



# *Geophysical Society of Pittsburgh*



*Proudly Presents Tuesday, March 4<sup>th</sup>, 2014  
At  
Cefalo's, Carnegie, Pennsylvania*

## **4D Microseismic – Interpreting microseismic data for engineering integration** by **Brad Birkelo**

**Abstract:** The microseismic survey conducted during hydraulic fracture stimulation is a geophysical measurement of an engineering process. As an industry, we have focused our efforts on understanding and improving the geophysics of the measurement but all too often we fall short on the last step, the translation of the geophysics into information that the engineers can use in their assessment of frac performance. This talk focuses on the types of information that the completions engineers would like to derive from microseismic surveys, understanding the underlying assumptions in the microseismic catalog, and finally, linking the microseismic data to the engineering data through the natural time-lapse nature of both data types.

Several practical tools to aid in microseismic-engineering integration will be presented using data examples to illustrate some basic information available. I will discuss several types of microseismic attributes that can be used to quantify the microseismic measurement and illustrate the use of R-T plots to identify sub-populations of the microseismic catalog that can provide insight to the frac stage performance. By focusing our attention on confident, “fluid triggered” events, we can get better estimates of the volume of reservoir affected by the stimulation. Finally we will explore opportunities to use the microseismic data to constrain where in the reservoir our proppant has ended up.



**Biography:** *Brad Birkelo is Chief Operating Officer at Spectraseis, where his work focuses on managing day-to-day operations of the company. Prior to this role, he was VP of Geoscience where he focused on further developing microseismic and passive seismic techniques and integrating these data with conventional oil & gas data.*

*Before joining Spectraseis, Brad managed the Houston office of Digital Prospectors, Inc., an oil and gas consulting firm and, prior to this, worked for Phillips Petroleum in Bartlesville, Oklahoma and Odessa, Texas where he processed and interpreted seismic data on numerous exploration and development projects. Brad received his MS in Geophysics from The University of Kansas (1987) and degrees from the University of Minnesota (BS Geology, 1982 and BS Geophysics, 1983). Brad served as SEG Secretary-Treasurer in 2006-07 and is an active member of the SEG, AAPG, and the Denver Geophysical Society. The SEG awarded him Life Membership in 2010.*

**Please RSVP using the PayPal link on the Geophysical Society of Pittsburgh website at: [www.thegsp.org](http://www.thegsp.org)  
Cost \$40 non-members, \$35 members, (\$20 for Students). Meeting Location: Cefalo's, 428 Washington Ave.  
Carnegie, PA, Pittsburgh, PA, 15106, 412.276.6600**

## ***Tuesday, March 4<sup>th</sup> Meeting Menu***

***5:00 pm Social Hour***

*This months social hour is proudly sponsored by*  
***Geokinetics.***



### ***Beverages:***

*Beer*

*Red & White Wines*

*Fine Spirits*

*Assorted Non-Alcoholic Beverages*

***6:00 pm Dinner***

### ***Dinner Buffet***

*Chicken Romano*

*Roasted potatoes*

*Mixed veggies*

*Pasta*

*Dessert du jour*

*Coffee & Cream*

***7:00 pm Lecture***

***We are pleased to announce that this months lecture will be held at :***

***Cefalo's***

***Banquet & Event Center***

***428 Washington Ave.***

***Carnegie, PA 15106***

***412.276.6600***

