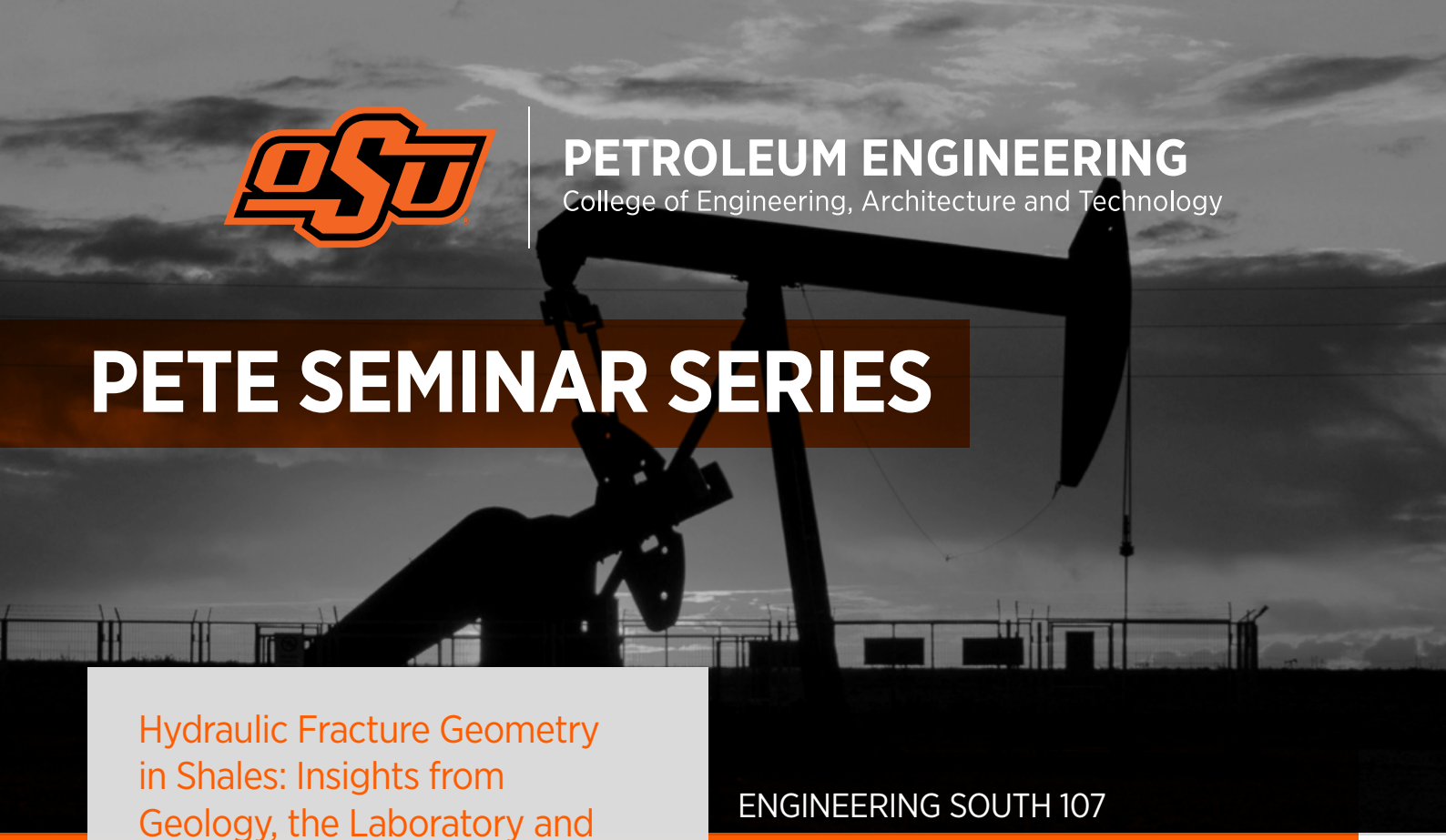

PETROLEUM ENGINEERING
College of Engineering, Architecture and Technology

PETE SEMINAR SERIES

Hydraulic Fracture Geometry in Shales: Insights from Geology, the Laboratory and Modeling

ENGINEERING SOUTH 107

OCTOBER 14, 3:00-4:00PM

JON E. OLSON , PH.D.

The greatest technical breakthrough in oil and gas production in the United States over the past 20 years is the successful exploitation of unconventional (shale) reservoirs with horizontal wells and hydraulic fracturing. We can derive insights into how best to create effective surface area for production in the reservoir through analysis of natural fractures, laboratory fracture experiments and numerical fracture modeling. I will review some of the lessons learned in my research group about hydraulic fracture network development from geologic outcrop analysis, small-scale hydraulic fracture injection experiments in synthetic rock, and from tensile crack propagation experiments in Marcellus shale. I will also describe our computationally efficient numerical modeling approach to simulate complex hydraulic fracture network development from horizontal wells. Our goal is to put just enough physics into the model, inspired by field and laboratory observations, to get reasonably accurate results in a reasonable run time. Fast computation allows us to employ our model using optimization techniques that require 10's or 100's of simulation iterations. A practical optimization example is determining the best perforation cluster spacing within a hydraulic fracture stage to maximize surface area created.

Dr. Jon E. Olson is a professor in the Hildebrand Department of Petroleum and Geosystems Engineering at The University of Texas at Austin. He has been at UT-Austin for 30 years, before which he worked 6 years on hydraulic fracturing and reservoir geomechanics for Mobil Research and Development Corporation in Dallas. He has BS degrees in civil engineering and geology from the University of Notre Dame, and a PhD in structural geology and geomechanics from Stanford. He has published on fracture and geomechanics related topics in both structural geology and petroleum engineering. He has been a Distinguished Lecturer for both AAPG and SPE, and is a Distinguished Member of SPE.