

# Geocellular Modelling

## A Three Day Advanced Training Course

### Introduction

Recent advances in geocellular modelling often overlook the importance of fundamental geological concepts; environment of deposition and process, facies, reservoir architecture, net to gross, and how each of these components are appropriately represented in the geocellular model.

This course does not rely on the prior knowledge or understanding of any particular modelling software. Instead the course aims to explain the importance of these fundamental concepts and the optimal method of integrating and translating basic geological concepts into a geocellular model.

GCA will present Case Studies to demonstrate the outcome of different approaches to assessing reservoir volumes, connectivity and how these assumptions affect management decisions.

The attendees will be guided through the importance of all datasets and the process of integrating geological, petrophysical, geophysical, production data and analogue models. The attendee will leave with an understanding of the relative importance of each dataset and how each influences different aspects of reservoir architecture and flow behaviour.

### Why GCA?

Gaffney, Cline & Associates has provided broad-based and focused technical and commercial advice to international E&P community for over 50 years. Our staff capabilities cover all of the disciplines found in an integrated oil company. GCA's technical professionals rely on their ability and extensive industry experience to analyse and prioritise issues presented in often complex datasets which require optimisation, leading to the rapid delivery of solutions to the clients. GCA staff are always objective, independent and committed to providing the optimal solution.

This course has been designed to utilise GCA's experience gained in the evaluation of many reservoir models. The course provides a critical review of reservoir modelling, and the potential impact that the choice of method can have on volume estimates, reservoir connectivity and how the static model is a key deliverable in reservoir simulation.

GCA has wide experience in working on clastic and carbonate reservoirs in most of the major petroleum basins worldwide. This includes building, auditing and advising on best practice in both static and dynamic modelling workflows for the E&P industry. Optimising static and dynamic models to suit Client objectives, differentiates GCA from the competition.

### Seminar Objectives

- Define Objectives of the Modelling Process
- Provide an Overview of Best Practice Reservoir Modelling Workflows
- Clarify Key Definitions, Guidelines and Methods used for Geocellular Modelling
- Explain Limitations of Geocellular Modelling
- Learn How to Create both a Geologically and Statistically Robust Model
- Optimise the Geological Model for Simulation, Reserves and Resource Audit or Development Planning

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### Seminar Structure

#### Day 1: Modelling Principles and Preparation

- Why Build a Model?
- How to QC your Data
- Geocellular Modelling Concepts
- Map Based Approaches?
- Basic Statistical Concepts
- Deterministic versus Stochastic Methods
- Incorporating Reservoir Engineering Observations
- Modelling Field Life: Pre-Appraisal to Mature Development
- What is Spatial Correlation?
- What is Data Bias and why is it Critical?

#### Day 2: Incorporating Geology in the Model and Available Methods

- Conceptual Geology: How to Represent the Geology
- Depositional Architecture and Hierarchical Schema
- Resolutions of Data (Core to Log to Model)
- The Modelling Method: Simple versus Complex
- The Reservoir as a Container
- Gridding
- Reservoir Layering
- Facies Modelling: Geostatistical Pros and Cons

#### Day 3: Property Modelling and Applications of Model

- Reservoir Properties: what to Model and what not to Model
- Net/Gross: Implications in Integrated Reservoir Studies
- Total Property Modelling v/s Effective Property Modelling
- Porosity and Permeability
- Water Saturation
- Critical QC and Checks
- Field Development Planning vs Reserves Audit
- Defining Uncertainty
- Uncertainty Management
- New Data: Updating and Refining

### Seminar Arrangements

The seminar is designed to add value and understanding across the subsurface disciplines for those who are involved in reservoir characterisation.

GCA is flexible in the provision of the seminar in terms of location, number of attendees and tailoring to specific focus areas. The seminar would typically be held in a client's office to permit for bespoke discussion. GCA also provides public, group seminars, for which we would arrange location following on from level of interest and geographical preference. Even at a public seminar, GCA can provide some tailoring of topic to suit the attendees.

Given the range of alternative options, please contact GCA to discuss specific requirements. We will always attempt to meet the requirements of our clients.

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### Course Leader



Sumon Bhattacharyya, MSc, CGeol, FGS: GCA Global Geological Modelling Advisor, A Senior Geologist with 23 years' experience in Geological and Geophysical interpretation, Geocellular Modelling and Seismic to Simulation workflows. Significant project experience in geocellular modelling for both carbonate and clastic reservoirs and expert knowledge of application and algorithm design for mapping and geocellular modelling. Worked on several integrated field studies and field development studies for several brown and green fields worldwide (Algeria, Angola, Abu-Dhabi, Brazil, Canada, China, Equatorial New Guinea, Indonesia, India, Israel, Iran, Iraq, Kazakhstan, Malaysia, North Sea, Nigeria, Oman, Romania, Russia, Sudan, Syria, Turkmenistan, United Kingdom, USA, Mexico, Mozambique, Vietnam, Venezuela etc.).

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