

# Petrogenium. Academy

Upstream (Geophysics)

## Quantitative Reservoir Characterization

Consultant / Trainer

**Jaap Mondt**



The **Petrogenium** (in collaboration with EPTS) **Quantitative Reservoir Characterization** participants in this course will gain a deep understanding of how to derive and interpret rock properties—such as porosity and fluid saturations—from quantitative analysis of pre-stack seismic data, which is central to reservoir characterization and exploitation. They will learn the importance of selecting and applying appropriate rock-physics models, with particular attention to the challenges of carbonate reservoirs where results are less unique compared to clastic reservoirs.



### Participants

This **Petrogenium**. course aims at Geologists, geophysicists, petroleum and reservoir engineers, involved in exploration and development of hydrocarbon fields. That means not only those involved in the production side but also geoscientists designing the acquisition of seismic and non-seismic data needed for Quantitative Interpretation.



### Learning Objectives

At the end of the course participants will have a solid foundation in Seismic Quantitative Interpretation. The aim of the course is to provide a solid conceptual understanding without going into mathematical detail. It uses a mixture of lectures, practical exercises and direct (workshop-like) participant involvement, complemented with case histories. Use of laptops for exercises and WIFI internet access in the classroom is mandatory.

# Programme

## Day 1

1. Biography, Program, Moodle, 52 Things, How a Geophysicist, Teams
2. Geophysical Methods, Seismic Acq & Proc, Workflow, Seismic for QI
3. Exercise: Resolution I (paper)
4. Rock Physics
5. Videos: Rock Physics (26:30)
6. Effective Media
7. Seismic Resolution: Point-Spread or Resolution Functions
8. Exercise: (Resolution) Resolution II (computer)
9. Team a: Preparation Summary of day 1

## Day 2

1. Team a: Summary of day 1
2. Structural & Stratigraphic Interpretation, Tuning: Simmons & Backus
3. Exercise: (Tuning) Tuning Wedge, Tuning AVA (computer)
4. Exercise: Effective Media (paper)
5. Videos: EAGE Gassmann Fluid Replacement, EAGE AVO
6. Effective Media, Anisotropy, AVA
7. Exercise: AVA (computer)
8. Preparation Summary of day 2

### Why select Petrogenium.?

The above support will be provided by principal consultants with 30+ years world-class experience in the technology and hands-on know-how from operation of refinery units.

### Contact Petrogenium.:

Email: [training@petrogenium.com](mailto:training@petrogenium.com)

Website: <https://www.petrogenium.com/training/>

***Because Experience Matters***

# Programme

## Day 3

1. Team b: Summary of day 2
2. EI, EEI, EPI, Lambda-Mu-Rho
3. Exercises: AVA ( $\Delta RPP$ ,  $\Delta RSS$ ) (computer)
4. Inhomogeneity & Anisotropy
5. ML Tutorial I
6. Exercise: AVA Rps (computer)
7. Videos: EAGE Wave Equation AVO, Activation Functions
8. Exercise: V-NMO-azi
9. Exercis: AVA VTI HTI (computer)
10. Exercise: AVA HTI Ortho (computer)
11. Team c: Preparation Summary of day 3

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## Day 4

1. Team c: Summary of day 3
2. AVAz Fractures, Machine learning,
3. Exercise: (Fractures) AVA lith1,lith2 (computer)
4. ML AVO Tutorial II, Inversion
5. Exercise: ML Classification (computer)
6. Videos: Classification, Inversion vs Machine learning I, Clustering
7. Exercise: ML AVA Tutorial II (computer)
8. SOM
9. Exercise: ML Clustering (computer)
10. Supervised, Unsupervised and Semi-Supervised learning
11. Team d: Preparation Summary of day 4

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# Programme

## Day 5

1. Team d: Summary of day 4
2. Videos: Hydrocarbon Indicators, Gassmann
3. Exercise: Gassmann Fluid Replacement (computer)
4. ML Keras, TensorFlow
5. Exercise: ML Regression (computer)
6. Video: You ain't seen nothing yet.
7. Exercise: Google Colab I
8. Gassmann subsalt rock
9. Exercise: Google Colab II
10. Course evaluation

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