimization (Pro), And Uncertainty Quantification (Uq) With Tens Of Millions Of Ai-based Models Runs.



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TOPICS

- History of Artificial intelligence
- Actual Definitions of Artificial intelligence & Machine Learning
- Modeling Physics using Artificial Intelligence
- Differences between Engineering & Non-Engineering Problem Solving using AI & ML
- Differences between Traditional Statistics and AI & ML
- Ethics of Artificial Intelligence in Engineering (AI-Ethics)
- Explainable Artificial Intelligence in Engineering (XAI)
- Basics of Artificial Intelligence (AI) and Machine Learning
 - Artificial Neural Networks (Deep Learning)
 - Fuzzy Set Theory
 - Evolutionary Computation
- Petroleum Data Analytics - PDA (Application of AI in Petroleum Engineering)
- Application of PDA in Reservoir Engineering
 - Data-Driven Reservoir Modeling - Top-Down Modeling (TDM)
 - Multiple Case Studies
 - Smart Proxy Modeling of Traditional Numerical Reservoir Simulation
 - Multiple Case Studies
 - Contribution of AI & ML in the aftermath of Deepwater Horizon (Gulf of Mexico)



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WHY ATTEND?

Petroleum Data Analytics is new. A handful of domain experts have dedicated extensive amounts of time and effort to developing and presenting the next generation of tools that incorporate these technologies in the petroleum industry. Unfortunately, hypes, buzzwords, and marketing ploys around data analytics have overwhelmed the petroleum industry in the past decade, specifically in the United States and most recently throughout the world. Many with little to no understanding and knowledge of physics and geology and others with a very superficial understanding of Artificial Intelligence have been marketing these hypes.

This course will demonstrate the power of Artificial Intelligence and the difference it can make for informed decision-making when it comes to accomplishing important short-term, mid-term, and long-term objectives. This course will also show how to distinguish between the realistic application of Artificial Intelligence in engineering especially in petroleum engineering versus marketing ploys.

WHO SHOULD ATTEND?

This course is designed for Petroleum engineers and geoscientists as well as managers and decision-makers in NOCs, IOCs, Independents, and Service Providers. In general, those involved in the planning, and decision-making of hydrocarbon assets are the main target audience.



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MEET YOUR TRAINER



SHAHAB D. MOHAGHEGH, PH.D.

WEST VIRGINIA UNIVERSITY & INTELLIGENT SOLUTIONS, INC.

Shahab D. Mohaghegh, a pioneer in the application of Artificial Intelligence and Machine Learning in the Exploration and Production industry, is a Professor of Petroleum and Natural Gas Engineering at West Virginia University and the president and CEO of Intelligent Solutions, Inc. (ISI). He is the director of WVU-LEADS (Laboratory for Engineering Application of Data Science)

Including more than 30 years of research and development in the petroleum engineering application of Artificial Intelligence and Machine Learning, he has authored four books (Shale Analytics, Data-Driven Reservoir Modeling, Application of Data-Driven Analytics for the Geological Storage of CO₂, Smart Proxy Modeling), more than 230 technical papers and carried out more than 60 projects for independents, NOCs, and IOCs. He is an SPE Distinguished Lecturer (2007 and 2020) and has been featured four times as a Distinguished Author in SPE's Journal of Petroleum Technology (JPT 2000 and 2005).



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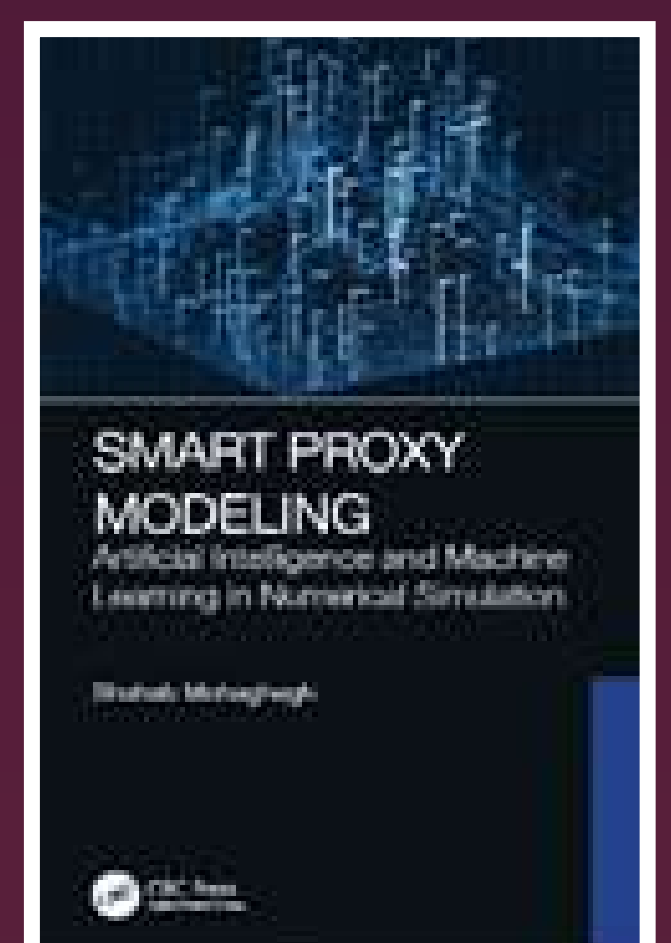
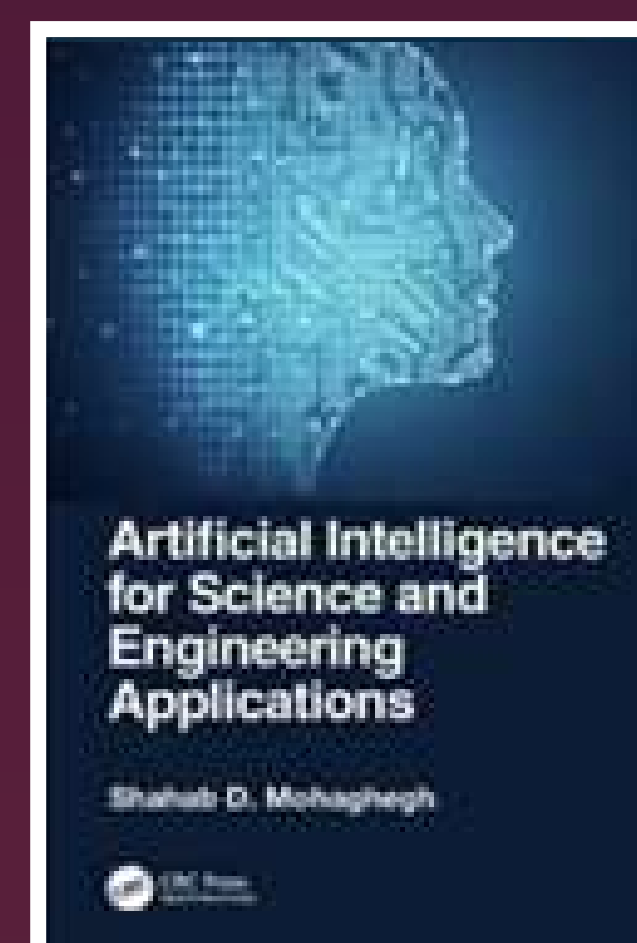
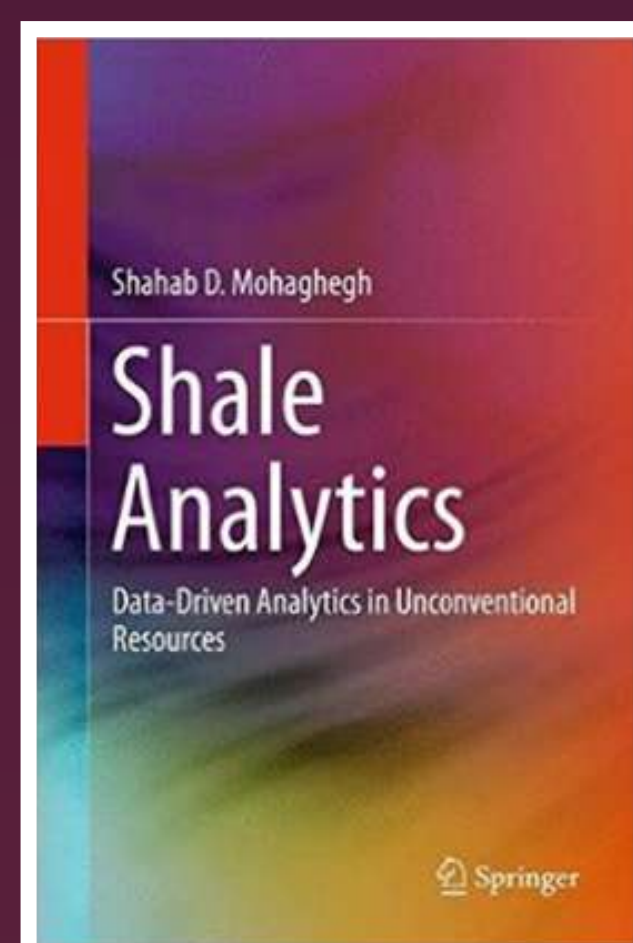
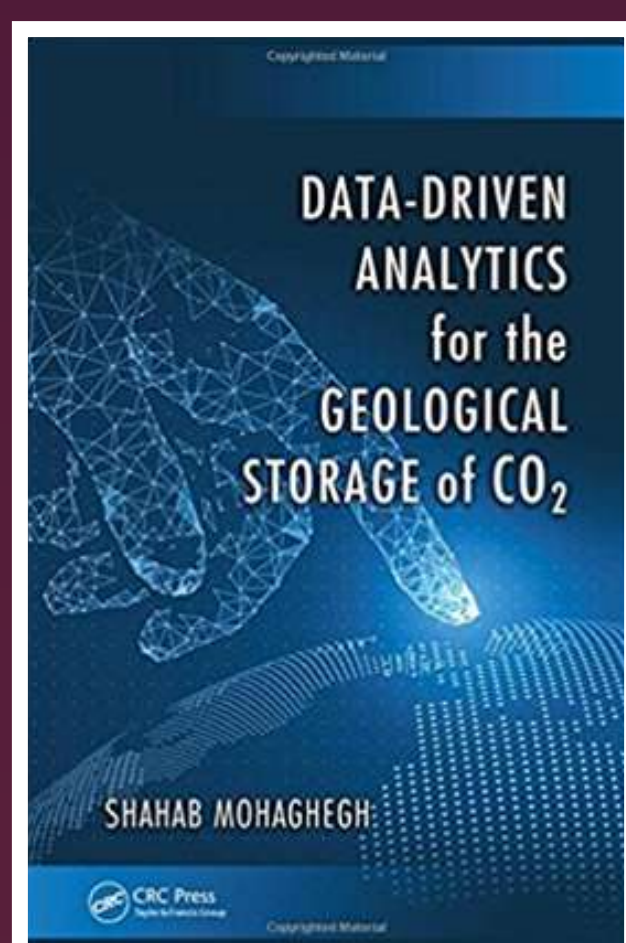
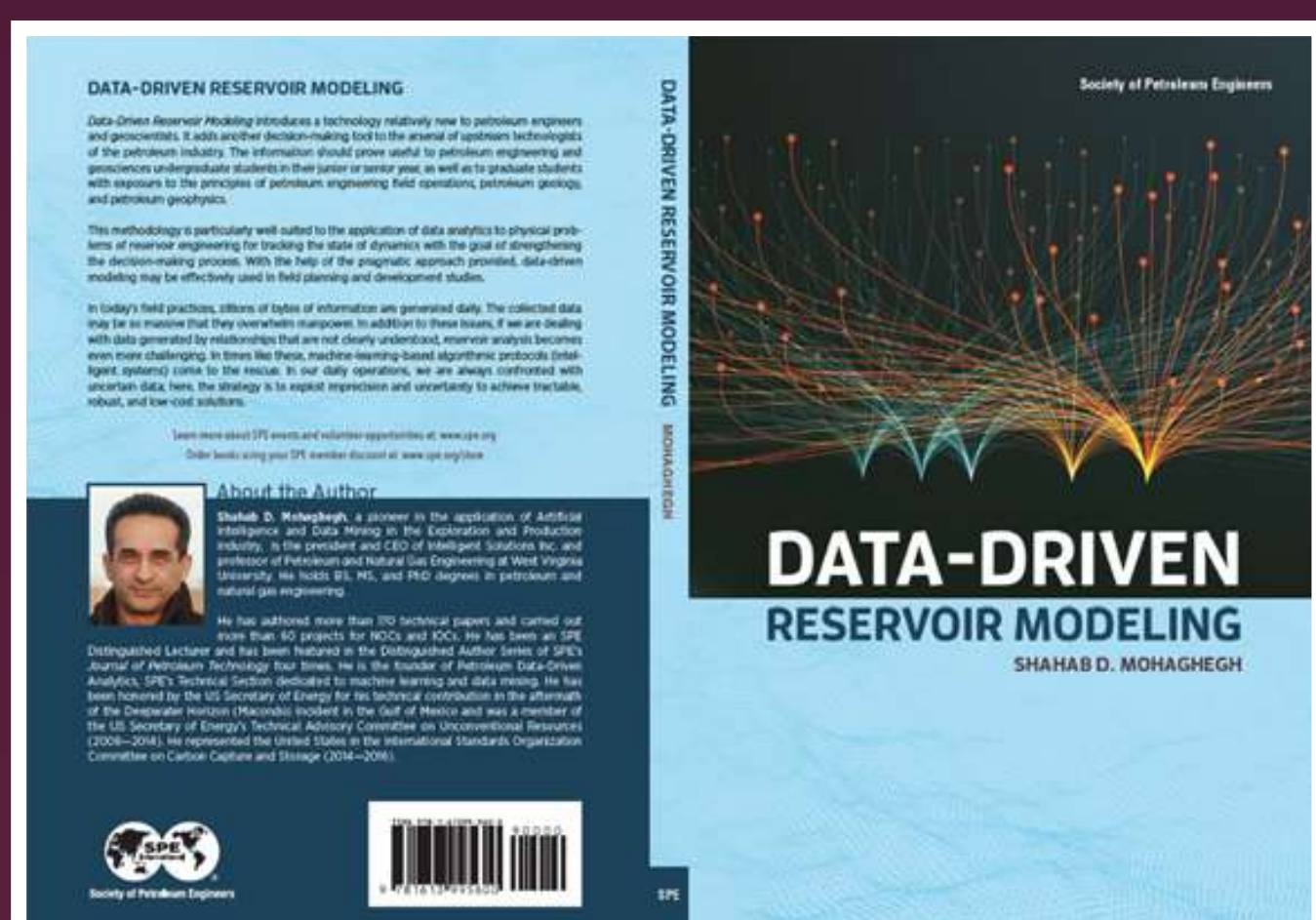


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He is the founder of SPE's Technical Section dedicated to AI and machine learning (Petroleum Data-Driven Analytics, 2011). He has been honored by the U.S. Secretary of Energy for his AI-based technical contribution in the aftermath of the Deepwater Horizon (Macondo) incident in the Gulf of Mexico (2011) and was a member of the U.S. Secretary of Energy's Technical Advisory Committee on Unconventional Resources in two administrations (2008-2014). He represented the United States in the International Standard Organization (ISO) on the Carbon Capture and Storage technical committee (2014-2016).

BOOKS BY THE COURSE INSTRUCTOR



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