# Inversion & Integration – in a geological framework

**Patrick Connolly[1]**
[1]*BP, Sunbury, UK*

## Abstract

 Reservoir characterization is invariably a data integration exercise; we need all the help we can get from all available data. This also makes it a multidisciplinary process that may typically involve geologists, geophysicists, petrophysicists and reservoir engineers. However as geophysicists we tend to associate reservoir characterization with inversion, carried out in a geophysical domain. But this is not a natural domain for other disciplines.

Bayesian methods provide a framework for data integration and our instinct is to translate the priors and likelihoods, with their associated uncertainties, into velocities and densities. But it would be more inclusive if we could work in a geological domain with parameter uncertainties defined directly in terms of reservoir parameters. As well as providing much greater transparency this would mean the integration step is moved towards the end of the process rather than the beginning which would allow each discipline to have a better understanding and control over their contribution and more easily adjust it as new data and new insights become available.
In this talk I'll illustrate how such an integration scheme may work. I'll demonstrate direct approaches to estimating reservoir parameters from seismic with their associated uncertainties and show how these can then be taken into a multidisciplinary integration process. I'll also demonstrate parameter estimation in a Shakespearian framework!