THE DEPARTMENT OF CHEMICAL
& BIOMOLECULAR ENGINEERING SPEAKER SERIES

PRESENTS

A Day in the Life of a Production Chemist:

Applying Chemistry to Hydraulic Fracturing

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Keynote Speaker in the 32nd Annual OChEGS Symposium
Friday, September 29, 11:20 AM – 12:20 PM
Houston Room, Student Center South

LECTURE ABSTRACT

Development of unconventional gas and tight oil (UGTO) resources presents a unique set of challenges to integrated oil and gas companies such as Shell. These hydrocarbon sources are contained in the pore space of extremely low permeability shale and carbonate rock. Thanks to recent advances in horizontal drilling and hydraulic fracturing stimulation techniques, light liquid & gas hydrocarbons can now be accessed and produced, albeit with varying degrees of difficulty.

Hydraulic fracturing is a well stimulation technique whereby mixtures of water, sand and chemical additives are pumped into the wellbore under high pressures to initiate a fracture in hydrocarbon bearing rock such as shale. The chemical formulations used in hydraulic fracturing fluids are critical to the process, and each fluid formulation varies depending on the operator's field development goals and unit development costs. Optimizing the fluid formulation is necessary in order to reduce costs and improve fracturing efficiency.

This presentation will provide examples of what types of chemicals are used in fracturing treatments, the purpose for each chemical, and the steps involved in making the selections including analytical techniques. Case studies from the field will also be used to demonstrate the chemical selection process. The goal is to inform students and faculty on the process of hydraulic fracturing and present examples of how engineers and chemists tackle the daily challenges in this field.

SPEAKER BIOSKETCH

Dr. Michael A. Reynolds is the Regional discipline lead for production chemistry at Shell Exploration and Production Chemistry. Before joining Shell in 2007 as a senior research chemist, he received a Ph.D. in Inorganic Chemistry from Iowa State University, conducted research as a postdoc at the University of Illinois at Urbana-Champaign, and worked as a research chemist at Criterion Catalysts. Dr. Reynolds' current work ranges from studying the fundamentals of hydraulic fracturing to managing several R&D projects with several universities as well as internal.