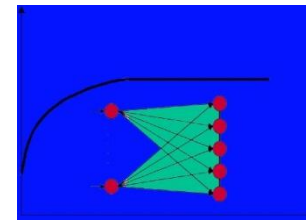Society of Exploration Geophysicists

GeoNeurale

announce

Kurt Marfurt

Dan Hampson

" THE ADVANCED SEISMIC ATTRIBUTES ANALYSIS "
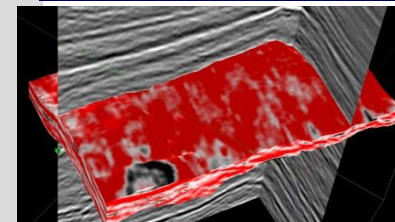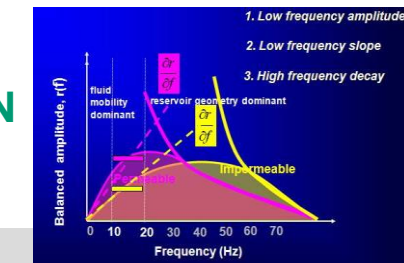
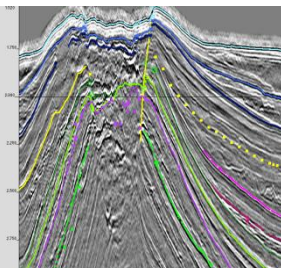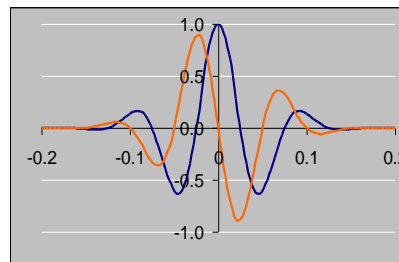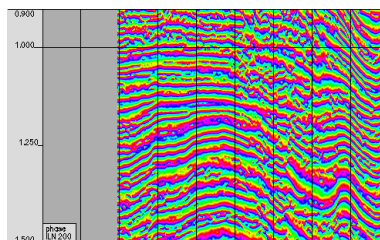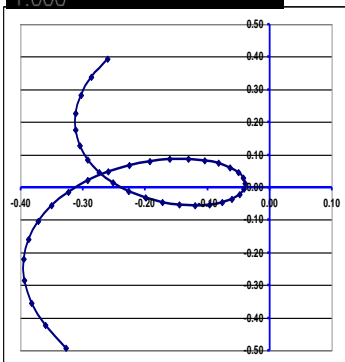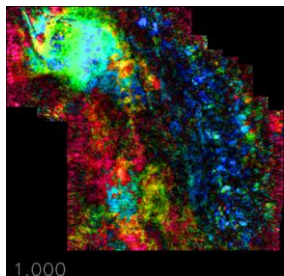## 3D Seismic Attributes

for

Prospect Identification and Reservoir Characterization

29 May – 1 June 2013

WITH HRS-9 SOFTWARE APPLICATIONS PRESENTATION

AND ONLINE COURSE PREPARATION

3D Seismic Attributes

for
Prospect Identification and Reservoir Characterization

29 May – 1 June 2013

(4 Days)

MUNICH

GATE – Garchinger Technologie und Gründerzentrum Munich-Garching

4 DAYS COURSE   **Registration Deadline: 19 April 2013**

INSTRUCTOR: **Kurt Marfurt**

Professor at the University of Oklahoma and Director of the Center for Applied Geosciences and Energy

SOFTWARE APPLICATIONS PRESENTATION: **Dan Hampson**

President – HAMPSON-RUSSELL S&S   (CGGVeritas)

AUDIENCE: seismic interpreters, seimic processing specialists, static modeling specialists, petrophysicists, reservoir
 engineers , geologists, scientists involved in Reservoir Characterization and Interpretation Studies.

COURSE FEES: 3150 Euro + VAT (19%)
(Private companies outside Germany are allowed to avoid VAT TAX . For informations contact: courses@geoneurale.com)

ONLINE REGISTRATION: www.GeoNeurale.com

3D Seismic Attributes
for
Prospect Identification and Reservoir Characterization
Kurt Marfurt

Kurt Marfurt drives us through a journey into the future of the Seismic Attributes Analysis illustrating the huge potential of these interpretation methods.

Starting from a physical classification of the attributes, their derivation and their main applications, Kurt explains advanced concepts like Fourier analysis, complex-trace analysis, gradient structure tensor, various methods of coherence calculations, spectral decomposition, wavelet transforms, neural networks applications and other fundamental concepts in a simple and intuitive way using several alternative methods opening new horizons for the scientist who wish to improve her/his potential interpretation skills.

All scientists involved in the micro, macro and mega scale interpretation will benefit from this course: seismic interpreters, seimic processing specialists, static modeling specialists, petrophysicists, reservoir engineers and geologists.

A 4 DAYS COURSE WITH HAMPSON-RUSSELL HRS-9 SOFTWARE APPLICATIONS

presented by
Dan Hampson
President of HAMPSON-RUSSELL Software & Services   (CGGVeritas)

The course is integrated on the 4th days with a practical presentation with interpretation examples using HAMPSON-RUSSELL HRS-9 software applications for Seismic Attributes and and AVO Analysis

ONLINE COURSE PREPARATION

PROPEDEUTICAL PHASE

We offer at request an online preparation to the course covering some useful fundamental mathematical applications. The preparation phase will start 2-3 weeks before the course.

TOPICS

Differential and Integral Calculus
Linear Algebra
Matrix and Tensors
Complex Numbers and Functions
Fourier Transform
Hilbert Transform
Convolution, Deconvolution
Filters
Green Function
Ricker Wavelet and Spectrum
function shift / spectral changes
spectrum shift / function changes
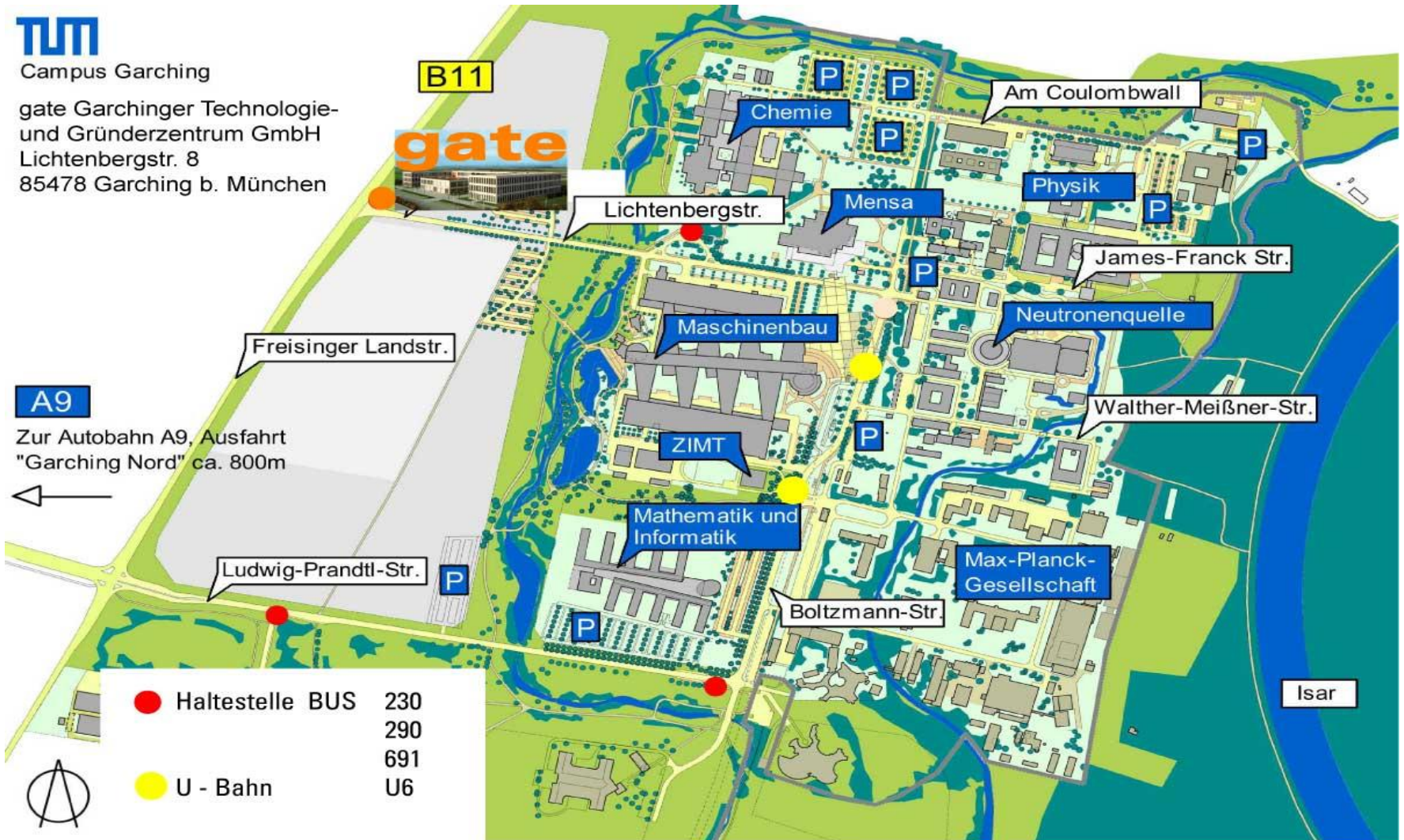Spatial Statistics
Markow Processes
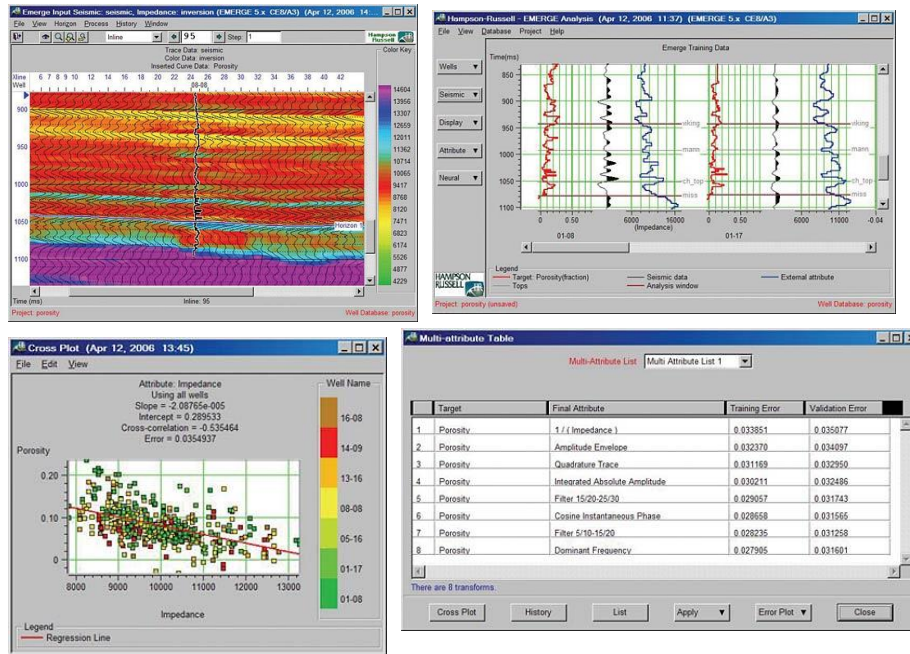
THE ADVANCED SEISMIC ATTRIBUTES ANALYSIS

A seismic attribute is any measure of seismic data that helps us better visualize or quantify features of interpretation interest. Seismic attributes fall into two broad categories – those that help us quantify the morphological component of seismic data and those that help us quantify the reflectivity component of seismic data. The morphological attributes help us extract information on reflector dip, azimuth, and terminations, which can in turn be related to faults, channels, fractures, diapirs, and carbonate build-ups. The reflectivity attributes help us extract information on reflector amplitude, waveform, and variation with illumination angle, which can in turn be related to lithology, reservoir thickness, and the presence of hydrocarbons, and water.

In the reconnaissance mode, 3D seismic attributes help us to rapidly identify structural features and depositional environments. In the reservoir characterization mode, 3D seismic attributes are calibrated against real and simulated well data to identify hydrocarbon accumulations and reservoir compartmentalization.

In this course, you will gain an intuitive understanding of the kinds of seismic features that can be identified by 3D seismic attributes, the sensitivity of seismic attributes to seismic acquisition and processing, and how 'independent' seismic attributes can are coupled through geology. We will also discuss alternative workflows using seismic attributes for reservoir characterization as implemented by modern commercial software and practiced by interpretation service companies. Participants are invited to bring case studies from their workplace that demonstrate either the success or failure of seismic attributes to stimulate class discussion.

EMERGE

predicts reservoir properties using seismic attributes and well log data

ISMAP is a mapping tool that **statistically compares and analyzes** mapped data

AVO analyzes the fluid content of reservoir rocks through a combination of visual, analytical and modeling processes using both pre-stack seismic and well log data
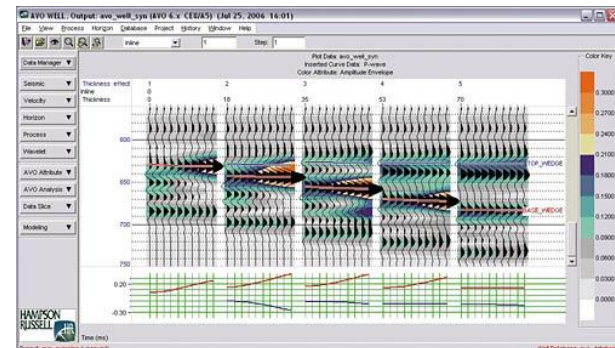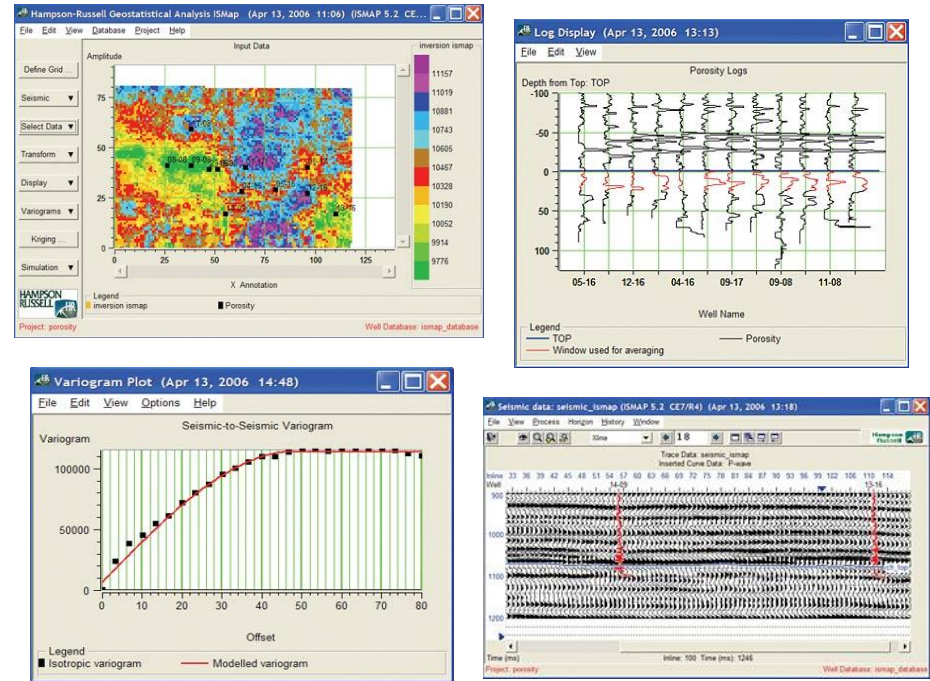
Course Outline

1)   Introduction

2)   Complex trace attributes

3)   Horizon and formation attributes

4)   Color display and 3D visualization

5)   Spectral decomposition and thin bed tuning

6)   Geometric attributes

a)   volumetric dip and azimuth

b)   coherence

c)   volumetric curvature

d)   Sobel filter edge detection and amplitude gradients

7)   Attribute expression of structure and stratigraphy

a)   tectonic deformation

b)   clastic depositional environments

c)   carbonate deposition environments

d)   shallow stratigraphy and drilling hazards

e)   reservoir heterogeneity

8)   Impact of data quality on seismic attributes

a)   Velocities and statics

b)   Acquisition footprint

c)   Seismic migration

9)   Attributes applied to offset- and azimuth-limited volumes

10)   Structure-oriented filtering and image enhancement

11)   Inversion for acoustic impedance

12)   Multiattribute analysis tools

13)   Reservoir characterization workflows

14)   3D texture analysis

Instructor´s Biography

Kurt Marfurt

Kurt J. Marfurt joined the University of Oklahoma in 2007 where he serves as the Frank and Henrietta Schultz Professor of Geophysics within the ConocoPhillips School of Geology and Geophysics. Marfurt's primary research interest is in the development and calibration of new seismic attributes to aid in seismic processing, seismic interpretation, and reservoir characterization. Recent work has focused on applying coherence, spectral decomposition, structure-oriented filtering, and volumetric curvature to mapping fractures and karst as well as attributed-assisted processing. Marfurt earned a Ph.D. in applied geophysics at Columbia University's Henry Krumb School of Mines in New York in 1978. He worked 20 years in a wide range of research projects at Amoco's Tulsa Research Center after which he joined the University of Houston for 8 years as a Professor of Geophysics and the Director of the Center for Applied Geosciences and Energy (CAGE). He has received best paper (for coherence) best presentation (for seismic modeling) and as a coauthor best poster (for curvature) awards from the SEG and served as the EAGE/SEG Distinguished Short Course Instructor for 2006 (on seismic attributes). In addition to teaching and research duties at OU, Marfurt leads short courses on attributes for the SEG and AAPG.

Dan Hampson

Dan Hampson is President of Hampson-Russell Software & Services

His academic training includes a B.Sc. in Physics from Loyola College in Montreal in 1971, an M.Sc in Theoretical Physics from McMaster University in 1973 and an MBA from the University of Calgary in 1993. He has worked for Veritas Seismic Ltd. in Calgary, Phillips Petroleum in Houston, and Veritas Software Ltd. in Calgary, where he was Vice President of Research.
Dan is the originator of several innovative ideas in the field of seismic processing, including the Generalized Linear Inverse approach to refraction statics analysis and the Parabolic Radon Transform noise and multiple attenuation algorithm. He has published numerous articles on these techniques, and in both 1981 and 1987, received the best paper award for papers delivered at the CSEG convention. Dan has been active in the Canadian SEG and served as president for the 1996/97 term.

Registration Details

•Course fee: 3150 Euro + VAT (19%)

Payment and Registration

Tuition fees are due and payable in Euro upon enrollment in the course by bank transfer to the bank account given below
unless another payment form is agreed
 Unless otherwise indicated, the payment should be received before the date specified in the invoice as payment term to make
the enrollment effective.

To register to the course please fill in the registration form and fax or email it along with the confirmation of your bank transfer to:
GeoNeurale
Am Nymphenbad 8
81245 Munich
T +49 89 8969 1118
F +49 89 8969 1117

ONLINE REGISTRATION: www.GeoNeurale.com

Bank Information: Genossenschaftsbank EG Muenchen

Bank Account N. 519618   BIC – Code : GENODEF 1M07
BLZ 701 694 64   IBAN : DE19 7016 9464 0000 5196 18

Please indicate your name and the purpose: "3D Seismic Attributes course fee".

www.GeoNeurale.com

Provisions

Tuition fees are due and payable in Euro upon enrollment in the course. Unless otherwise indicated, fees do not include travel costs and living expenses of the participant.

Payments are also accepted via personal or company check, traveler's check, credit card, and Company Purchase Orders.

Cancellations by Participant:

All cancellation are subject to a 100 Euro non-refundable cancellation fee. Cancellation have to be notified to our office, at least 30 days prior to the course start date to receive a refund (less the 100 Euro cancellation fee).

If the participants are unable to cancel prior to the 32 days notification date, they may substitute another person at their place in a course by notifying us prior to the course start date.

Course Cancellations:

GeoNeurale reserves the right to cancel the courses if necessary. The decision to cancel a course is made at least two weeks prior to the course start date. If a course is cancelled, the participant will receive a full reimbursement of the tuition fees (but not of the plane ticket or hotel expenses or any other costs), or will be enrolled in another course upon his decision (the cost of the original course will be applied to the cost of the replacement course).

Before booking any flight or hotel, please wait the written course confirmation on our website. GeoNeurale can not be responsible for any penalties incurred for cancellation or change of flights or hotel reservations .

Refunds:

GeoNeurale will promptly remit all refunds of tuition fees due to cancellations or annullment (less any appropriate non-refundable cancellation fee) within 30 days of the course cancellation.

Force Majeure:

GeoNeurale can not be responsible for cancellations due to "force majeure" events : airplane or airport strikes, emergency situations, natural catastrophes and all situations and incidents independent or outside the human control that can delay or cancel the course. In case of such events related cancellations the course tuition fees will be refunded to the client .

GeoNeurale is not responsible for any delay or absence caused by the training instructor or training instructor company for reasons which are independent or out of the control of GeoNeurale´s decisions.

AGREEMENT: Upon enrollment all parts accept the above mentioned provisions. The above specified provisions shall regulate the agreement between GeoNeurale and the participant and the participant company and will enter into force upon enrollment.

REGISTRATION FORM

THE ADVANCED SEISMIC ATTRIBUTES ANALYSIS

3D Seismic Attributes for Prospect Identification and Reservoir Characterization

Munich , 29 May – 1 June 2013   (4 Days)

Course Fee: 3150 Euro + VAT 19%

Name:

Company:

Address:

Job Title:

Phone:

Fax:

Email:

SIGNATURE: _____

INFORMATIONS, HOTELS, MAPS, LINKS

TRAINING LOCATION – RESEARCH CENTER

http://www.geoneurale.com/documents/GATE-Y7.pdf

GATE GARCHING

http://www.geoneurale.com/documents/GATE-Y6.pdf

MAP MUNICH-GARCHING

http://www.muenchen.city-map.de/city/db/130208000001/14269/Garching.html

MUNICH INFO and MAP MUNICH CENTRAL

http://www.muenchen.de/home/60093/Homepage.html

MAP MUNICH UNDERGROUND

http://www.mvv-muenchen.de/web4archiv/objects/download/3/netz1207englisch.pdf

HOTELS NEAR GeoNeurale

http://www.geoneurale.com/documents/HOTELS-GARCHING.pdf

BAVARIA INFO

http://www.geoneurale.com/documents/Around-Munich-Info.pdf