



Geophysical Society of Houston

VOL. 32, NO. 12

NEWSLETTER

OCTOBER 1997

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MEMBERSHIP ALERT

If the mailing label on this issue of your GSH Newsletter contains a BLUE STRIPE, then the GSH has NOT received your 1997/98 membership dues and this will be your LAST newsletter issue. To insure uninterrupted delivery of your GSH newsletter, please immediately submit your membership dues to:

Membership Chair
Geophysical Society of Houston
7457 Harwin Drive, Suite 301
Houston, Texas 77036

COMING IN DECEMBER

SEG Distinguished Instructor Short Course

The SEG has selected Houston for its inaugural offering of the SEG Distinguished Instructor Short Course in December. The SEG distinguished instructor will be Ian Jack of British Petroleum, speaking on "Time Lapse Seismic Monitoring". This six hour course is available free of charge to individuals who are current members of both the GSH and the SEG. Complete short course details will be available in the November issue of the newsletter.

GEOPHYSICAL SOCIETY OF HOUSTON

**Joan Henshaw, Office Manager • 7457 Harwin Drive, Suite 301 • Houston, Texas 77036
(713) 785-6403 • (713) 785-0553**

Office Hours 7 a.m. - 4 p.m.

Event Reservations Number: (713) 917-0218

email: reservations@hougeo.org • website - http://www.seg.org/sections/gsh/gshhome.html

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1997-98 GSH Board Members



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Bob Tatham, President Elect; Diana Shaw, Secretary

Standing (L to R):

*John Sumner, First V.P.; Don Herron, Second V.P.; Bill Gafford, President;
Dennis McMullin, Editor; Richard Vern, Treasurer*

Editor's Notes

Listed below are the remaining newsletter content deadlines for the 1997-98 editorial year. To insure your information reaches all our society members in a timely fashion it must appear in the appropriate newsletter issue. The newsletter editor must receive materials on or before the corresponding content deadline date.

Content deadlines occur approximately six weeks prior to publication, usually on the third Thursday of the month.

1997-98 GSH Newsletter Deadlines

<u>Newsletter Issue</u>	<u>NEWSLETTER CONTENT DEADLINE</u>
December, 1997	October 16, 1997
January, 1998	November 13, 1997
February, 1998	December 18, 1997
March, 1998	January 15, 1998
April, 1998	February 19, 1998
May, 1998	March 19, 1998
June, 1998	April 16, 1998

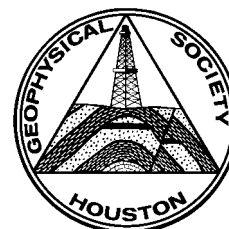
Volunteers Still Needed

The GSH still needs volunteers for the following positions:

Assistant Newsletter Editor -
contact Dennis McMullin
(281-560-1069) or
Bill Gafford (281-366-7873)

Interpretation SIG Volunteers -
contact Larry Godfrey, SIG Chairman

Volunteers interested in helping with SIG meetings, speakers or organizational items are always appreciated. Please contact the specific GSH SIG Chairpersons to see how you can help.



Technical Luncheon

Chair - **Phil Hosemann**,
713-655-9838, 713-655-7301

Date: **October 20, 1997**

Time: Register and cash bar,
11:30 AM ; Luncheon
and Talk 12:00 Noon

Location: NEW Hess Building,
5430 Westheimer
Formerly the Carlyle
Restaurant located on
the north side of
Westheimer between
Chimney Rock and
Yorktown.

Cost: \$20 for pre-registered
members; \$25 for walk-
ins and guests

Reservations: Call 713-917-0218
or email:
reservations@hougeo.org
no later than 12:00
Noon on Friday October
17, 1997

Speaker: **Dr. Leon Thomsen,**
SEG 1997 Fall
Distinguished
Lecture

Topic: **"Peering Through a**
Cloud of Gas: The
Valhall 4C OBS
Survey"

Abstract:

This is an exciting time in marine exploration geophysics, with several major new techniques becoming feasible: very long streamers, vertical cables, 3D-VSP's, and Ocean Bottom Seismics. We concentrate here on the latter development, and apply the lessons learned to land exploration as well.

Ocean Bottom Seismometers have been deployed for many years, first as "bay cables" (hydrophone strings for use in shallow waters), then as 3C seismometers deployed sparsely in deep water for academic investigations, then as 2C cables (hydrophone + vertical geophone) deployed densely in 2D, 3D, and 4D surveys of exploration and exploitation. Lately we have seen the concept deployed in minimal arrays of 4C seismometers for 2D surveys, and now in dense 4C arrays in 3D surveys. We discuss here this advanced application.

This is not cheap data acquisition (although it is *rapidly* getting cheaper), so it is important to understand its particular benefits. The reason for the horizontal geophone components is to record the shear waves which are converted from incident compressional waves somewhere in the subsurface. The reason for recording these converted shear waves is two-fold:

- the shear-waves carry new information about *lithology, pore fluids, and fractures* in the subsurface.
- the shear-waves may *image* the structures better.

We consider here this *imaging* advantage.

Amoco's Valhall reservoir is a 20 Billion dollar reservoir in the North Sea, midway between Stavanger and Aberdeen. However, the crest of the structure cannot be imaged by conventional seismic means, because these compressional waves get absorbed in the overburden. The absorption happens because of (noneconomic) concentrations of gas in the overburden, gas which has leaked up from the reservoir over geologic time. This gas strongly enhances P-wave absorption, but not S-wave absorption. So, the converted shear waves can, in principle, image the reservoir, whereas the P-waves never return to the surface.

This technique was pioneered by Statoil in 1994, using stakes-in-the-mud, deployed by a free-swimming remotely operated vehicle. Their survey was successful, but was logistically awkward. Subsequently, it became clear that, because of the low levels of noise on the ocean bottom, the issue of seismic coupling is not so difficult, at least in favorable circumstances.

Amoco used PGS' current (1996) OBS hardware: 8 dragged sleds (~50 kg each) in their Valhall survey. (Now, several contractors can put *hundreds* of small (2-5kg) 4C receivers in cables on the sea floor, so that 3D/4C (and even 4D/4C) surveys are feasible.) The survey successfully imaged entirely across the reservoir, revealing a complex set of small-throw faults. A full understanding this geometry will be a crucial requirement for fully-effective exploitation of the reservoir.

The idea of using shear waves instead of compressional waves, *because they respond to different physical properties of the rocks*, is a very powerful one, applicable all over the world, in innumerable contexts of exploration and exploitation. Because converted waves deliver most of these advantages, while minimizing source-costs and enabling applications at sea, it is easy to predict that mastery of these evolving techniques will be crucial for world-class prospecting.

Speaker Biography:

Leon Thomsen comes by his interest in geophysics naturally: his father, Erik Thomsen, was an early member of the SEG. During 1938-74, he found oil throughout the American southwest, and the family followed that search through thirty-five moves from Bakerfield to Tulsa to Odessa to Shreveport to Houston.

The family was in Tyler when Leon graduated from high school, and (with the help of an SEG scholarship) went west to attend the California Institute of Technology, then and now a center of excellence in geophysics. In those days, the real excitement was in plate tectonics, planetary exploration, and the constitution of the deep interior, *not* in hydrocarbon exploration.

So, Leon followed those ideas to Columbia University in New York City. There he met and immediately married Purnima "Pat" Gulati. His Ph.D. thesis, in 1969, dealt with seismic rock properties, and represented a new way to physically interpret seismic data for clues to the composition and crystal structure of the deep interior of the earth.

In a post-doc position at the Centre Nationale de la Recherche Scientifique in Paris, another back at CalTech, a consulting position with IBM, a faculty position at the State University of New York at Binghamton, and a sabbatical appointment at the Australian National University in Canberra, he used relativistic quantum mechanics to improve and refine this physical interpretation. These particular tools of mathematics and physics might seem, to some, to be an inappropriate foundation for the task of finding oil and gas.

However, in 1980, during a period of high oil prices and rapid oil industry staff expansion, Leon joined Amoco's Research Center in Tulsa. Within two weeks of his arrival, he discovered that the mathematical tools and physical insight which he had acquired in his previous academic career uniquely equipped him to recognize, in exploration seismic data, the effects of azimuthal anisotropy, to interpret it, and to deal with it. For five years, unusually long in this business, he and others inside Amoco refined their understanding of these effects, unnoticed by the rest of the oil industry, despite the public discussion of some of the critical ideas by academics. In the 1986 SEG convention in Houston, they went public at a now-famous "Anisotropy" technical session.

By now most oil and service companies are attempting to master these ideas, in order to more effectively explore and exploit hydrocarbon resources. Amoco had an early lead in developing these ideas because of the extraordinary intellectual environment created at Amoco's Research Center by leaders like Mike Waller, Gordon Greve, and Sven Treitel (all now retired). Leon's contributions to this development were recognized by the SEG with the Reginald Fessenden Award of 1993.

In 1995, Leon transferred to the new Strategic Technologies Applications Team in Amoco's worldwide exploration division in Houston. This is a team of fifty technical experts, organized in self-directed teams, reporting to a single manager, applying Amoco's best proprietary technology in support of exploration teams worldwide. He had previously provided theoretical foundations for many of these techniques (multicomponent exploration, AVO, pore pressure prediction), so the assignment to aggressively apply these technologies was a natural one.

A group like STAT is uncommon in today's oil industry; and its Multicomponent Seismology subteam is even less common. But, since seismic waves are vectors, it is inevitable that

exploration will be more effective through utilization of all their components. These Distinguished Lectures are direct outgrowths of that insight.

Technical Breakfast

Chair - **Scott Sechrist**, 713-961-1804, fax 713-961-9773, email: acoustic@neosoft.com
Scott Sechrist has volunteered to coordinate the GSH technical breakfasts.

Date: October 15
Location: The NEW Hess Building, 5430 Westheimer
Formerly the Carlyle Restaurant located on the north side of Westheimer between Chimney Rock and Yorktown.

Time: Breakfast from 7:00 - 7:45 a.m.; Speaker from 7:45 to 8:15 a.m.; Meeting ends by 8:30 a.m.

Cost: **No Charge.** The GSH would like to thank **Geophysical Development Corporation** for sponsoring the October Technical Breakfast meeting..

Speaker: Fred Hilterman
Subject: Geophysical Perspectives on Exploration Topics

Breakfasts are scheduled monthly, on the Wednesday of the second full week of each month: Nov. 12; Dec. 10; Jan. 14; Feb. 11; Mar. 11; Apr. 15; May 13; June 10 (possible).

Please contact Scott for further breakfast information or to suggest potential topics and speakers.

SIG Announcements

Interpretation SIG

SIG Chair - **Larry Godfrey**, 281-499-6068, email lgodfrey@intertex.net

There is no SIG meeting scheduled for October.

The Interpretation SIG will announce four meetings throughout the coming year on topics concerning *Technology for Interpretation*. Larry is actively seeking volunteers to serve on the Interpretation Committee. These volunteers could help to organize meetings, contact and schedule potential speakers, arrange venues, etc. If you are interested in helping out, please contact the SIG Chairman, Larry Godfrey.

Data Processing SIG

SIG Chair - **Young Kim**, 713-966-6156, 713-966-6333, young.c.kim@exxon.sprint.com

The Data Processing SIG has scheduled nine monthly meetings for the coming year with themes for each of the meetings as listed below. The meetings are scheduled from September 1997 through May 1998, with two speakers at each meeting. The selected dates and topics are:

10/15/97 Sampling issues in 3-D land acquisition
Art Barnes*, Dave McCann

11/19/97 Wavefield reconstruction
Young Kim*, Karl Schleichler

12/10/97 AVO
Stan Truxillo*, Chengbin Peng

1/21/98 Velocity for depth migration
Alfonso Gonzalez*, Dave McMann

2/18/98 Time lapse (4-D) seismic
Jozica Gabizsch*, Chengbin Peng

3/18/98 Anisotropy
Chengbin Peng*, Richard Verm

4/15/98 Multiple attenuation
Jerry Kapoor*, Richard Verm

5/20/98 Traveltime calculation for depth migration

Ilkka Noponen*, Karl Schleichler, Jerry Kapoor

* denotes the primary organizer

October Meeting

Date: Oct. 15 (Wed), 1997

Time: Social 4:30 p.m.; presentations 5:00 to 6:00 p.m.

Location: Texaco International, Baxter Auditorium, 4800 Fournace (Ask guard for directions.)

Cost: NO CHARGE

Topic: Sampling issues in 3-D land acquisition

Speakers: *Norman S. Neidell*, Zydeco Energy, "Space-time sampling issues and imaging resolution for onshore seismic data acquisition".

Karl L. Schleichler, Geophysical Development, "3-D DMO improvements that attenuate the acquisition footprint"

Organizers: Art Barnes*, Dave McCann

First Abstract & Bio:

Space / Time Sampling Issues and Imaging Resolution for Onshore Seismic Data Acquisition

Dr. Norman S. Neidell
Zydeco, Energy, Inc.

Recently I showed that by treating seismic data according to imaging theory rather than signal theory, substantially higher resolution displays could be attained (greater than 10-fold) and using significantly less data (typical reduction in data of 75% or greater). In adopting this approach it was recognized that most of the typical processing steps were not only not needed, but in fact limited the data information content. Anti-alias filters, statics corrections and any waveform treatment top the list for such operations.

Field operations with subsequent processing and interpretation have proven validity of the method. Cost

savings for the most recent survey approached 50%. The procedure used for this transition zone work in Western Louisiana applied a standard layout, but with less dense placement of shots and receivers.

A comprehensive theory for the relationship between imaging resolution in the spatial and time variables and field parameters based on the full information content of a wavefield sampling has yet to be developed. Clearly however, there must be some basis upon which particular operational configurations will achieve advantage using these alternative imaging concepts for the purpose of trying to better understand what one might do to improve seismic acquisition. While our understanding is far from complete, important insights are developed which teach us better viewpoints toward the seismic waveforms, the role of source bandwidth and the requirements for imaging shallow objectives.

Speaker Biography:

Norman S. Neidell received a B.S. Degree from New York University, a Post Graduate Diploma in Applied Geophysics from Imperial College and a Ph.D. in Geodesy and Geophysics from Cambridge University. He acquired basic experience with Gulf Oil and Seiscom-Delta, and then undertook independent ventures and consulting in 1971.

He co-founded GeoQuest International (now Petroleum Information) and Zenith Exploration Co., and served as its President and Chief Executive Officer. He co-founded Gandalf Explorers Intl. Ltd. which now by merger is MMS Petroleum, PLC which explores for oil and gas and operates licenses in four Eastern European countries. In July of 1997 he merged this company, Wavefield Image, Inc., with Zydeco Energy, Inc. where he now serves as Vice President - Innovations. Zydeco is an oil and gas production company.

He was an Adjunct Professor in the Geology Department of the University of Houston. Dr. Neidell is a Past President and Honorary Member of the Geophysical Society of Houston (GSH), a Distinguished Lecturer for the SEG, a Past Associate Editor of Geophysics and a member of several AAPG and

SEG committees.

Second Abstract and Bio:

3-D DMO Improvements that Attenuate the Acquisition Footprint

Karl Schleicher, Geophysical Development Corporation

Economical 3-D seismic surveys, especially land and marine bottom cable surveys, often include a wide range of source to receiver azimuths. The offset and azimuth distribution varies spatially and 3-D DMO typically creates artifacts far more severe than for single azimuth data. These artifacts are called the "acquisition footprint" because they correlate with the field geometry.

Two improvements to conventional DMO that attenuate the acquisition footprint are spatial wavelet binning and fold normalization. These techniques have been independently developed and described by multiple authors in 1996 and 1997. Spatial wavelet binning requires the data to be scaled and summed to multiple bin locations rather than simply summing to the nearest bin. Fold normalization is accomplished by dividing input traces by the time and space variant fold within each offset gather before Kirchoff mapping. These improvements increase runtime of DMO by about 20%.

These improvements can be compared to a rigorous approach to the wide azimuth geometry problem, conjugate gradient DMO. This technique, first described by Ronen in 1987, estimates the uniformly sampled zero-offset model that after application of inverse DMO best matches the input offset data. An accurate inverse DMO algorithm is feasible, because it operates on the uniformly sampled zero-offset data. A practical way to solve this large set of linear equations is to use a few iterations of the conjugate gradient method. Each iteration of the conjugate gradient algorithm runs approximately twice as long as conventional DMO and tests indicate the algorithm converges after only two or three iterations. The cost of the method is approximately four to six times the cost of conventional DMO. This cost is substantially more than the cost of wavelet binning and fold normalization, but small enough to

allow the practical application of the technique on many land surveys.

Tests on field and model data indicate wavelet binning and fold normalization significantly reduce the acquisition footprint artifact caused by a conventional implementation of 3-D DMO. Application of this improved DMO to a single fold cross spread model produced results with few artifacts. Model data results obtained using conjugate gradient DMO were marginally better than those obtained using 3-D DMO including wavelet binning and fold normalization.

Wavelet binning and fold normalization produced significant improvements on a field dataset test. The field data results obtained using conjugate gradient DMO were nearly identical to the results obtained from the improved DMO.

The cross spread swath geometry used on the model and field data probably contributed to the success of the improved DMO on this dataset. The marginal improvement observed on the model data may be due to the departure from exactly regular cross spread geometry. Other typical land acquisition geometries are likely to produce similar results.

Speaker Biography:

Karl Schleicher is a senior research geophysicist for Geophysical Development Corporation. He has also worked in seismic processing and technology development for Western Geophysical, Halliburton Geophysical, and Geophysical Services Inc. He received a BS in Mathematics from the University of Houston in 1974 and an MS in Operations Research from the University of Texas at Dallas in 1988. His professional interests are the use of signal processing, wave equation imaging, and advanced computers for effective seismic processing.

Potential Fields SIG

SIG Chair - **Chuck Campbell** of Accel Services (713-993-0671 or email at campbell@neosoft.com)

The Potential Fields SIG does not have a scheduled meeting for the month of October.

The Potential Fields SIG plans to have 1997-98 meetings every other month, from September to May (September, November, a holiday party in December, January, March, and May). Meetings typically consist of a social hour, dinner, and technical presentation. Anyone interested is invited to attend. For information about meeting times, locations and speakers, please contact the SIG chairman, Chuck Campbell.

Near Surface Geophysics SIG

SIG Chair - **Tom Dobecki**, with FUGRO-McClelland (281/679-5558)

The Near Surface SIG does not have a scheduled meeting for the month of October.

The new SIG Chairman, Tom Dobecki, indicates that he intends to broaden the SIG's emphasis to include all aspects of shallow geophysics, including environmental, archaeological, geotechnical, forensic, and exploration applications — everything from statics corrections and buried tanks to buried Pharaohs. Tom invites anyone interested in giving a SIG presentation, or suggesting possible topics of interest to contact him.

Reservoir Geophysics SIG

SIG Chair - **John Eastwood** - Exxon Production & Research Co., P.O. Box 2189, 713/966-3196, 713/965-7309(fax), john.eastwood@exxon.sprint.com.

The Reservoir Geophysics SIG does not have a scheduled meeting for the month of October.

Ads / Notices

American Institute of Professional Geologists - 34th Annual National Meeting

The Texas Section-AIPG officers and members host and enthusiastically invite members, guests, and friends to the 34th Annual National Meeting of the American Institute of Professional Geologists

Where: Double Tree Post Oak Hotel, 5353 Westheimer Road in the Uptown- Galleria Area, Houston, Texas
When: October 6-12, 1997

“The 21st Century Professional Geologist: Training, Credentials, Political & Business Considerations”

What: This year's program includes:
2 venues:
ENERGY- Houston is the oil capital of the world.
ENVIRONMENTAL MANAGEMENT- a newly emerging sector in industry.
56 outstanding papers
7,000 square foot Exhibit Area
9 short courses and 1 mini-symposium
8 field trips

REGISTRATION:
Preregistration (payment on or before 9/12/97) and on site costs and refund policy are available from General Chairman John DeVault by fax 281/558-5876 and in the TPG newsletter.

Member or guest registration for the American Institute of Professional Geologists in Houston, Texas meeting is NOT required for continuing education short courses for

geologists, geophysicists, and engineers at this year's annual national meeting of — registration is encouraged.

Conference updates on Texas-AIPG website at: <http://www.ela-iet.com/AIPG/aipg.html>

Fax 281/588-5876 for preregistration form mail payment to AIPG-Houston 1997, P O BOX 218567, Houston, TX 77218-8567

SHORT COURSES (SC) AND FIELD TRIPS (FT) —CEU credit cost included in the cost unless otherwise stated.

SC #1 Management Development Program for Geologists and Related Professionals Monday, October 6 and Tuesday, October 7, 8:00 am to 5:00 pm.

Anyone in a geological or related profession who desires a basic foundation of knowledge in the principal subjects of business management will benefit from this course which introduces management of

organizations, planning and control, marketing and contracts, operations management, business ethics, and stewardship of the earth. Participation in the interactive sessions will develop management skills.

Presented by: Donald E. Fletcher, Ph.D., Director of the Executive Program and Professor of Mineral Economics, Colorado School of Mines, Golden, Colorado. John H. White, CPA.

SPECIAL NOTE:

MARS: Update on the Geological Investigation of Mars will be presented by David McKay of NASA in the Environmental Geology Distinguished Lectures

Technical Session #1B.

For updates and more details see the Texas-AIPG website: <http://www.ela-iet.com/AIPG/aipg.html> and in the TPG newsletter.

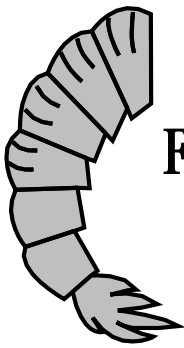
Emerging Technologies Energy Conference

A new national technology transfer conference has been specifically designed for owners and CEOs of domestic oil and gas companies and will take place Nov. 17-19 at the *Houston Hyatt Regency*. The “**Emerging Technologies Energy Conference (ETEC)**” is a joint effort of IPAA (Independent Petroleum Association of America) and the regional network of the PTTC (Petroleum Technology Transfer Council).

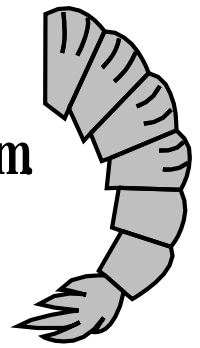
For information about exhibiting or attending, contact IPAA at 1-800-433-2851 or visit their National Website at <http://www.pttc.org/hq/>

Dallas SEG notice

ISEM notice



HGS/GSH Shrimp Peel



Friday, October 10, 1997 • 5:00 p.m until 9:00 p.m



Houston's First Microbrewery
2522 Fairway Park Drive

Tickets \$15.00 advance / \$25.00 at the door (tickets may not be available at the door)

Event limited to 600 Persons Only

Make checks payable to GSH

Advance purchase by mail until **Friday, October 3, 1997**

HGS/GSH Office

7457 Harwin, Suite 301 • Houston, Texas 77036

(Enclose a self-addressed, stamped envelope)

Advance purchase in person until **Wednesday, October 8, 1997**

Southwest

Joan Henshaw
HGS/Gsh Office
7457 Harwin, Suite 301
(713) 785-6402/6403

North

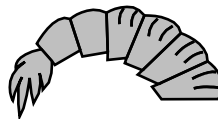
Mike Bennet/Hillia Barzilla
Paradigm
11 Greenspoint
16945 Northchase, Suite 1400
(281) 876-3473

Downtown

John Adamick/Melissa Ramos
TGS Calibre
333 Clay Street
3 Allen Center, Suite 3900
(713) 754-6701

Galleria

Julie Hardie
Seismic Exchange, Inc.
1776 Yorktown, Suite 500
(713) 623-8300



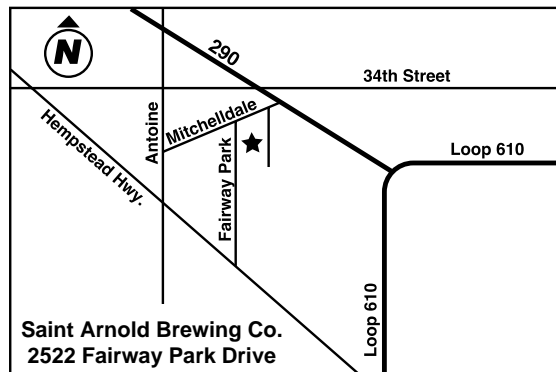
West

Brian Anderson/Sarah Murphy
LCT, Inc.
1155 Dairy Ashford, Suite 500
(281) 558-8383

Event Chairpersons

Matt Bognar
Digicon
(713) 512-8510

Tim Hartnett
BHP Petroleum
(713) 961-8346



Refreshments

Music

Dancing

NORTH HARRIS COLLEGE

GEOSCIENCE TECHNOLOGY TRAINING CENTER

FALL 1997 COURSE SCHEDULE

OCTOBER

COMPUTER WORKSTATION MODELING: AVO

24 hours

This course deals with the analysis of Amplitude Variations with Offset (AVO) and post-stack amplitude inversion. Topics will include seismic data processing and displays, forward modeling using well log data, synthetic models, and model-based inversion methods utilizing well logs and NMO velocities, and seismic trace attribute extraction.

CGTTC 2B011 NN002 S 10/11- 10/25 8:00 a.m. - 5:00 p.m. WNSP 261

RESERVOIR ENGINEERING II

24 hours

The geoscientist will continue the study of reservoir engineering concepts covered in Reservoir Engineering 1, including: capillary properties of rocks, relative permeability, PVT behavior, fluid sampling, multiphase flow, and mobility ratio. In addition, classic reservoir engineering equations will be presented, including the instantaneous GOR (Gas Oil Ratio) equation, fractional flow equation and material balance. Behavior of oil and gas reservoirs will be discussed, including: dry gas, wet gas, retrograde gas, volatile oil, and black oil.

CGTTC 2H012 NN021 T/TH 10/14 - 11/6 6:00 p.m. - 9:00 p.m. WNSP 207

WORKSTATION INTERPRETATION: SEISMIC MICRO TECHNOLOGY

24 hours

Students will utilize 2d/3dPAK seismic interpretation software to interpret a seismic data set on PC's. Students will interpret faults, horizons, create time slices, polygons, create various vertical seismic displays, and manipulate colors using a variety of workstation viewing options and utility functions.

CGTTC 2E071 NN017 S 10/18 - 11/1 8:00 a.m. - 5:00 p.m. CMED 207

GEOGRAPHICAL INFORMATION SYSTEMS: ENVIRONMENTAL

24 hours

This **PC based** course will study the applications of GIS and ARC/INFO software to study such environmentally important issues as ground water flow and contamination, waste management, air pollution, and how to identify and track such problems through map generation and data-base management.

CGTTC 2C021 NN005 M/W 10/20 - 11/5 6:00 p.m. - 10:00 p.m. CMED 207

GEOLOGICAL INTERPRETATION: STRATWORKS

24 hours

This course deals with the interpretation of geological data using a UNIX workstation. topics will include the use of well logs and log correlation, construction of cross-sections, mapping of geological data, horizon interpretation, and map editing.

CGTTC 2E021 NN009 T/W/Th 10/21 - 10/23 8:00 a.m.- 5:00 p.m. WNSP 261

WORKSTATION INTERPRETATION: SEISWORKS

24 hours

Students will utilize a UNIX workstation, LANDMARK SeisWorks and 3D seismic data to interpret faults and horizons, create time slices, and contour maps using a variety of workstation viewing options and utility functions.

CGTTC 2E051 NN014 T/W/TH 10/21 - 10/23 8:00 a.m. - 5:00 p.m. WNSP 261



NOVEMBER

GIS: REMOTE SENSING I

24 hours

This course will introduce students to the basic fundamentals of remote sensing and the growing role of this technology in industry through lecture, lab activities, demonstrations, and team exercises. Emphasis will be on practical, real world applications including petroleum exploration, environmental monitoring, oceanography, land use mapping, and new uses for remote sensing. This introductory class is not computer-based.

CGTTC 2C031 NN006 S 11/1 - 11/15 8:00 a.m. - 5:00 p.m. WNSP 165

UNIX FOR THE WORKSTATION SCIENTIST

24 hours

Introduction to the use of UNIX as a tool for workstation manipulation and improved project management. Topics include basic Unix architecture and concepts of shells, filesystems, directory paths, and client/server relationships in addition to basic UNIX commands. Experience with keyboard and "mouse" manipulation recommended. This is NOT UNIX for dummies.

CGTTC 2D011 NN025 S 11/1 - 11/15 8:00 a.m. - 5:00 p.m. WNSP 261

GEOPHYSICAL DATA LOADING: SEISWORKS FORMAT

24 hours

This course will cover the basic methods for loading 2D and 3D seismic data from tape into a project, or projects created to receive these data sets. This course will discuss seismic tape formats, quality checking data, scaling and clipping data for the final load, bit integers, time slice generation, and other topics relevant to 2D and 3D seismic data loading in Landmark format.

CGTTC 2L011 NN023 M/W 11/3 - 11/19 6:00 p.m. - 10:00 p.m. WNSP 261

GEOLOGICAL INTERPRETATION: STRATWORKS

24 hours

This course deals with the interpretation of geological data using a UNIX workstation. Topics will include the use of well logs and log correlation, construction of cross-sections, mapping of geological data, horizon interpretation, and map editing.

CGTTC 2E021 NN010 T/W/Th 11/4 - 11/6 8:00 a.m.- 5:00 p.m. WNSP 261

EXPLORATION ECONOMICS, AN OVERVIEW

24 hours

This lecture-based course will provide students with a basic understanding of economics and how economics relates to exploration and development project planning. Topics will include the value of money through time, risk assessment, return rates on investments, profit margins, and basic economic definitions and concepts.

CGTTC 2G011 NN019 T/Th 11/4 - 11/20 6:00 p.m. - 10:00 p.m. WNSP 209

GIS: INTRODUCTION TO GLOBAL POSITIONING SYSTEM

24 hours

Global Positioning System uses a specialized instrument to gather location information by tracking a series of satellites. Normally this information is plotted on a map. The system will be explained in lectures, followed by taking the instrument outdoors to collect point and line data on the campus. Better instruments allow one to collect attribute data along with the position data. These data will be turned into maps using one of the mapping software packages.

CGTTC 2C041 NN007 M/W 11/10 - 11/19 6:00 p.m. - 10:00 p.m. CMED 207



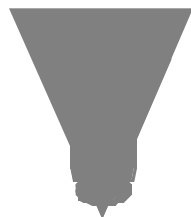
ACADEMIC COURSE

COMPUTER APPLICATIONS IN GEOLOGY

4 hours

A semester-long workstation interpretation course featuring four weeks of UNIX, six weeks of GeoQuest IESX, and six weeks of Landmark SeisWorks geophysical interpretation. Students learn basic UNIX commands and syntax. Students will also interpret two 3D seismic prospects while learning the basic interpretation components of Landmark Graphic and GeoQuest interpretation software. Evaluation is in the form of a written UNIX exam and interpretation skills tests.

GEOL 2404 12001 T/TH Spring/Fall Semesters 6:30 p.m. - 9:20 p.m. WNSP 261



FOR INFORMATION: :

REGISTRATION and GENERAL COURSE INFORMATION:

Community Education Registration Desk: 281-443-5600
Fax: 281-443-5633

COURSE CONTENT or INSTRUCTIONAL SOFTWARE please contact:

Sarah G. Stanley, Coordinator
Geoscience Technology Training Center
North Harris College
2700 W. W. Thorne Drive
Houston, Texas 77073-3499
Telephone: 281-443-5715

Of Course You Can!

The North Harris Community College District provides equal employment, admission and educational opportunities without regard to race, color, religion, national origin, sex, age, or disability.

SEMINAR

INTRODUCTION TO THE INTERNET FOR GEOSCIENTISTS

The Houston Geological Society for Computer Applications Committee is sponsoring an all-day session on the Internet on Saturday, October 25, 1997 from 9:30 to 4:30. This session is designed primarily for people who:

- have been reading about surfing the Internet or getting on the Information Highway but are not sure what information is available to them
- have already gained access to the Internet at some level but find themselves in danger of information overload, or
- are concerned that the Internet would be mainly a time waster for their staff and a security problem for their companies.

Topics and questions to be addressed include:

- What is the Internet really good for? and how can my company use it?
- What services are available for me and how will they benefit my work?
- What do I need to get set up and running? what kind of hardware? software?
- What will it cost? how do I create my own home page?

The speakers are members of the HGS Computer Applications Committee and are experienced in setting up access and using the Internet: ken Aitken, David Crane, Inda Immega and Bill Osten.

The session includes an in-depth, audience-interactive, live demonstration of navigating today's Internet. Each attendee will receive a disk with numerous web addresses to geoscience locations, example home page HTML code and other useful information.

Pre-registration by mail, before October 24, 1997, is \$40 with on-site registration being \$45. Non-HGS members add \$5.00. Lunch is included. There is a limited seating capacity, so interested persons should reserve their places early!

To register, please send the following to the HGS office, 7457 Harwin, Suite 301, Houston, 77036-2190; your name, address, work phone, email address and a check for \$40.00 (Non HGS members \$45.00)

The seminar will be held in Room 904 in the Phillips Petroleum Co. office in the Texas Commerce Bank Bldg., 6330 West Loop So., on the NW corner of Bissonnet and the West Loop (610) South.

For more information on the class, you can contact Bill Osten, (713) 669-2146, or Inda Immega, (281) 544-4706.

OCTOBER 1997

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2	3	4
5	6 AIPG National Meeting	7 AIPG National Meeting	8 AIPG National Meeting	9 AIPG National Meeting	10 GSH Shrimp Peel AIPG National Meeting	11 GSH AIPG National Meeting
12 AIPG National Meeting	13	14	15 GSH Technical Breakfast DP Sig Meeting GSH Board Meeting	16 December Newsletter Deadline	17	18
19	20 GSH Technical Luncheon	21	22	23	24	25 HGS Internet Seminar
26	27	28	29	30	31	

GEOPHYSICAL SOCIETY OF HOUSTON

7457 HARWIN DRIVE, SUITE 301
HOUSTON, TEXAS 77036
(713) 785-6403



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