

PhD Research Studentship (3 years)

Controls on fracture propagation across sealing faults in petroleum reservoirs: a numerical modelling study

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Faults may act as major barriers to fluid flow within the subsurface. In some cases, this allows them to trap hydrocarbons over geological time and hence create traps for oil and gas. Intrareservoir faults can, however, compartmentalize reservoirs resulting in decreased recovery or the need to drill more wells. A key factor influencing the ability of faults to act as barriers to fluid flow is whether or not they are cut by later open fractures. Evidence from outcrop suggests that in some cases fracture propagation is prevented by the presence of faults, which will mean that they continue to act as barriers to flow. In other cases, the fractures propagate through the faults in which case the faults will no longer act as a barrier to flow.

There are currently no robust methods to predict whether fractures are blunted by faults or propagate through them. Here we propose to conduct a study to identify the controls on fracture propagation through faults and then use the results to develop a workflow that will allow the sealing capacity of faults in fractured reservoirs to be predicted based on standard information that is available to geoscientists (e.g. seismic, wire-line log and core data).

The project will develop analytical and numerical models for fracture propagation in anisotropic and heterogeneous media. If necessary, the study will also conduct laboratory experiments and outcrop observations to provide basic input data for the models and to validate their results.

The successful applicant is likely to have a strong engineering background. They will be based at Warwick University but will regularly travel to Leeds for meetings and to use the facilities of the Wolfson multiphase flow laboratory.

Funding: The studentship covers tuition fees at the UK/EU rate (£4,191 at the 2018/19 rate) and standard stipend (£14,700 at the 2018/19 rate) per annum for three years.

For informal enquiries or formal applications, please send a CV, a covering letter stating how your interests and experience relate to the project, your academic transcripts and the names and email addresses of two academic referees to Dr Mohaddeseh Mousavi Nezhad, email: m.mousavi-nezhad@warwick.ac.uk.

Closing date: 15 August 2018.