GEOSCIENCE TRAINING

Four Dimension Education, Training & Management Consultancy (4Dimension)

4Dimension is an ISO 9001:2008 certified training organization which aims to offer all clients high quality and creative solutions for all aspects of employee competency and development.

4Dimension courses are unique, developed in the context of a carefully nurtured relationship with each one of our clients.

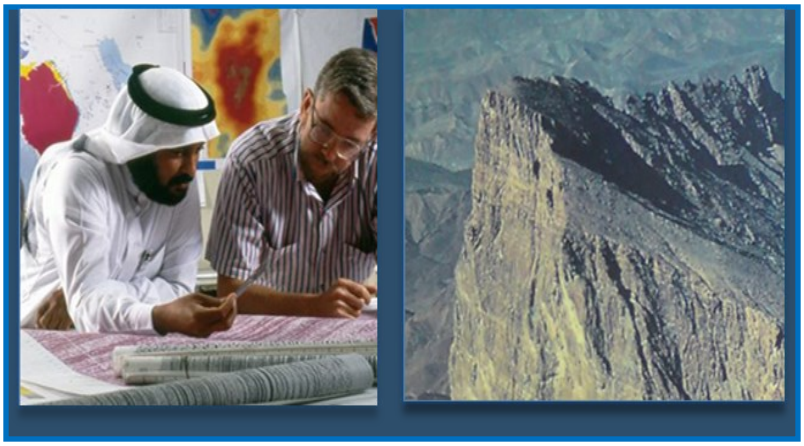
We provide multiple Geoscience Training Programs.

1. **Petroleum Geology for Non-Geoscientists**
2. **Seismic Stratigraphy Workshop**
3. **Applied Sequence Stratigraphy**
4. **Deepwater Reservoirs**
5. **Carbonate Reservoirs**
6. **Fluvial and Shallow Marine Reservoirs**
7. **Reservoir Characterization**

All the participants can incorporate company specific case studies into class room exercises.

Contact us:

4Dimension
PO BOX 33771 Abu Dhabi, UAE
Tel: **+971 2 6772216**
Fax: +971 2 6772217
Email: **marketing@4d-uae.com**
Website: www.4d-uae.com



PETROLEUM GEOLOGY FOR NON-GEOSCIENTISTS

5 DAYS

This course is geared towards managers, engineers, IT personnel, geotechs (aka 'data managers'), petroleum economists, HSE Personnel, and petro physicists. Participants will be not only get a broad overview as to what geoscientists in their teams do, but also what their capabilities are.

Unlike a lot of similar courses taught through training providers, the purpose of this course is not to make an amateur geologist out of you. The idea is for you to understand presentations at meetings and to create a better understanding between your roles.

Day 1. Rock Types, depositional systems, and factors governing reservoir quality.

Day 2. Hydrocarbon generation, migration and entrapment. Structural styles and trapping mechanisms.

Day 3. Exploration tools: Seismic, well log and core data. Costs and hazards of data collection, processing, drilling and wireline logging.

Day 4. Conventional vs. Unconventional Reservoirs and their challenges.

Day 5. The role of geoscientists in the oil and gas business, What geoscientists can and cannot do for you, training for your staff, role of consultants, timelines and costs for assigned tasks, hiring summer interns and full time employees—bringing in the right skills set for your team.

GEOSCIENCE TRAINING

APPLIED SEQUENCE STRATIGRAPHY
5 DAYS

Several companies teach sequence stratigraphic courses. I would argue that each company has a different version. The key-word here is 'applied.' That means the course is not academic, I will not bore you with details of trying to figure out whether the cyclicity in your basin is from climate-change, tectonics etc, we won't spend ages drawing Wheeler Diagrams for your basin, and we certainly won't be drawing coastal onlap curves.

The objective of this course is to help you find more oil and gas using well-logs, core and seismic data. This is a prerequisite course for others listed here. Participants are urged to enrol in this before enrolling in more detailed courses. Topics include the recognition of key sequence stratigraphic surfaces and systems tracts in seismic, well-logs, core and outcrop. Exercises during the course will teach participants how to chronocorrelate wells using wireline logs and core.

Day 1. Introduction, applications, 4 events 7 surfaces and their recognition in core, well-logs and seismic. Siliciclastic sequence stratigraphy and prevalent models

Day 2. Carbonate sequence stratigraphy and its control on reservoir distribution and quality, recognition of key surfaces in core.

Day 3. Sequence stratigraphic models by the Exxon Group, Hunt and Tucker, Plint and Nummedal, Galloway's genetic sequences, T-R cycles of Ashton Embry and the use of 3G parasequences in correlation.

Day 4. Introduction to ichnology and its use as a tool in sequence analysis of shelf systems. High impact biostratigraphy.

Day 5. Introduction to sequence analysis on seismic lines.

SEISMIC STRATIGRAPHY WORKSHOP
5 Days

This is a hands-on course (workshop format) where participants will spend most of their time performing sequence and seismic analysis on their own data along with seismic lines provided by the instructor. Original Exxon models covered in AAPG Memoir 26 will be covered in detail.

Participants will also be introduced to the up and coming field of clinoform trajectory analysis.

Day 1. Introduction, calculating seismic frequency and resolution, seismic impedance, pitfalls. Review of sequence stratigraphy.

Day 2.Seismic of reflection terminations such as onlap, offlap, toplap etc. Seismic facies analysis and how reflection configurations can be used to interpret environments of deposition, risk of reservoir presence and quality, and net:gross.

Day 3.Integration of biostratigraphic data with seismic data to perform sequence analysis. Seismic geomorphology: time, slices, horizon slices and stratal slices, attribute analysis including spectral decomposition and curvature.

Day 4. Seismic imaging of carbonate reservoirs: differentiating between attached shelves and isolated platforms and ramps, effects of karstification, and fracturing.

Day 5.(Half-Day).Clinoform trajectory analysis: Bruhn's Law, clinoform morphology, shelf vs shelf margin-clinoforms, siliciclastic vs carbonate clinoforms.

Note: Company specific case-studies can be incorporated into class room exercises
Prerequisites: Sequence Stratigraphy course.

GEOSCIENCE TRAINING

DEEPWATER RESERVOIRS

5 Days

This is an in-depth course which not only provides the background of process sedimentology required to understand deep-water systems but also teaches recognition of sediment gravity flows on sub-surface datasets.

At the end of this course participants should be able to:
On seismic data: differentiate between Mass Transport Complexes, Sediment Gravity Flows, and Contourites and predict Net: Gross values for each.
On well-logs: differentiate between channels, lobes, mass transport complexes and contourite deposits.
In core: identify processes responsible for sedimentary structures, bedforms and lithology and use these to determine environments of deposition and lateral continuity of reservoir.

Day 1. Introduction to deepwater oil and gas exploration, sequence stratigraphic controls on deepwater sedimentation, exercises on sequence analysis on seismic and well logs.

Day 2. Process sedimentology of deepwater systems: fluid gravity vs sediment gravity flows, hyperpycnites, debrites, contourites (bottom-current deposits), turbidites, hybrid beds, traction vs suspension bedforms, liquefaction and fluidization, mass transport complexes and the effects of processes on reservoir quality.

Day 3. Deepwater Channels: Hierarchy, fill, architecture, evolution, recognition in outcrop, core, well-logs and seismic.

Day 4. Deepwater Lobes: Hierarchy, fill, architecture, evolution, recognition in outcrop, core, well-logs and seismic.

Day 5. Latest models and techniques: Mike Gardner's BCFS, AIGR and SSEM models, LOBE and SLOPE consortia at the University of Liverpool, PAB consortium out of IFP, France, SPODDS out of Stanford.

CARBONATE RESERVOIRS

5 DAYS

This is a comprehensive course which has a lecture component and a workshop component. Participants will perform several exercises the aim of which is to familiarize them with carbonate depositional systems, microfacies and reservoir characterization. Participants are highly encouraged to bring-in seismic lines and well-logs from their own work projects.

The fifth day of the course can either focus on reservoir characterization or a 1-day core workshop on our company's core data.

Day 1. Controls on carbonate production, dolomitization models and effects on reservoir quality, leaching, dedolomitization and evaporite associations. Exercise: Modern carbonate depositional environments, facies distribution.

Day 2. Carbonate classification of Folk vs Dunham, Reef rock classification, Microbialite classification, microfacies: grain types, textures, and porosity. Exercise: Describing core and thin sections

Day 3. Carbonate factories of Schlager: T-factory, M-factory and C-factory, carbonate platforms types and associated plays. Exercise: How to approach a carbonate play by integrating seismic, well logs, and core

Day 4. Carbonate sequence stratigraphy and cyclicity: shelf cycles of ramps, Lofer and Latemar cycles, Brining upwards cycles, recognition of stratal discontinuities in core, well-logs and seismic, Carbonate seismology. Exercise: Identification of key-sequence stratigraphic surfaces

Day 5. Carbonate reservoir characterization: controls on porosity and permeability distribution, fractured carbonate reservoirs OR description of your company's carbonate core. Exercise: How to calculate Net: Gross in carbonate reservoirs

Note: Company specific case-studies can be incorporated into class room exercises. Prerequisites: None

GEOSCIENCE TRAINING

RESERVOIR CHARACTERIZATION

5 Days

This is a course designed for geologists, geophysicists, reservoir engineers and production engineers who wish to develop a better understanding of the factors that influence hydrocarbon flow in their reservoirs. The course not only covers conventional sandstone and carbonate reservoirs but introduces participants to different types of unconventional reservoirs as well.

Lithologies, depositional environments, the role of sequence stratigraphy in connectivity and compartmentalization, influence of fractures on reservoir quality and reservoir parameters such as porosity, permeability and net: gross are covered in detail.

Day 1. Introduction to reservoir characterization and its role in the Exploration and Production Cycle. Clastic lithologies and sedimentary structures. Fluvial Sandstone Reservoirs. Shallow Marine Sandstone Reservoirs

Day 2. Deep Marine Sandstone Reservoirs. Sequence Stratigraphy of Siliciclastic Reservoirs. Exercise on siliciclastic core. Lithocorrelation vs Chronocorrelation and its effects on perceptions of reservoir connectivity and compartmentalization

Day 3. Introduction to Carbonates and their lithologies. Schlager's Carbonate factories and builders through time. Carbonate Platforms: Ramps, Rimmed Attached Shelves, Isolated Platforms. Exercise on carbonate core

Day 4. Carbonate Sequence Stratigraphy. Reservoir parameters of carbonate and siliciclastics reservoirs: porosity, permeability and different methods of calculating net:gross. Exercise on calculation of N:G for clastics and carbonates

Day 5. Introduction to Unconventional Reservoirs: Fractured Shale Plays, Tight Gas Sandstones, Basin-Centered Gas, Coalbed Methane, Salt entrapped sandstones, Microporous Carbonates. Mechanical Stratigraphy and Fractured Reservoirs. Introduction to Geomodeling. Exercise on property modeling.

FLUVIAL AND SHALLOW MARINE RESERVOIRS

5 DAYS

The course is designed for geoscientists and reservoir engineers who primarily focus on 'shallow marine' successions, especially those involved in building or updating geomodels.

Besides presenting standard facies models, quantitative modelling equations are presented in exercises. By the end of the course participants will be able to predict reservoir geometries, dimensions, and N:G of fluvial and paralic sedimentary systems and look for stratigraphic traps. Given below is a detailed outline:

Day 1. Introduction to the course and sedimentary structures in fluvial to shallow marine successions. Fluvial systems: classification of rivers, architectural elements, prolific global fluvial reservoirs, exercise on calculating channel dimensions and geometry using core or borehole image log data.

Day 2. Deltaic systems: Wave, Tidal, Fluvial processes, deltas through sea-level cycles, architecture, fan-deltas, gilbert-type deltas, shelf-margin deltas and supply of sand into the basin and reservoir prediction using clinoform trajectory analysis on seismic lines.

Day 3. Incised Valley Systems and Tidal Systems: Distribution of reservoirs and their vertical stacking patterns, exercise focuses on describing shallow marine core.

Day 4. Barrier Islands, Shorefaces, Spits and Washovers: How to differentiate between each? Effects of stacking patterns on Kv and Kh, N:G changes, exercise on well correlation.

Day 5. Workshop on the identification of Gross Depositional Environments in well-logs.

TRAINER'S PROFILE:

DR. ALI JAFFRI

Dr. Ali Jaffri is a **Consultant Sedimentologist** with **international experience in unconventional and conventional reservoirs**. His specialization include **Sequence Stratigraphy**, **Seismic Stratigraphy**, **Core Description**, **Seismic interpretation**, and **Well-log analysis**. He is proficient in **Petrel**, **Carbonate Petrology**, **Sedimentology**, and **Geomodelling**, people skills, teaching and training.

Dr. Ali's **unconventional reservoir experience** include **Geological Consultant** at Statoil (Norway and theUSA), and Brigham Oil and Gas(USA), **Operations Geologist** at Chevron (USA) and Delta Petroleum (USA), a **Researcher** in Oklahoma State University and The Oil And Gas Development Corporation Of Pakistan (USA).

His **conventional reservoir experience** include **Geological Consultant** at United Energy Pakistan, Next Instructor at Schlumberger (USA), aSenior Reservoir Geologist atVNG Norge (Norway).

In teaching and training, Dr. Ali taught **Fluvial and Shallow Marine Reservoirs** course at United Energy Pakistan. He led field---trip titled "**Outcrop analogs for fluvial and geo-modeling applications**" for Statoil in the Book Cliffs of Colorado, USA. He taught **Applied Sequence Stratigraphy** and **Seismic Stratigraphy** courses to United Energy Pakistan. Also, he taught **Applied Sequence Stratigraphy** and **Seismic Stratigraphy** courses to Kuwait Energy Company. He initiated in-house training in sequence and seismic stratigraphy at VNG and held 5-day courses at the Stavanger, Oslo (Norway), and Leipzig (Germany) offices.

Dr. Ali taught **Seismic Stratigraphy** course to BP, Pakistan Oilfields Limited, Ocean Energy and Oil and Gas Development Corporation (OGDCL) geoscientists and **Fundamentals of Sequence Stratigraphy**.

Qualification and Skills:

- **PhD, Petroleum Geology**at Colorado State University, Fort Collins, USA
- **Masters, Geology** at Oklahoma State University, Stillwater, USA
- **Bachelors, Geology** at University of Colorado, Boulder, USA
- Computer Skills: Petrel, Geolog, PathFinder, Stratworks, Seisworks, Petra, SMT King Suite, HTML, and Canvas.

4Dimension
PO BOX 33771 Abu Dhabi, UAE
Tel: +971 2 6772216
Fax: +971 2 6772217
Email: marketing@4d-uae.com
Website: www.4d-uae.com