

# *Pittsburgh Geophysical Society*

**DATE:** Tuesday, November 2<sup>nd</sup>, 2010

**PLACE:** Radisson Hotel - Greentree  
101 Radisson Drive, Pittsburgh, PA 15220  
412-922-8400

**TIME:** 5:00 PM – Social Hour  
6:00 PM – Dinner  
7:00 PM – Speaker

**COST:** \$30.00

**PAYMENT:** Cash or Checks at the door. Please make checks payable to  
“Geophysical Society of Pittsburgh”

## **DINNER OPTIONS:**

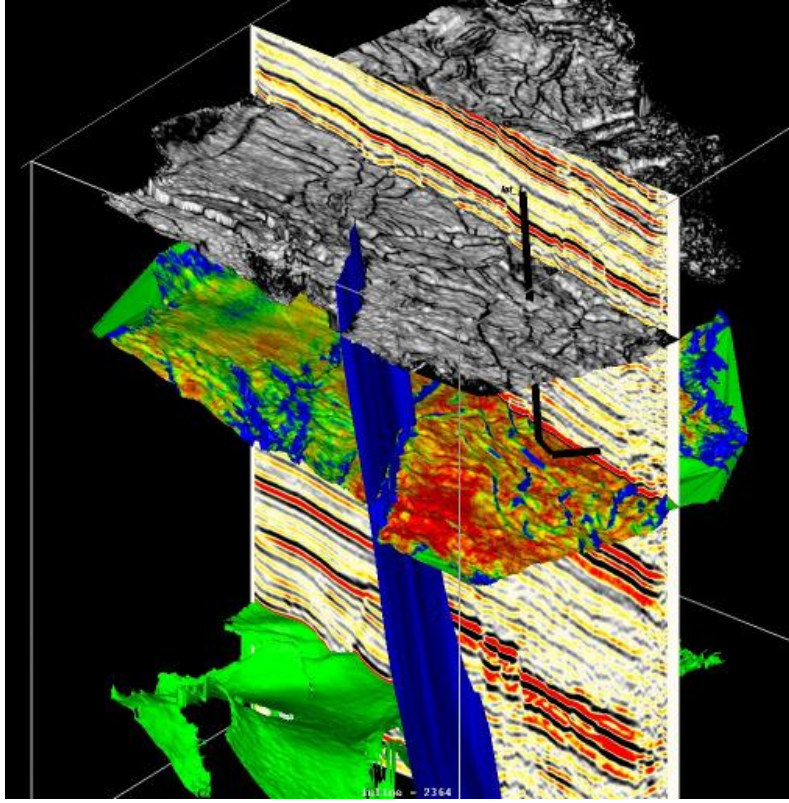
*Breast of Chicken Scampi*, Garlic in a Lemon Butter Sauce, includes salad, bread,  
and dessert of Carrot Cake. Coffee, Tea, Decaf Coffee, Iced Tea.

Or

*Roast Pork Loin*, Herb Crusted with Apple Chutney, Chef’s Selection of Seasonal  
Vegetables, includes salad, bread, and dessert of Carrot Cake. Coffee, Tea, Decaf  
Coffee, Iced Tea.

**RSVP** by October 29<sup>th</sup>, to Mr. Philip Towey  
(email:Philip.Towey@cabotog.com)

## *Presentation:*



## Seismic Prospecting in Shales: Integrating Seismic Data to Extract Rock Properties

*Cambrey Johnston, Weinman GeoScience – a division of Global Geophysical*

Extracting rock properties from seismic data should be the goal of any processing and interpretation effort. Integration of various seismic data can improve one's understanding of local rock properties in order to build a successful exploration plan, and this requires certain acquisition and processing parameters.

Seismic data offer a number of opportunities to understand potential heterogeneities in reservoir rocks. Seismic structure shows variations in thickness of the target formation, and can often yield information about gas or oil in place. Coherence and curvature attributes highlight lineaments associated with small-throw faults and possible fracture trends. Effective interpretation and 3D visualization of the target section can identify anomalies that may impact well positioning and reduce drilling risk. Amplitude variations can also highlight drilling targets, if the formation of interest exhibits an AVO effect. By linking the results of seismic inversion to wells and these seismic attributes, operators can increase their chance of economic success.

Proper acquisition and processing methods can make this information significantly more reliable. Collection of high frequency, high fold data with a focus on long offsets and full azimuth data are critical for us to determine anisotropic parameters. Layer anisotropy (VTI – Vertical Transverse Isotropy) and azimuthal anisotropy (HTI – Horizontal Transverse Isotropy) may help infer clay content and fracture presence. Rock property changes typically apparent in far offset gathers but muted in stacked volumes offer insight into the petrophysics. Careful attention to this aspect of the seismic acquisition enhances the overall image of the section, and provides fracture or stress information critical to planning drilling programs.

It is also necessary to address anisotropy prior to any AVO analysis or elastic inversion attempt. Far offset amplitude variations due to poor characterization of the velocity and anisotropy fields will lead to incorrect elastic parameters in the inversion. Rock property studies help indicate how well correlated the porosity and impedance are and thus, tell us how useful the inversion is in highlighting the best intervals in the formation. Ultimately, the proper survey planning, acquisition, and processing lead to more accurate rock property prediction and reduce drilling risk. The smart operator will utilize all the tools available to study the target section while recognizing the limitations of the technology.

## **Biography**

Cambrey Johnston has a BS degree in Geophysical Engineering from the Colorado School of Mines. She is currently pursuing her Master's degree in GeoSciences from the University of Texas at Dallas. Her geophysical experience includes acquisition, processing, and interpretation of 2D and 3D seismic data. She has worked for Western Geophysical, Geophex, and Nearburg Producing Company. Her interest in the basins of the world led her to her current job in 2005 as a Geophysicist for Weinman GeoScience, where she processes and interprets seismic data. Global Geophysical Services bought Weinman in 2008 to be their processing and interpretation/analysis division. Cambrey's main interests are land and marine processing, azimuthal analysis for fracture detection, and shale plays. Cambrey is a member of the Society of Exploration Geophysics (SEG), the Rocky Mountain Association of Geologists (RMAG), and the Denver Geophysical Society (DGS).

