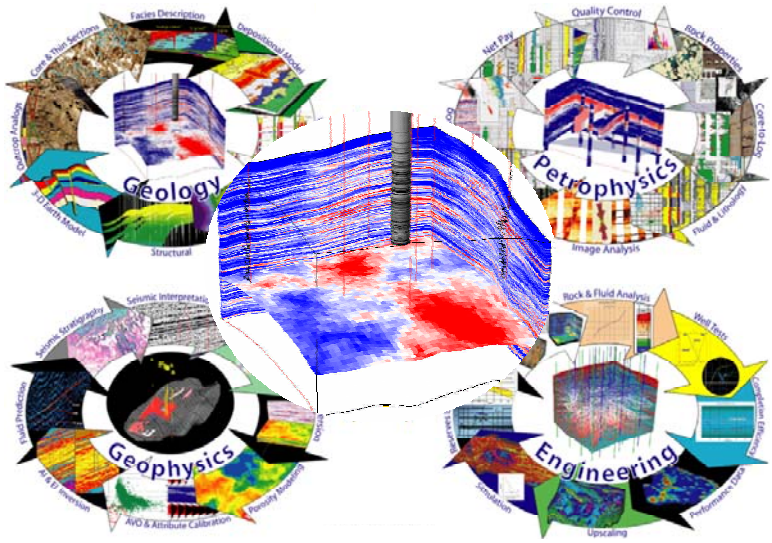
Training
in Reservoir Characterization and Simulation

The solution to complex and challenging hydrocarbon reservoir problems requires the participation of disciplines that provide different and complementary insights about the reservoir. However, very little training is available to address the multidisciplinary, integrated nature of reservoir characterization and simulation projects. **Typical oil industry training** is usually focused on improving skills in one discipline, with little emphasis on integrated solutions that aim to solve a common problem.

Classes that explain the "how-to" details of all the different disciplines that may be involved in a reservoir characterization project (geology, petrophysics, geophysics, geochemistry, rock mechanics, geological modeling , reservoir engineering and flow simulation) are not available in the training market because they would be costly and time consuming.

iReservoir offers two types of training courses on reservoir characterization:

- Taylor made to fit client needs.
- General overview.



Goals of the General Overview Reservoir Characterization Class

- ***Identify problems and solutions along different phases of the value chain.***
- ***Examine how the team should be structured, what questions should be asked and what tasks should be performed.***
- ***Address different workflows and data requirements for conventional and unconventional hydrocarbon plays.***
- ***Teach the fundamentals of reservoir characterization to enable a clearer understanding of the components and details of how they fit together in subsequent "how-to" training courses focused on individual disciplines.***
- ***Illustrate integrated workflows for data rich exploitation phases and explain how the workflows may vary for both shorter time frames and/or limited data scenarios.***

In the class designed to meet specific client needs, participants learn the details of a reservoir characterization workflow by applying the concepts and methods to a data set of their interest. Under this category, iReservoir works in the data first and then teaches the client the details of the different methods and choices made during the study. The actual teaching can be done at the client's facilities or at iReservoir's offices.

The general overview class is **aimed at multidisciplinary teams of geoscientists and engineers** of various degrees of experience but with a common desire of learning about the language, assumptions and contributions of all disciplines. By providing numerous examples, the class emphasizes the need of interactions among disciplines during the life of the reservoir characterization project, as opposed to the common practice where one discipline passes results to the other "over the fence" which can result in pitfalls.

At the end of each class, participants understand the contributions from all team members (geologist, petrophysicist, geophysicist and reservoir engineer) to an integrated reservoir characterization project. They also learn the value of geological, petrophysical, geophysical and engineering data and methods required for the project and determine the key questions which have to be addressed and answered by the integrated team.

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Reservoir Characterization Class Table of Content

Day 1: Geology
- Stratigraphic controls on heterogeneity and productivity
  - Stratigraphic concepts for reservoir characterization
  - Flow units/reservoir rock properties
  - 1-D analysis, interpretation, 2-D analysis, correlation
  - Depositional environments
- Structural controls on heterogeneity and productivity
  - Key surfaces, faults
  - Fracture controls

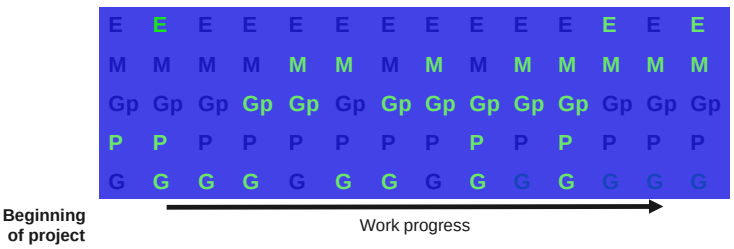
Day 2: Reservoir Petrophysics/Rock Physics
- Data sources, logging tools
- Log quality control and log data normalization. Core QC
- Petrophysics conventional analysis and models
- Permeability, fluid identification
- Reservoir compartments identification
- Lithology estimates, core-to-log calibrations
- Rock physics, rock mechanics
- Production logs, special reservoir characterization logs
- Unconventional reservoir analysis

Day 3: Seismic Technology
- Fundamentals of seismic wave propagation
- Seismic data acquisition
- Seismic data processing and imaging
- Structural framework
- Time to depth conversion
- From seismic amplitudes to elastic properties
- What to do with elastic properties
- Seismic based fracture characterization
- Other remote sending methods

Day 4: Construction of geological models
- What do we need from a geomodel
- What data is required
- Integration of seismic data
- Structural and stratigraphic framework
- Facies and lithology
- Porosity, permeability and water saturation
- Net-to-gross considerations, static pore volume
- Volumetric uncertainty analysis
- Fracture models
- Unconventional resource models
- Up-scaling for flow-simulation

Day 5: Reservoir Dynamics
- Important factors in behavior of dynamic systems
- Data and interpretation for dynamic behavior
  - PVT / fluid properties
  - Multiphase flow
  - Stress impacts on fluid flow
  - Wellbore flow
  - Dynamic well tests and production analysis
  - Performance analysis
- Forecasting economic recovery
  - Simulation grids , PVT data
  - Rock and fluid interaction
  - History matching and forecasting

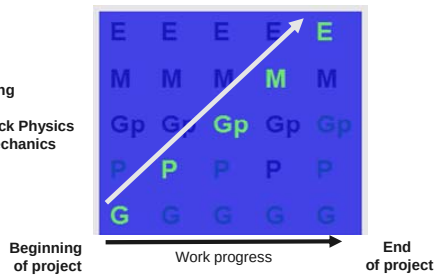
Integrated Approach to Reservoir Characterization



We teach your team the value of this...

Common Sequential Approach to Reservoir Characterization

E = Engineering
M = Geological modeling
Gp = Geophysics
P = Petrophysics & Rock Physics
G = Geology & Geomechanics



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