Bay Area Geophysical Society Seminar Series

Joe Stefani

Chevron

February 20, 2019

4pm Rm 265 McCone Hall UC

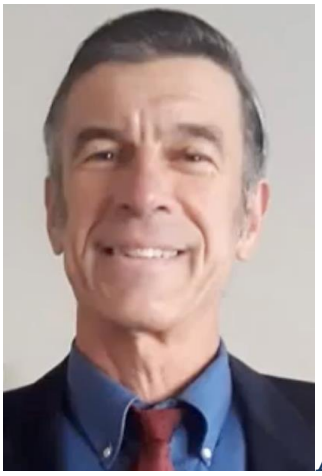
Berkeley Campus

Seismic Geomechanics: What, Why, How

Abstract: Seismic Geomechanics is the use of seismic data for geomechanical inference and of geomechanical data for seismic inference. The better-constrained quantity is used as a constraint on the other, or each can bring equal information into an inversion. Areas of application of seismic geomechanics include earth model building for seismic imaging in complex geology, for which elementary geomechanics can provide velocity constraints; reservoir monitoring, for which seismic data are used to estimate pore pressure evolution during hydrocarbon production in conventional reservoirs and to estimate effective fracture volumes in unconventionals; and estimation of hazard potential in the reservoir and overburden, for which seismic data are used to estimate potentially hazardous strains that can cause wellbore shearing and can induce seismic events. The uncertainties associated with these inversions can be significant because things

seismic and things geomechanical are separated by several inferential bridges. Apart from our general ignorance of important details of earth heterogeneity, inferential leaps in our models include the connection between seismic data and velocity/anisotropy changes, between velocity/anisotropy changes and stresses/strains, and between stresses/strains and the causative event or condition of interest. This talk will illustrate the "what" and "why" of seismic geomechanics in applied geophysics and give a view into the uncertainties associated with the "how".

Speaker Bio: Joe Stefani is Geophysical Consigliere in Chevron Energy Technology Company, San Ramon, and has worked for 35 years in various "A&R" R&D areas of seismology: acquisition, anisotropy, tomography, imaging, seismic scattering & forward modeling and earth model building. He has built several industry benchmark earth models including "Sigsbee" and several SEG "SEAM" incarnations. Seismic Geomechanics is the current and likely last chapter (of unspecified length).



After the talk: We will gather at Matiki Island BBQ and Brew (no host) 1828 Euclid St (300ft from North Gate entrance on Euclid)