

Advanced Reservoir Characterisation Workshop using HampsonRussell

Lagos, Nigeria

30th June to 3rd July 2025



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Course overview

Participants will gain a solid understanding of AVO analysis, seismic inversion (deterministic and stochastic), Bayesian classification, and machine learning techniques using HampsonRussell, enabling them to predict reservoir properties and improve subsurface interpretation accuracy.

Course benefits

This hands-on workshop will equip geoscience professionals with practical skills to enhance reservoir Characterization workflows, integrate well and seismic data, reduce uncertainty in interpretation, and apply advanced GeoAI tools to real exploration and development challenges. Whether you're working in exploration or development, this course provides the tools and insight to support more confident decision-making and better well planning.

Software covered

HampsonRussell's Strata, AVO, LithoSI, Emerge, GeoSI and GeoAI

Who should attend?

Geophysicists, geologists, engineers, and technical staff who want to understand the theory and learn how to apply these increasingly critical techniques

Pre-requisite

Experience with HampsonRussell Software is NOT a prerequisite for this workshop, although students will become familiar with the functionality through attendance

Duration & Format

4 days

Instructor-led, workflow-based, classroom training onsite in Lagos

Register now and take your reservoir characterization skills to the next level. Learn to extract more value from your data, reduce interpretation uncertainty, improve subsurface insight, and support reservoir evaluation and well planning.



Course Outline

Day 1: AVO Modeling & Analysis

Theory and Concepts

- Fundamentals of seismic wave propagation
- AVO principles and elastic properties
- Zoeppritz equations and their practical approximations
- Introduction to anisotropy and its impact on AVO responses

Practical Session

- Preparing seismic gathers for AVO analysis and Inversion
- Generating and interpreting AVO attributes
- Cross-plotting and classifying AVO responses
- Case studies highlighting real-world AVO challenges and solutions

Day 2: Deterministic & Stochastic Inversion

Theory and Framework

- Fundamentals of seismic inversion: reflectivity, wavelets and initial models
- Deterministic inversion methods: band-limited, model-based, colored and sparse-spike methods
- Simultaneous inversion on pre-stack data. Elastic impedance and Lambda-Mu-Rho approaches
- Introduction to stochastic inversion: Bayesian principles and uncertainty quantification. Overview of deterministic vs. stochastic inversion

Practical Session

- Applying band-limited, colored, and model-based techniques on post-stack data
- Pre-stack simultaneous inversion
- Implementing stochastic inversion workflow
- Evaluating inversion results: QC checks and interpretation



Day 3: Interpretation of Inversion Result – Bayesian Classification and Machine Learning Theory and Methodology:

Bayesian Classification Overview:

- Fundamental principles of Bayesian inference and Probability Density Functions
- Step-by-step workflow for lithology classification using Bayesian methods

Introduction to Neural Networks and Machine Learning:

- Basic concepts of neural network architecture, training and validation
- Applying deep neural networks to predict reservoir properties

Practical Session

Bayesian Classification:

- Defining litho-classes and optimizing PDFs
- Using workflows to generate lithology probability volumes
- Interpreting classification results with confidence

Neural Network-Based Reservoir Property Prediction:

- Building and training neural network models using seismic attributes and well data
- Generating 3D reservoir property volumes from seismic data and validating results

Day 4: Machine Learning for Reservoir Characterization (GeoAI)

Introduction and Theory

- Supervised learning workflows and neural network basics
- Role of synthetic data in improving machine learning models
- Convolutional Neural Networks (CNNs) and transfer learning for seismic applications

Practical Session

- Training CNNs on synthetic and real seismic data
- Generating elastic and rock property volumes using GeoAI
- Comparing ML predictions with traditional inversion methods
- Quality control and final interpretation of machine learning outputs



Profile

With over 12 years of experience in geophysics, Pavel specializes in seismic inversion, AVO analysis, and the integration of machine learning in reservoir studies. He has worked extensively with GeoSoftware tools on projects across Europe, West Africa, and the Middle East, with a strong focus on practical application and workflow efficiency.