

---

## N548: Reservoir Modelling for Storage

Instructor(s): Mark Bentley and Tim Wynn

### Format and Duration

Classroom - 3 Days

Virtual - 5 Sessions

---

## Summary

Modelling the ‘storage complex’ requires us to build models that encompass not just the target reservoir for drilling, but also the surrounding rock volumes, including the lateral volumes where the injected fluid plume is expected to migrate to. This draws on a need to capture the geomechanics of these rock volumes, and also to model on a scale that can support seismic monitoring of the moving plume – a larger scale than we would normally model for production alone. However, the supercritical fluids involved are particularly sensitive to reservoir heterogeneity. Rather than hindering our objective, as in the case of production, heterogeneity can be an advantage for storage either through the creation of compartments or through direct capillary trapping – a smaller scale than we might normally model for production. This course will summarise the unique issues when modelling for storage. Participants will learn to consider fluid properties, heterogeneity, geomechanics, seismic monitoring, and scale when carrying out reservoir modelling for storage.

**Business Impact:** We will never cease to be interested in **fluid flow in the subsurface**. The same reservoir and simulation technologies that have been developed in the pursuit of producing oil and gas resources will continue to be required in the future, not only for a declining production of hydrocarbons, but for disposal of CO<sub>2</sub> and the storage of energy itself. Although sharing common areas, the **models** we build for **storage** will nevertheless **differ in a number of ways compared to those we use for production**.

## Learning Outcomes

Participants will learn to:

1. Understand the distinction between modelling for storage vs. production.
2. Describe the data required to build a useful storage model.
3. Explain the impact of heterogeneity on model design.
4. Describe how to go about designing a modelling study for storage, encompassing the use of multiple packages, applied at multiple scales.
5. Assess the uncertainties associated with modelling for storage.

## Training Method

This is a classroom or virtual classroom course comprising a mixture of lectures, discussion, case studies, and practical exercises.

## Who Should Attend

Anyone involved in the modelling and monitoring of the subsurface for storage; geophysicists, geologists, petrophysicists, reservoir engineers.



---

## N548: Reservoir Modelling for Storage

Instructor(s): Mark Bentley and Tim Wynn

### Format and Duration

Classroom - 3 Days

Virtual - 5 Sessions

---

## Course Content

The following topics will be covered:

### Session 01

- Summary of issues – storage vs. production
- Fluid properties – CO<sub>2</sub> physics and chemistry to capture

### Session 02

- Essential heterogeneity
- The storage complex

### Session 03

- Data requirements for geomechanics
- Geomechanical modelling techniques

### Session 04

- ‘Coupled’ modelling
- Forward-modelling for seismic monitoring

### Session 05

- Multi-scale modelling
- Synopsis – Reservoir Model Design