



## NERC Centre for Doctoral Training in Oil & Gas (2017 start)

**Project Title:** Determining the age of oils using flowering plant biomarkers

**Host institution:** Oxford

**Supervisor 1:** Stuart Robinson

**Supervisor 2:** Erdem Idiz

**Additional Supervisor (s):**

**Project description:**

In some basins, determining the age of oil is a critical step in identifying the source rock and thus constraining the history of the petroleum system. This is particularly true if there are multiple possible source rocks or the potential source rocks have not even been identified. Age-diagnostic, organism-specific biomarkers within oils can, potentially, help provide age constraints if the original stratigraphic range and geographic distribution of the source organism is well known. Biomarkers sourced exclusively from flowering plants (angiosperms), such as the oleonoids, have been used to distinguish, principally, mid-Cretaceous and younger sourced oils from older ones (e.g. Moldowan et al., 1994). However, this broadbrush stratigraphic delineation does not fully reflect the known range of the stratigraphic evolution and palaeogeographic distribution of angiosperms. Angiosperms first appeared in the geological record during the Early Cretaceous at low palaeolatitudes, before gradually radiating to higher (polar) palaeolatitudes. By the end of the Cretaceous they were the dominant component of global flora. In order to better constrain the use of angiosperm biomarkers as a method of 'dating' oil, it is critical that the differences in the timing of the appearance of angiosperms in different palaeogeographic localities is considered and incorporated into any assessment of an oil with unknown origins. This project will aim to refine our knowledge of the biomarker record of angiosperm appearance and geographic dispersal using globally distributed organic-carbon-rich sediments and oils sourced from stratigraphically well-constrained source rocks. This has potential to impact on modelling and exploitation of frontier basins and those with little existing constraint on subsurface geology.

Reference: Moldowan et al., (1994), Science, 265, 768-771.

**CDT Research theme(s):**

Exploitation in Challenging Environments

**Research context:**

Current PhD students in the department (funded by NERC, University Scholarships and Industry) are working on characterizing source rocks in the Jurassic and Cretaceous elsewhere, aspects of Mesozoic stratigraphy, palaeoclimates and palaeoceanography. These students use a broad range of geological, organic and inorganic geochemical tools and this project would complement, and benefit from, the existing group.

**Research costs:** Key budget items include travel to sample outcrops and core repositories, and funds for geochemical analyses in Oxford.

**Career routes:** A successful student will be well qualified to undertake a number of career paths in academia or industry including in specialist research, oilfield services, or upstream exploration.

Submissions must conform to this single-sided A4 format. The Awards Committee reserves the right not to consider submissions that do not adhere to this condition.