

2023 ARMA Future Leader Webinar Series

Every Two Weeks on Fridays 9-10 AM MT



17th lecture: November 03, 2023

Please reach out to shahrzad.roshankhah@utah.edu to get the Zoom meeting information.

Speaker: Mao Sheng

Artificial Intelligence assisted real-time diagnostics of hydraulic fracturing in unconventional reservoirs

Hydraulic fracturing diagnostic is highly required for efficient stimulation in unconventional reservoirs. Real-time diagnostics for hydraulic fracturing faces a big challenge because of the uncertainty of events and the constraint of the physical model. This paper proposes an Artificial Intelligence (AI) package solution to assist the real-time diagnostics of hydraulic fracturing events including pumping stages, frac-ball seating status, abnormal pressure diagnostic, and sand-screen warning by using the recurrent neural network and real-time pumping data. The technical details of developing the automated diagnostic models and their field application were discussed. It can be concluded that the variation of real-time pumping data is able to be used to extract the data features for fracturing diagnostic. Long Short-Term Memory neural network and Gaussian process regression were validated as effective for the fracturing diagnostic with an accuracy of over 80%. Furthermore, theoretical knowledge is also required to be the constraint of the AI model to acquire a high accuracy. This work provides an alternative approach for real-time diagnostics of hydraulic fracturing.

Biography:

Dr. Mao Sheng is a professor at the China University of Petroleum-Beijing (CUPB). He was selected as the National Distinguished Young Scholar of China and the Future Leader of America Rock Mechanics Association in 2021 and 2020. He obtained his Ph.D. degree from CUPB in 2014 and was a visiting scholar at the University of Oklahoma from 2011 to 2012. His research interests involve unconventional oil and gas well completion and AI application in hydraulic fracturing. He has published 36 first/corresponding-authored papers, authorized 6 registered patents, and received 2 R&D awards in this field.

